DESIGN DRIVEN INNOVATION: ENHANCING IDEA QUALITY IN FRONT END IDEA GENERATION PRACTICES IN LARGE MULTINATIONAL COMPANIES (MNCs)

MARTA PEREZ GARCIA

PhD 2016

DESIGN DRIVEN INNOVATION: ENHANCING IDEA QUALITY IN FRONT END IDEA GENERATION PRACTICES IN LARGE MULTINATIONAL COMPANIES (MNCs)

MARTA PEREZ GARCIA

A thesis submitted under the requirements of Birmingham City University for the degree of

Doctor of Philosophy

Faculty of Art, Design and Media (ADM)

July 2016

ACKNOWLEDGEMENTS

I would like to thank my supervisor Professor Simon Bolton for his continuous support, his marvellous way of pushing me to improve myself, to help me overcome the challenges along the way and whose teaching and advice will never be forgotten. His motivation and enthusiasm have made this journey a great adventure. Thank you Simon!

I would also like to thank Dr Lawrence Green, whose advice and guidance has been essential in this study.

Thanks to my parents, who have always encouraged me to follow my path and chase my dreams.

Last but not least, my deepest gratitude to my partner Oscar, who has been my biggest motivator in times of strength but also of weakness. He has never stopped demonstrating his kindness along this challenging journey and has never complained about it. I could not think of a better partner.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Abstract

This study is framed within the context and knowledge that companies tend to struggle when generating high quality ideas in Front End Innovation practices. Generating, evaluating and selecting good ideas require appropriate people, knowledge, tools and skills: in short, a successful idea management process. Unfortunately, this is something that many organisations still lack. Furthermore, it is widely recognised that ideas are crucial for innovation, but many organizations investing in the latter have trouble generating quality ideas that move beyond incremental and me-too offerings, implementing them and turning them into successfully commercial products and innovations. Although these issues are not new, they have not yet been adequately addressed. A second key issue and tension that underpins this study is the 'relevance of idea quality' versus the 'generation of a large number of ideas' without clear evaluation criteria. Clearly, the quality of ideas should be a core concern for organisations. However, this is an issue that can be downplayed, and some firms promote creation of a multiplicity of ideas, even though the latter frequently lack focus, and result in ephemeral and tangential concepts that cannot be translated readily into innovations. The consequences of these practices are currently impacting negatively on the quality of outcomes in frontend innovation (FEI). Awareness of these issues has raised the following question: For what reasons do large organisations struggle to generate quality ideas and how can the process be enhanced?

The main aim of this study is to build upon previous work of organisations such as the Design Council and PDMA, and authors such as Ulrich and Eppinger, Barczack, Stroebe and Diehl and Baeck and Gremett. These institutions and researchers have indicated the importance of generating high quality ideas in order to drive innovation and have highlighted a series of issues around this area. The purpose of this study is to develop a Synthesised Idea Generation Framework that is able to enhance the quality of ideas generated in by addressing weaknesses in FEI.

Several studies provide relevant insights into generic effective practices offering evidence of the benefits of using a formal process, multidisciplinary inputs, planning and establishment of clear evaluation criteria. The research below continues this line of

work but extends the analysis to examine specifically: (1) the importance of generating high quality ideas to achieve business success; (2) the range of practices and tools that MNCs typically use; (3) the effectiveness of those practices and tools; (4) the resources and understanding of FEI practices in MNCs; and (5) the factors that contribute to success and failure in FEI practices in MNCs.

This study is important in two key respects. First, because this research is based on the identification of effective Idea Generation processes supported by appropriate practices and tools. This helps us to understand both current idea generation practices and the key factors impacting on idea quality. Secondly, the study highlights three influential elements in effective idea generation practices: (1) the importance of building creative confidence in individuals and teams; (2) the importance of planning and preparing for innovation in order to transform data into insights and insights into innovative solutions; and (3) the importance of the role of the group facilitator in delivering effective idea generation sessions.

The research was undertaken in three phases. The initial phase involved a series of scoping interviews in one of the sample companies. The second involved the development of a series of exploratory case studies in relation to different types of innovation projects: validating the potential of a given idea, identifying the potential of a given technology, activation of an existing identified idea pipeline and generating ideas to increase new business opportunities. Following the data analysis, a third phase of ‘validation’ was undertaken via deployment of two additional case studies. These were designed to determine the validity of the results when generating new value proposition ideas to boost a specific innovation pipeline. Main findings from this study include the identification of key factors that influence idea quality, key issues in idea generation practices, and key issues in design driven innovation practices (NPD and FEI).

This study provides a contribution to new knowledge by establishing that MNCS do not typically have an understanding of the key constructs needed to develop a good idea, nor do they spend enough time in preparing to generate ideas. It unpacks and details the (1) factors that impact on Idea Quality in Front End Innovation in Large Multinational organisations and develops (2) a Synthesised Idea Generation Framework that helps to

enhance Idea Quality. Furthermore, this study maps state-of-the-art research in this field and suggests an agenda for future investigations to stimulate and support the importance of establishing a structured idea management process in order to drive innovation outcomes.

Keywords:

Front End Innovation, Idea Generation Practices, Idea Quality, Design Driven Innovation.

Introduction

The aim of the introduction section is to set out and explain the rationale behind the study. It will underline the chronology of the study, outline the how and why the research was implemented and demonstrate why the study is very relevant today. The objective of this chapter is to detail the focus of the investigation and to explain the presentation and structure of the dissertation for the reader. It will discuss the following issues:

- Chronology of the Study
- Context
- Key Players
- Identified Gap
- Contribution
- Focus of the Study
- Review of Theory: A Commentary
- Research Questions
- Methodology and Operationalisation
- Data Collection and Analysis
- Findings
- Analysis and Discussion
- Conclusion

CHRONOLOGY OF THE STUDY

Prior to undertaking this study, I was working as a practitioner and needed to consider the contingencies of combining a full-time PhD study and my professional practice. However, it was precisely my professional career that triggered the interest to deepen my knowledge of Front End Idea Generation. My practice in industry was moving from a pure design emphasis into a more strategic research driven approach. The core objective of undertaking this PhD was to establish a robust knowledge of theory across the topics of Front End Innovation and Idea Generation practices. This understanding aimed to interweave with my professional practice, building up my applied analytical and writing skills. Due to a full-time commitment to this study, my academic career has developed rather rapidly in detriment to my professional practice, which I have developed more slowly during these three years of investigation. Academically I have developed an interest in publishing in well-established conference proceedings in order to develop my academic capabilities and to strengthen my academic writing, which represented a key aim in this study. Professionally, I have had the opportunity to build my theoretical knowledge into practice-based projects across my PhD, which has helped me to translate theory into practice and vice versa. This aspect has also raised the acknowledgment of relevancy of the topic both in theory and practice. Therefore, my studies could be described as both timely and relevant within the MNCs context it was being undertaken. For instance, the lack of understanding of what it takes to develop a good quality idea. This problem was especially surprising, giving the significant publication of studies such as Barczack et al (2009) have highlighted the importance of an effective idea management process to achieve business success.

CONTEXT

This research study is placed within a context in which there is a clear recognition that ideas are important for business success and the benefits of creating and developing a systematic process to generate a stream flow of quality ideas to feed into the organisations' innovation pipeline. Research has established idea generation and idea quality are the main route to accelerate innovation capabilities in large organisations (Koc and Ceylan, 2007; de Bono, 2007), however, as a design researcher and practitioner working with large corporations I have observed many organisations struggle to generate quality ideas (Christensen, 1997; Ahuja & Lampert, 2001; Levitt, 1963; Staw, 1990). Furthermore, the root of this issue is, in fact, a lack of understanding of what constitutes a good idea and how can idea quality be defined, measured and evaluated (Dean et al, 2006; Bjork and Magnusson, 2009; Reitzig, 2011). These issues impact on the uncertainty of outcomes during idea generation practices.

The importance of implementing an effective Idea Generation process within Front End Innovation is not a new issue, however, it has not been addressed. This study focuses on the need highlighted by Barczak et al, (2009) for the necessity to balance 'systematic' (very strict and disciplined processes that can constrain creativity) and 'reflective' practices (free thinking activities in which participants rely on their own experiences and knowledge instead of a process or methodology) in idea generation processes in front end innovation. Imbalances currently exist due to current approaches becoming more systematized (Bolton, 2014). The consequences of these changes are currently impacting negatively on the levels of creativity in front end innovation (FEI) (Barczak et al., 2009). So what are the reasons behind the struggle to generate quality ideas and how can the process be enhanced?

This question highlights the importance and relevancy of this investigation. In spite of the numerous rigorous studies (Koc and Ceylan, 2007, Barczack et al, 2009; and Kenneth, 2013) that promote the importance of Idea Management for successful innovation, as well as the number of organisations that have adopted it (IDEO, 3M, Procter & Gamble) there is still a need for investigation of this matter to understand the functioning of relevant processes and to order improve their effectiveness.

KEY PLAYERS

This study focuses on building upon the research of key organisations such as the PDMA (Product Development and Management Association) and the Design Council, and authors such as Ulrich and Eppinger (1995), Barczack (2009) and Koc and Ceylan (2007). These researchers have investigated the benefits idea management has on business growth and more importantly, how ideas are the engine for innovation. They also highlight the way organisations are currently undertaking these kind of practices, the tools and processes they use in order to generate quality ideas.

IDENTIFIED GAP

There are several key studies that have suggested effective practices in New Product Development (Barczak et al., 2009) and more specifically in Idea Generation (Girotra et al, 2010). However, what appears not to have been undertaken is a detailed study on how idea quality can be enhanced in Front End Innovation activities, considering the factors that impact on and influence the idea generation and selection setting practices. Therefore, the objective of this study is to identify the key constructs that can help contribute to the development of a Synthesised Idea Generation Framework that helps to improve the quality of ideas generated by reducing uncertainty and maximising effective practices in FEI. More specifically, this investigation aims to: (i) identify and evaluate the critical factors that impact on idea quality in Front End of Innovation idea generation and selection activities in large multinational companies (MNCs); (ii) examine the effectiveness and weaknesses of current methods and approaches that multidisciplinary teams in large MNCs typically deploy when generating and selecting ideas; (ii) create, develop, test and validate a new framework that address identified weaknesses along the study; and (iv) demonstrate how improved idea generation practices at both individual and team level can impact on idea quality.

The value of this study relates to the importance of creating, developing and implementing effective Idea Management processes, advocated by organisations such as the PDMA. Secondly, from a research point of view, this study will build upon previous research in order to contribute to new knowledge around the insights in idea generation and selection practices by blending theory effective practice and practice adoption.

The study will focus on addressing the identified dysfunction between over structured and unstructured practices (Murphy and Kumar (1997); Brennan and Doodley (2004); Barczak et al, 2009). The intention is to identify the underlying factors that impact on idea quality in Front End Innovation (FEI). It will therefore balance systematic practices (that generate a stream of valid ideas lacking creativity) and reflective practices (that generate creative ideas but not aligned to business objectives) in multidisciplinary teams in large corporations through exploratory methods and tools, specifically in MNC companies.

CONTRIBUTION

The study will address these issues and make a contribution to new knowledge by focusing on understanding and exploring the key constructs that enhance idea quality in Front End Innovation practices within a MNC setting. It aims to understand the factors that impact on idea quality in FEI activities in UK MNCs, in particular telecommunication companies, and develop a new Synthesised Idea Generation Framework in order to address gaps in current knowledge and practices. To do this the investigation draws upon the work of Ulrich and Eppinger (see Table 1), who established a Concept Development Framework that makes a special focus on the generation, selection and refinement of concepts that come from collected and analysed data. This model represents the starting point for the generation of a new Synthesised Idea Generation Framework.

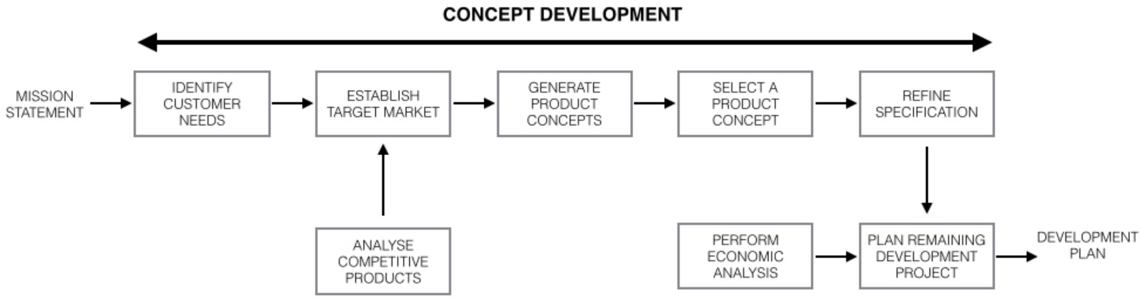


Table 1 Front-end Product Development Activities – Concept Development Stage (CDS), Ulrich and Eppinger (1995) p.35

FOCUS OF THE STUDY

The focus of this study is on Front End Idea Generation practices within New Product Development context. This is the reason that Ulrich and Eppinger's (1995) Concept Development Stage (CDS) has been established as the basis for the conceptual framework. The core activities within the CDS process that are crucial for this study are: data collection and analysis and idea generation, selection and development. This investigation considers a wide range of activities and methods to achieve this, which is further explored across previous studies. Consequently, this study focuses on shedding light onto how idea quality could be enhanced in Front End activities within a MNC New Product Development context in order to increase the value of ideas to a business. Within Front End Innovation stage, Idea Quality is related to the creation, development, evaluation and selection of a set of ideas that comes from the identification of user insights and it is utilised through a series of supporting tools in order to maintain the thread across the entire innovation process. This study will focus on identifying the strengths and weaknesses of current Idea Generation and Selection practices and how they can be brought together and embedded into a new framework to improve Idea Generation practices.

This study follows a multi-trajectory literature approach that focuses on the following themes: (i) idea quality, (ii) idea generation and selection and (iii) Front End Innovation (FEI) within NPD. The previous section has indicated the identified gaps in knowledge, both from theory and practice, and the focus and research questions within this study (see Table 2).

Principle Research Questions	Core Concept Development Stage Activities
1. Critical Factors that impact on Idea Quality	Identification & Collection of User Needs
2. Effectiveness and weaknesses of current Idea Generation and Selection methods	Establishing Target Markets
3. Key tools to generate high quality ideas	Evaluation of Competing Products
	Generation of Product Design Requirements /Specifications
	Generation & Selection of Product Design Concepts

Table 2 Principle Questions and CDS Activities

The rationale for embracing this multi-theme approach is the emerging importance of Idea Management within New Product Development practice and the significance of generating high quality ideas in order to increase business value and leverage the market.

Building upon the exploratory nature of this study a framework has been developed (See figure 1) to align Ulrich and Eppinger (1995) key Concept Development Stages to the three key questions being investigated within the study, overlaid with the specific issues and concepts that this exploratory study will focus on. By undertaking an inductive reasoning approach, a series of issues have been identified which have helped to establish the basis of the core questions of this study.

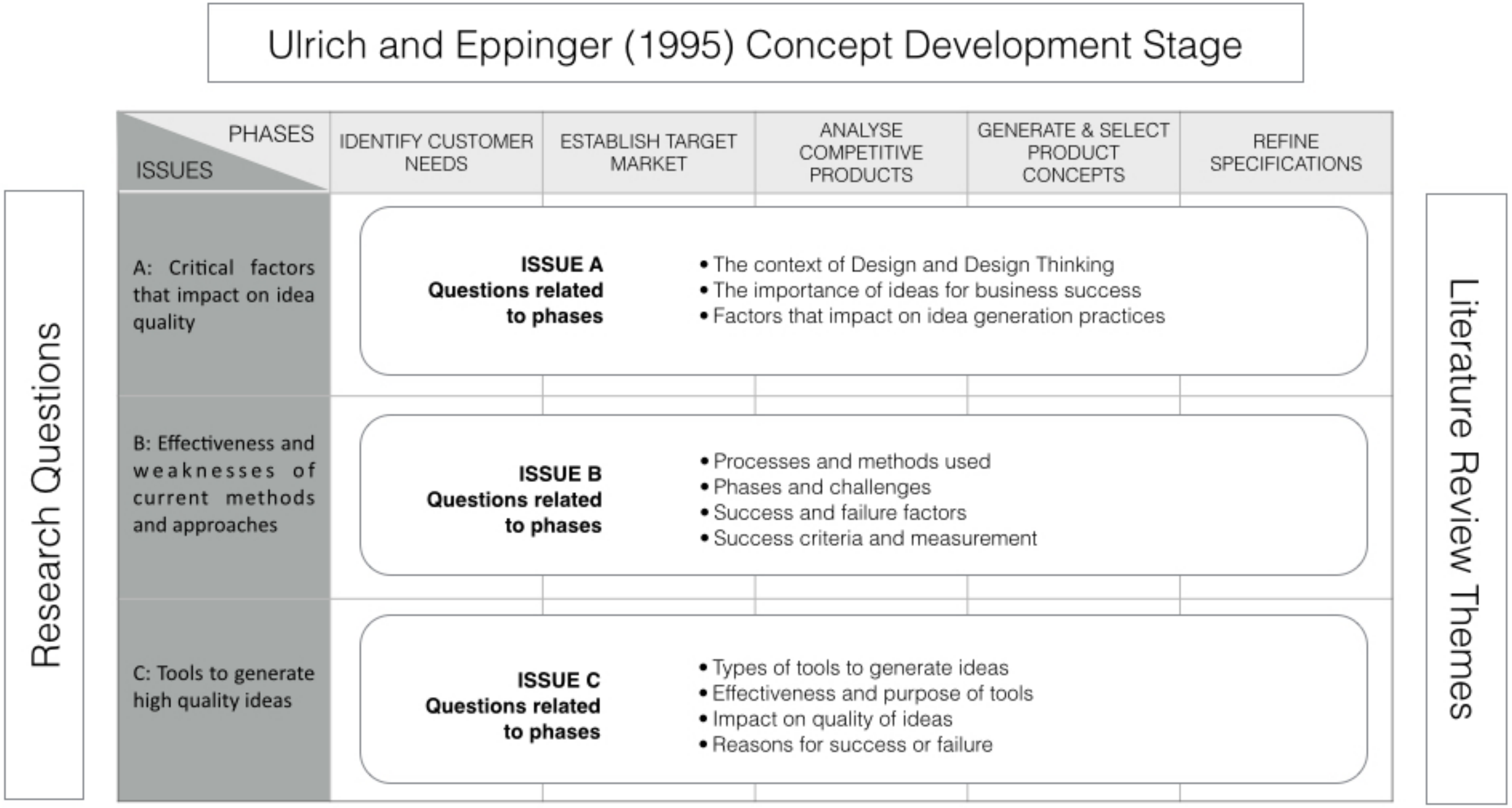


Figure 1 PhD Investigation Framework

REVIEW OF THEORY: A COMMENTARY

This study embraces Boland and Collopy's (2004) statement that the quality of ideas are a key driver of business value and that a lack of good quality idea generation is a key reason of failures in NPD management. This exploratory study has adopted a multi trajectory theme investigation due to the need to understand both the individual nature and the interrelationship of the issues (quality), activities (FEI/idea generation) and outcomes (value) that impact on Boland and Collopy's (2004) observations.

More specifically a multi trajectory approach will aim to help to identify: (i) the advantages and disadvantages of current practices and (ii) the factors that are impacting on both idea generation practices and idea quality in Front End Innovation activities within a MNC setting. This approach was therefore considered an appropriate way to structure the investigation as it aims to help to explore the gaps in knowledge and key factors impacting on Idea Quality, triggering a series of findings contrasted both in literature and practice in order to identify patterns by establishing appropriate research methods (Robson, 2011).

The aim of the literature review chapter is to trigger a critical understanding of the context around idea management in front-end new product development activities. In order to achieve this objective, the literature review focuses on five key thematic areas:

- The importance of Ideas for Business success
- The factors impacting on the dynamics of New Product Development
- Factors influencing Idea Generation practices
- Decision Making in Front End Innovation
- Tools and Practices in Idea Generation

The literature review aims to establish the emerging issues gathered from multiple sources and summarise a series of emergent themes within each topic to demonstrate the importance, relevancy and timeliness of this research study.

RESEARCH QUESTIONS

The critical analysis of the emerging themes from the literature review, such as the importance of idea generation in new product development, current methods to generate and select ideas and the critical importance of generating high quality ideas, has enabled the identification of three core research questions, and a set of sub-issues within each:

(RQ1) *How can Front End Idea Generation practices in Multinational Organisations be enhanced to improve (a) the quality of ideas generated and their (b) alignment to business objectives?*

Sub-issues explored in relation to the question:

- Highlighting the importance of undertaking effective Front End Innovation activities to help generate high quality ideas.
- Determining how frequently MNCs undertake Front End Innovation Processes and Methods to understand its impact on the quality of outcomes.
- Identifying what are the reasons for Success & Failure in Front End Innovation practices to establish both best practices and aspects to avoid.

(RQ2) *What are the strengths and weaknesses of current methods and approaches in Idea Generation and Selection practices?*

Sub-issues explored in relation to the question:

- Identifying the advantages and disadvantages of current Idea Generation and Selection practices to aid understanding of their usage, purpose and performance.
- Determining the frequency of engagement in Idea Generation and Selection practices and the impact this has on teams and outcomes.
- Determining the typical nature of Idea Generation and Selection practices (formal or informal) in Front End Innovation.

(RQ3) *What are the critical factors that impact on Idea Quality?*

Sub-issues explored in relation to the question:

- Establishing what constitutes a ‘high-quality idea’ and what evaluation criteria are applied in assessing Idea Quality in MNC’s Front End practices.
- Identifying current effective processes and methods used to evaluate Idea Quality.
- Determining the current nature of idea evaluation practices (formal or informal) and the impact of this on Idea Quality.

METHODOLOGY AND OPERATIONALISATION

This is an exploratory study concentrating on a focused sample, deploying a qualitative methodological approach. It aims to gather rich data and in-depth understanding of Idea Generation participants' attitudes, perceptions and beliefs (Denzin and Lincoln, 2005). Unpacking these perceptions will help understand how the process, practices and outcomes influence behaviours. From these learnings, the objective is to develop a conceptual framework that will help enhance idea quality during FEI practices.

By carrying out a series of actual NPD projects in the sample organisations, this study will be able to examine the strengths and weaknesses of current processes, practices and outcomes in NPD projects and Idea Generation sessions in order to evaluate their effectiveness in pursuing high quality ideas. This will help to answer the research questions as well as will help to develop and develop a Synthesised Idea Generation Framework that brings together effective practices and will be able to improve the quality of outcomes in Front End Idea Generation practices.

The data will be gathered via: observation, field notes, interviews and analysis of documents and materials (Marshall and Rossman, 1998) that will build up a series of case studies. The approach will be naturalistic and interpretivistic (Guba and Lincoln, 2005) aiming to achieve rich data that will provide a deeper understanding of Front End Idea Generation processes.

This study will adopt a blended approach of reflective and systematic practices observed form other studies (Bolton, 2014), in order to help identify the key points in which teams experience uncertainty and complexity, therefore an opportunity to develop strategies and tools to address them.

DATA COLLECTION AND ANALYSIS

The articulation of this exploratory research study is split into three main steps: (1) data collection, which is based on gathering rich data from the sample organisation processes, practices and tools used; (2) analysis of the factors that are currently impacting on Idea

Generation Quality in order to determine where the core issues are focused; and (3) synthesising current effective Idea Generation methods into a coalesced framework.

This empirical study is built on a Case Study model. The case study methodology has been the chosen research strategy for this project for two reasons: (1) this is an exploratory research study that will offer the opportunity for a more precise subsequent investigation (Miles, 1979; Herbert, 1990: 19) and (2) because it will explore the 'how' and 'why' of a current real life phenomenon within a specific context (Yin, 2003), in this case Idea Generation Quality in the context of Front End Innovation Projects, through the use of a series of visual templates to obtain the maximum information on opinions, session feedback, outcomes achieved, strengths, weaknesses and key learning.

As with most case studies, there is a combination of methods and sources of information used besides theory (Denzin, 1978), which in this case relates to observation and interviews.

By combining scoping interviews, observation and field notes, which build upon the case studies, this investigation's aim is to gather rich data that will provide a solid base for data analysis and decoding that will help to build a robust framework to understand the factors impacting on Idea Generation Quality in FEI. The final stage of this study will test the tools and methodology with a larger sample of participants to validate the efficacy and value in a multiple organisation setting.

The data analysis for this study is based upon a blended approach (Bolton, 2014) that combines several methods of analysis. It adopts a structured approach to analysing large data sets by mapping all the informants' responses and information against defined parameters and themes in order to identify commonalities and differences (Braun and Clarke, 2006). These large data maps will highlight the core issues to be further explored. Due to the nature of this exploratory study and its early stage, the chosen approach has been inductive reasoning as it is an open-ended approach to data analysis. This reasoning comes from the premises: observation, interviews and case studies ending up in a series of preliminary conclusions based on gained knowledge (Herbert, 1990: 19). The analysis from interviews will feed back into the ideas to build the tools and methods, testing the accuracy of the outcomes.

FINDINGS

The findings chapter present the achieved results from the case studies. It will go through the main areas of research, such as strengths and weaknesses of processes, practices of NPD projects and Idea Generation sessions; the factors that impact on Idea Generation Quality and how can they be enhanced by the Synthesised Idea Generation Framework. This chapter is divided into three main sections that address the three research questions: (1) processes and practices in FEI; (2) Level of involvement in Idea Generation and Selection Activities; and (3) Idea Quality in Front End Practices. Each of these sections will explore and summarise the main findings as well as discuss emerging issues in the field from the case studies, such as the importance of undertaking effective front end innovation activities, what are the frequent FEI processes and methods in MNCs, reasons for success and failure in FEI practices, as well as frequency, effectiveness and nature of idea generation and selection practices. Lastly, it will determine the findings around the role of Idea Quality in FEI, more specifically the importance of Idea Quality in MNCs Front End practices, the current processes and methods to evaluate idea Quality and the nature of current Idea Quality practices.

DISCUSSION

The Discussion chapter analyse in detail the emerging themes from the findings and how they contrast with, support or extend previous published studies in the field. It will therefore link the results from the data collection and analysis to the findings in the literature review. It will focus on four main areas around the development, testing and validation of the Synthesised Idea Generation Framework: (i) bringing together key established Design Driven Innovation processes and practices; (ii) Processes and methods undertaken to generate and select ideas; (iii) The key factors that impact on Idea Quality; and (iv) the need for the Synthesised Idea Generation Framework. The discussion will point out that MNCs see the importance of ideas for business success but fail to acknowledge what it is needed (preparation, resources and time) to develop a good idea. This supports the research on PDMA effective practices study (2009), which highlights the raising importance of ideas as a key competitive advantage to drive innovation and successful outcomes. The discussion will also indicate that the sample companies lacked a systematic process to generate and evaluate ideas within their Front End Innovation activities. It was repeatedly observed within the study that these practices tend to be undertaken in an informal and unstructured manner often leading to unsuccessful outcomes.

CONCLUSION

The conclusions of this exploratory study will return to the research questions in order to shed light onto the way the findings help to address the identified gap in knowledge (i.e. how do MNCs carry out idea generation and selection practices and what are their NPD and FEI processes and models). The conclusion will also set-out key learning points, both from theory and practice, from this study, and connect these with several themes. It will indicate a series of issues around the building of the Idea Generation Framework such as principles behind it, reasons for success when using the Framework and the conclusions from their implementation in this study. However, this chapter will also shed light onto the factors that influence Idea Quality, the constructs needed to develop a ‘good idea’, and how the Synthesised Idea Generation Framework is able to address issues in theory and practice to improve idea quality. It will close with a discussion of the limitations of the study and future research opportunities.

1 Ideas, Innovation and Business: The State of the Art

1.1 The Importance of Ideas for Business Success

Introduction

This section is designed to put in context emergent themes, key authors and journals that have contributed to this topic development with respect to the importance of ideas for business success in current literature. The following section explores four trajectories and culminates with a summary:

- The Concept of Creativity
- Design and Design Thinking
- The value of Design practice today to Business Success
- The importance of Ideas to Business Success
- Summary of Emergent Issues

1.1.1 The Concept of Creativity

The literature presents a diverse range of complex views on creativity. For example, De Bono (2007) presents the notion of creativity as derived from the word ‘create’, which means to set up something with value that did not exist before, by which creativity can be defined as bringing into existence something that has value (Process). On the other hand, Ford (1995) claims that there is a consensus between creativity definitions that refer to creativity as something that is novel and useful (outcome). However, these descriptions seem to be very broad, as they do not relate to a specific context, objective or situation (definitions switch from process to outcome). Nevertheless, Amabile (1988) narrowed the concept of creativity within an organizational context of products and ideas, describing creativity as the “production of novel and useful ideas”, which was highly adopted and cited by other authors (Ford, 1996; Woodman et al., 1993). This definition of creativity offered a new angle of value and relevancy to organizations’ business objectives (Cummings and Oldham, 1997). Continuing with the attribute of usefulness, given by Amabile (1988), an idea is considered useful when is able to comprise the prerequisites of a proposed situation or it can solve a problem (MacKinnon, 1978).

Amabile (1993) linked Creativity to motivation (within the workplace) by defining it as the act of looking for satisfaction, curiosity, interest and challenges at work; as when someone gets bored or not motivated at work, it will be rather difficult to make a creative contribution (Csikszentmihalyi, 1988). Multiple authors have identified a series of common characteristics attributed to individual creativity: (1) personality, which is a given factor and it refers to the person idiosyncrasy, which is not a very robust variable; (2) intrinsic motivation (Amabile, 1996; Woodman et al., 1993; Ford, 1996); (3) expertise as prior knowledge, which has been argued to be a requirement for creative action (Weisberg, 1999), which helps the individual to solve a problem or carry out a task, hence it is believed crucial to have a certain experience in a function to produce creative work (Taggar, 2002). Muñoz et al (2008) build upon this by suggesting cognitive style determines the degree of flexibility and imagination that people have in order to face up to their problems.

According to Kaufmann (2004), there are two different kinds of creativity: proactive and reactive. He argues Kirton's (1976) theory of styles of creativity divides people into *innovators* or *adaptors.* Kaufmann suggests a partial model for creativity in which people that are presented with a familiar problem-solving situation and given a series of limitations are able to deliver novel ideas, he calls this *proactive creativity*. However, Kaufmann does not address what happens when people are given an unfamiliar situation**.**

This section has linked the concept of creativity to the organisational context shedding light on the close linkage between creativity and idea generation, highlighting the need to enhance people's creativity to impact on their generation of relevant ideas (Amabile, 1988).

CREATIVE PROBLEM SOLVING

Over the last fifty years, research has shown a wide range of models and processes to tackle Creative Problem Solving (Osborn, 1953; Parnes, 1967; de Bono, 1973; Isaksen et al, 1992; Lewin, 1998; Treffinger, 2000). This section will discuss a series of models due to their focus on practices and activities around idea generation. The perceived purpose of Creative Problem Solving is to solve problems, however, as a process there has been an almost constant evolution from an explicit process (Osborn, 1956) to educational programs (Parnes, 1967) to focusing on the people in the process (1985), to breaking down the process (Isaksen et al, 1992), through to describing the process (1992) and to integrating problem solving models into frameworks (1994). Consequently, it appears to be an evolution in the models going from a process driven approach to considering other factors such as people involved and its integration in a wider context.

Osborn was the precursor of Creative Problem Solving as he acknowledged its importance back in 1940s and developed multiple models demonstrating the importance of his theories. Osborn expanded the principles of the Creative Problem Solving process in his book Applied Imagination, which adopts a behavioural science approach (Hughes, 1999). He closely linked Brainstorming and Mind Mapping as appropriate techniques to include in the Creative Problem Solving process. However, he did not explore this issue alone but with Dr Sid Parnes, who joined the Creative Education Foundation in 1955 founded by Alex Osborn to develop educational programs at the Creative Problem Solving Institute (CPSI). Osborn developed the concept of Creative Solving Process (CPS) to generate solutions to given problems (Hurson, 2007) and explored these themes further in 1967 with this colleague Parnes.

Osborn (1953) established two approaches to Creative Problem Solving (CPS) in his book Applied Imagination: (1) Descriptive and (2) Prescriptive. The first relies on a flexible framework and is based on an individuals' own experience while the prescriptive approach has targeted outcomes and is based on the expertise of participants. In his revised edition of Applied Imagination (1963), Osborn rationalises the CPS model from seven stages into three core activities: fact-finding, idea finding and solution finding (See table 3). His work around these models suggested that creativity could be developed as a talent, especially in the field of education.

Osborn's Creative Problem Solving Process		
Seven Step (1953)		Three Stage (1963)
1. Orientation	Pointing up the problem	1. Fact Finding: problem definition and preparation
2. Preparation	Gathering pertinent data	
3. Analysis	Breaking down the relevant material	2. Idea Finding: Idea Generation and Idea Development
4. Hypothesis	Pilling up alternatives by way of ideas	
5. Incubation	Letting up to invite illumination	
6. Synthesis	Putting the pieces together	3. Solution Finding: Evaluation and implementation of solutions
7. Verification	Judging the resultant ideas	

Table 3 Creative Problem Solving Process by Osborn

The writers and researchers in Creative Problem Solving were often in touch with each other or collaborated together on research. For instance, in Tables 4 and 5 there is a mapping on the different CPS models created by Parnes, in collaboration with Osborn (1967) and with Noller and Blondi in 1977. However, Parnes's research within the Creative

Problem Solving process builds upon Osborn's by employing divergent thinking techniques during idea generation in Brainstorming and convergent thinking, narrowing down to the best idea to solve the given problem.

Parnes's Creative Solving Process		
Five Stage (1967) Osborn and Parnes	Spiral CPS model (1967)	Visionizing Model (1988)
1. Fact Finding	Mess is the starting point 1. Fact Finding 2. Problem Finding 3. Idea Finding 4. Solution finding 5. Acceptance Finding New Challenges is the end point	1. Problem Finding 2. 2. Fact Finding 3. DESIRES 4. Acceptance finding 5. Solution finding 6. Idea finding 7. Problem finding 8. Fact finding 9. DESIRES 10. Acceptance finding 11. Solution finding 12. Idea finding 13. Problem finding 14. Fact finding 15. DESIRES
2. Problem Finding		
3. Idea Finding		
4. Solution Finding		
5. Acceptance Finding		

Table 4 Creative Problem Solving Process by Parnes

Noller, Parnes and Blondi's Creative Problem Solving process (1977)										
Problem sensitivity	Mess or objective	Fact finding	Problem finding	Idea Finding	Solution finding	Acceptance finding	*Plan*	*Action*	*New Challenges*	*Etc*

Table 5 Creative Problem Solving Process by Noller, Parnes and Biondi

While Osborn simplified the stages of the CPS, the other researchers tended to add more stages and complicate the process. Nevertheless, in the 1990's Isaksen (1992) developed a similar process to Osborn three stages CPS (1963), which focuses on understanding the problem and generating ideas to tackle it. However, the third stage differs from Osborn's, while Isaksen focuses on the implementation planning, Osborn's approach highlights the importance of the evaluation of the solution before its implementation.

Isaksen et al Creative Problem Solving process		
Components of CPS (1992)		
1.Understanding the problem	2. Generating ideas	3. Planning for action

Table 6 Creative Problem Solving Process by Parnes

Some of these models have been the basis for future studies in Design Driven processes, such as Hughes (1999), who explored three different processes for design methods that would enhance innovation strategies, which suggests a strong link between the two of them. The first one relates to Osborn and Parnes (1967) Creative Problem Solving where he splits the process into six stages (1) identify a goal, wish or challenge; (2) Gather data; (3) Clarify the problem; (4) Generate ideas; (5) Select and strengthen solutions and (6) Plan for action. Hughes' study sheds light on the 'fuzziness between the concepts' of Creative Problem Solving and Design Methods.

Key studies suggest that there are four key techniques attributed to problem solving: (1) *Creativity techniques* that help to change someone's mental state into a creative one (Osborn, 1953), for instance, taking a reflection break when trying to coming up with a solution for a long or intense period of time; (2) *Multiple Idea Facilitation techniques* that focuses on enhancing the generation of a large quantity of ideas, which is believed to increase the chances of generating a quality idea (Chohan, 1979); (3) *Change in Perspective techniques* that promotes a change of viewpoint to find the solution to a challenging problem (Osborn, 1953) to differentiate very similar concepts; and (4) *Problem Reframing techniques* that aim to recap objectives that are to be achieved in order to identify new key insights (Vance and Deacon, 1995).

THE CREATIVE PROCESS

One of the first significant researchers to explore the Creative Process was Graham Wallas (1926), a social psychologist who built up a theory around the four stages of the creative process. He developed his theories based on both his professional empirical observations as well investigating the work of other inventors. Wallas's Creative Process includes four activities: (1) preparation which focuses on a thorough investigation and gathering of resources to create a solid base to generate ideas. It comprises research, planning and framing the key issues; (2) The incubation stage is about processing all the elements without trying to fully address the problem. The way Wallas suggests this should be done is by interrupting our thinking and changing to other matters, avoiding finishing our work around the given problem too fast in order to reflect on it. During the incubation stage there is a focus on reflective thinking (Schön, 1983) to absorb information gathered; (3) the third stage, illumination, is based on the work of the French polymath Poincaré (1913), and it seeks to pull together 'the pieces of the puzzle' in order to freely generate quality ideas based upon the culmination of identifying successful associations across the stages; and (4) the verification stage focuses on testing the validation of the idea in order to develop and address weaknesses. What is significant about this model is the relationship input-output activities, the output of every stage represents the preparation for the next one. This approach drives quality of outputs at every stage, highlighting the importance of every stage for the final outcome and is known to current models.

The key insight from this section is the acknowledgment of the fact that almost 90 years ago, the concepts of preparation and evaluation were at the core of the creative process, raising the question: why were these techniques not built upon?

1.1.2 Design and Design Thinking

The establishment of design as a discipline began its journey in the 1960s with Herbert A.Simon as the key precursor. He first spoke about the 'Science of Design' in a lecture he gave in 1968 titled: 'The Science of Design: Creating the Artificial', which triggered his book *The Sciences of the Artificial*. Simon (1968) framed Design in his Science of Design lecture as a search for criteria to achieve a goal, reducing Design into a problem-solving approach. Consequently, drawing attention to how design professionals could play a key role in problem solving. In *The Sciences of the Artificial* (1969) Simon developed a Rational Model of decision-making for problem solving which he defines as a Design theory. It emphasises the impact that external factors have on making rational decisions, which he developed and focused on educational and computer based interactions. He also developed a Design Process (Simon, 1969), which is comprised of seven stages: (1) define, (2) research, (3) ideate, (4) prototype, (5) choose, (6) implement and (7) learn. It is through these series of steps that a problem can be shaped, that associations can be triggered by asking of the right questions, that actionable ideas can be generated in order to provide best potential solutions to a problem.

Building upon these constructs, Krippendorff (1989) proposed one of the first definitions of Design, which parts from the etymology of the word and focuses on what matters to the user rather than any specific side of Design (Verganti, 2008): "The etymology of design goes back to the latin de + signare and means making something, distinguishing it by a sign, giving it significance, designating its relation to other things, owners, users or gods. Based on this original meaning, one could say: design is making sense (of things)". Simon (1996) gave a definition of Design as a holistic process that explores 'what things ought to be', rather than 'what they are' by combining both engineering and management. However, this did not remain as a standard definition of Design, since it did not include social factors (Schön, 1983; Suchman, 1987). While Simon (1996) considers Design as a 'rational problem solving', Schön (1983) juxtaposes this model with his 'reflection in practice' concept, which relies on professional expertise and intuition to solve problems. Therefore, Design Thinking combines both schools of thought by making sense of things through critical reflection in practice by making sense of things.

Over the past few decades, both the meaning of Design and its functions have been explored (Schön, 1983; Suchman, 1987; Simon, 1996) and expanded (Sutton and Hargadon, 1996; Kelley, 2001; Boland and Collopy, 2004; Cross, 2006). However, in terms of universal language, multiple definitions of Design exist. Two key relevant definitions to this study relating to the concept of Design are: (1) According to Cox (2005), Design is creativity put to use with a clear objective - it is also the link between creativity and innovation and it seeks to develop and enhance ideas (Process: strategic and Practices: practical); and (2) Dziersk (2007) who considers Design helps to visualize strategic thinking in order to effectively communicate complex issues (outcome). Therefore, both authors clarify the value of Design for business success, however, while for one Design is a compelling strategic process to achieve innovation-driven outcomes for business growth, for the other Design is only an operational tool whose value lies in the visualisation of complicated issues as an output.

Design as a practice has been linked to a series of different practical activities: …(a) sketching and drawing (Cross, 2006) (practice); (b) experience and object/artefact prototyping, (Kelley, 2001) (process); (c) Brainstorming (Sutton and Hargaddon, 1996) (practice); and, (d) deconstruction of a sketch of a potential solution (Boland and Collopy, 2004) (outcome). Some of these practices, processes and outcomes are woven into idea management activity, and into front-end innovation, and this provides an articulating link for processes and practices. Therefore, Design has transitioned from a conventional-traditional craft process of sketching and drawing towards a strategic thinking orientation that is more attuned to the pursuit of innovation.

It has been argued that Design is a major lever for market leadership, and that it represents a crucial resource for managers as it offers prospects for the inter-weaving of inductive, deductive and abductive reasoning in problem-solving scenarios, and creation of value in evolving business contexts (Hatchuel, 2001). Therefore, Design enables organisations and aids the acceleration of innovation practices.

There has been a constant evolution of the meaning of Design, from a practice to a series of activities or even tools. It has evolved from Design Practice to Design Process to Design Methods, and in the 1990's to Design Thinking. This lack of agreement in Design has triggered a wide range of research studies (Brown, 2009; Collopy 2009). Krippendorff (2006: 209) evolved his definition to refer to design as *'a systematic collection of accounts of successful design practices, design methods, and their lessons, however abstract, codified, or theorized, whose continuous rearticulating and evaluation within the design community amounts to a self-reflective reproduction of the design profession. (...) Its aim is to keep design discourse viable and productive*'. In reality this is more a description of design processes, practices and outcomes rather than a definition. However, this is one of a multitude of definitions given to Design Thinking, Brown and Wyatt (2010) defined it as a "system that comprises the 'process' of inspiration, ideation and implementation of ideas, which relies on intuition, pattern recognition and the ability to express in other way, rather than just words". These two examples reinforce the continual conceptual shift from process, practice and or outcome based definitions, which indicate that there is still no common and or consistent agreed meaning of Design and or Design Thinking.

Lockwood (2010) belongs to a group of authors (Martin, 2007; Brown, 2009; Kumar, 2012) who paid a special attention to Design Thinking in the 2000s when the term started to spread within business. His research explored how to create and implement design thinking practices within organisations in order to drive business success. His work highlights the shift from traditional design practices into more strategic approaches linked to the business field. Borja de Mozota (2011) supports this linkage between design thinking and business. Her work has proved the benefits of working with designers to drive successful management practices. The work of these two authors, along with others such as Buchanan (1992), Kelley (2001) and Boland & Collopy (2004), has helped open and expand the discipline to individuals that do not need to have a design related background to become design-driven leaders (Dunne & Martin, 2006)

Baech and Gremett (2011) claim Design Thinking is not only about solving problems (practice and outcomes) but about defining business challenges and finding new ways to address them by combining empathy, creativity and user feedback (processes and practices). Hence Design Thinking, within the ideation process, has highlighted the importance of customer knowledge in helping to generate holistic solutions that meet user needs and generate revenue.

Nevertheless, there is some discrepancy among some authors about what design thinking means for organisations, unveiling an opportunity to rethink the vocabulary and language that design uses to achieve greater adoption of design within business. It has been suggested that Design Thinking processes and practices (Buchanan, 1992) can enhance performance in multidisciplinary teams (such teams can be defined simply as a group composed by members with a wide range of skills and expertise). The use of visual tools within Design Thinking practices are considered to help members of multidisciplinary teams to understand each other better (Tschimmel, 2012) when dealing with a problem (processes, practices and outcomes). Both insights reinforce the idea that Design Thinking helps make individuals and teams look at problems in a unique way and that it helps make the process of finding solutions easier. Furthermore, Neumeier (2009) considers the success of Design and Design Thinking to be related to the fact that it can help organisations (if deployed effectively) to develop more holistic strategies that seek to increase the number, if not the percentage, of viable options.

DESIGN THINKING PROFILES - DESIGN AS A NEW (OR NOT SO NEW) LENS FOR SOLVING BUSINESS PROBLEMS

In the past few years a series of new emergent concepts have started to influence employee's ways of thinking in business: organizational design, design strategy, etc. (Kimbell, 2009). There has been a shift from encouraging a standard managers mind set to adopting a design attitude (Boland and Collopy, 2004) and designerly behaviour (Dunne and Martin, 2006). Clark and Smith (2008) and Brown and Wyatt, (2010) both support the notion that the way that designers are able to look at problems in unique ways (externalise issues) that they appear to be able to find solutions to problems more easily (visualise routes to solutions).

It is not surprising due to the potential value of design thinking that many have attempted to define the successful characteristics of design thinkers. Therefore, there are several characteristics that have been advocated that Design Thinkers should have. Table 7 shows three sets of capabilities by Brown (2008), the d.school (2009) and Baeck and Gremett

(2011), who all believe that design thinking can be an educated skill, not an innate one, that can be learnt and which managers should able to embed into their daily practices. Buchanan (1992) work focused on identifying what a design attitude entitles and he suggests that it is about bringing a new lens through which to look at wicked problems, which had previously been referred to as ill-defined or tricky problems (Rittel et al, 1973). Therefore, design thinking is not only an attitude or a way to solve problems but an intellectual orientation that instil the empathic qualities of design (Brown and Wyatt, 2010).

Brown (2008)	d.School Bootcamp (2009)	Baeck and Gremett (2011)
Empathy	Focus on human values	Empathy
Integrative Thinking	Show don't tell	Holistic
Optimism	Create clarity from Complexity	Curiosity
Experimentalism	Get experimental	Constructive
	Bias toward action	Open Mindset
Collaboration	Collaborate across boundaries	Collaborative
	Be mindful of process	Ambiguity

Table 7 Attributes of the Design Thinkers, by Author

Among these attributes there are three core constructs that are repeated across authors: (1) *Empathy*, which relates to the ability of adopting a first person approach to considering a project from multiples perspectives such as the user, client, colleagues, manager and customer point of view, suggesting that Design Thinkers are better able to notice things others do not (Brown, 2008); (2) *Experimentation*, driven towards an action in order to explore constraints; and (3) *Cross disciplinary collaboration*. Baeck and Gremett (2011) make two relevant points by highlighting the need for an open mind-set to embrace Design Thinking no matter what industry, size of organisation, scope of the project, level of uncertainty and type of problem. To prepare employees for the unexpected and the unclear when dealing with a problem can encourage collaboration among disciplines and departments to achieve a common objective. For instance, many organisations implement Design Thinking "through cross-training employees, by providing business and management support to designers and training engineers, marketers and managers in design" (Tschimmel, 2012) so that they can be educated in Design Thinking and start developing the core design thinking attributes (empathy, experimentation and collaborative practices).

THE DESIGN PROCESS

French (1985) was the first author to claim that different stages of the Design Process existed and named them, for example: detail, concept, etc. Articulated as a linear process, whose progression is arranged across a series of stages that need to be completed before moving into the next one (Cross 2008). This highlights that the outcome from a stage becomes the starting point of the next one. Therefore, jumping from one stage to another would not typically bring success to the outcome of the project. This is of high importance within a business context, because it requires employees to understand the value of each of stage and what is the required outcome of each stage, before passing to the next one. In figure 2, the circles represent the different stages of the process and the rectangles the activities within the process.

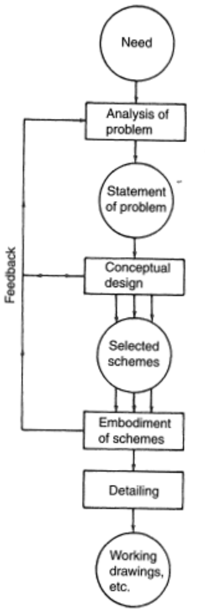


Figure 2 Systematic Design Model of the Design Process, French (1985)

Cross (2000) explored the Design Process and identified two types of design models: (1) *descriptive*, which aim to find a solution early in the process, and (2) *prescriptive*, which encourage new ways of working. His Descriptive four stages of the Design Process focus on the core activities that a designer typically aims carries out within an engineering design process. Cross (2000), refers to this as a ‘systematic design model’ in which the design proposal is always evaluated against the established objectives, challenges and criteria stated within the design brief. The final stage, communication, aims at getting the product or service ready for manufacturing. French’s model (Figure 2) fits with Cross’s first type, that of a descriptive design model process, as he considers the first step of the process is to start with a statement about the problem, then to analyse the problem and finally, to identify a solution to solve it. Cross (2008) subsequently developed a second model (see table 8) in which he turns the basic Creative Problem Solving process into a Design Process by focusing on a given problem and the development on a solution to tackle it.

EXPLORATION	GENERATION	EVALUATION	COMMUNICATION

Table 8 Descriptive Design Process by Cross (2000)

Previously, Jones (1984) suggested that prescriptive design models tend to follow a process of analysis, synthesis and evaluation. He defines the *analysis* as the stage in which the requirements are turned into specifications of the problem; *synthesis* as the phase that finds solutions to the problem specification; and *evaluation* as the validation of the final design solution to fulfil the specifications. Jones (1984) developed a basic model of the Design Process that is based on the problem-solving approach in which Cross suggests 'Designers evolve both the solution and the problem at the same time' and then break the problem down into sub-problems and the sub-solutions into the overall-solution.

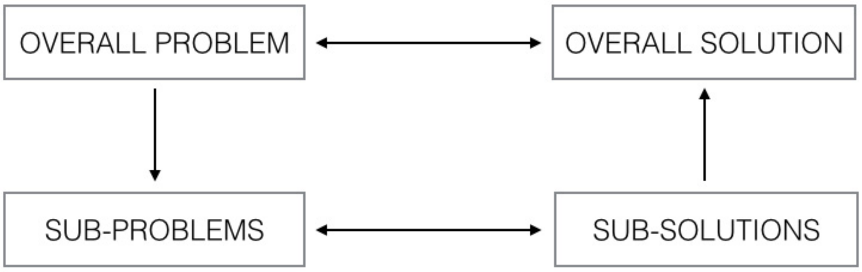


Figure 3 Basic Model of the Design Process, Cross (2008)

At the same time, Cross was working on his Design Process model, the Design Council developed in 2005 another visualisation of the Design Process (see Figure 4). They divided it into four core phases: discover, define, develop and deliver. The Design Council carried out a thorough research on the Design Processes used in global corporations in 2007. They then published a report in which they established their Double Diamond model. What was unique about this model was that it conveyed the convergent and divergent nature of the process that designers typically go through when attempting to solve a problem, need and or challenge. The Double Diamond model is divided into four stages, with each stage typically including several activities. The first stage, *Discover* includes data gathered via market research, user research and information management. The key aspect of this stage is to gather data from diverse sources in order to generate the core question and identify the problem; the second stage, *Define*, focuses on the alignment of the discovery needs to business objectives; *Develop* stage seeks design-led solutions; and the fourth stage, *Deliver*, concentrates on the implementation of the product or service by finalising it and launching it to market.

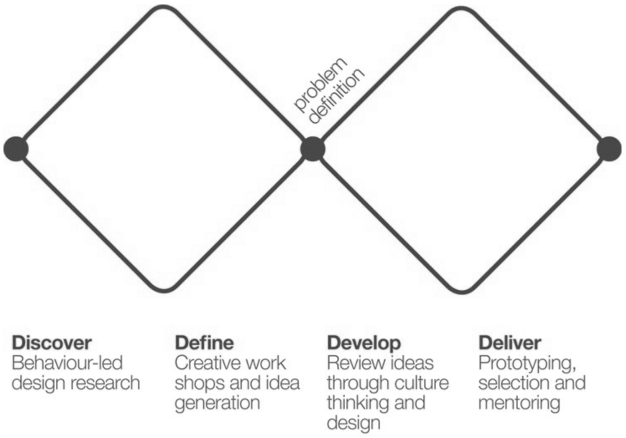


Figure 4 The Design Process by The Design Council

DESIGN METHODS

Before exploring the Design Process, Cross had developed an interest in the 1980's in design methods that led to two key books for this field of research. The first one, *Developments in Design Methodology*, was published in 1984 and *Engineering Design Methods*, first published in 1989. The second publication explored different Design Methods and suggested that they can be split into two main categories: *creative methods* and *rational methods*. Creative methods are defined as Design Methods that aim to promote and stimulate creative thinking via enhancing creative capabilities in idea generation practices. They include (1) *Brainstorming*, which is typically considered a technique for idea generation (Osborn, 1953), but in this context, is considered a Design Method, unveiling a dysfunction of meaning and language between Idea Generation techniques and Design Methods; (2) *Synectis* (Gordon, 1961), which relies on analogical thinking for bringing together apparently different elements. Cross's (2000) Rational Methods in Design Methods were based on Simon's (1969) Rational Model. The drawback of this rational model is that it considers that there is not a set goal to be achieved throughout the process as he argues that the problem changes constantly.

Professor Kumar, from the Illinois Institute of Technology's Institute of Design, published in 2012 the book 101 Design Methods. In this book, he splits the process of planning for innovation into seven key modes: (1) Sense Intent, (2) Know Context, (3) Know People, (4) Frame Insights, (5) Explore Concepts, (6) Frame Solutions, and (7) Realize Offerings. Each of the modes is again broken down into a series of design methods in order to facilitate the understanding the issue being tackled. The first four stages are focused on investigating and understanding the different aspects involved in the project. For instance, the first stage is focused on planning the project by understanding the goal of the project and investigating references in the area; secondly it focuses on the context with Kumar suggesting a series of methods that will help an individual and or team to understand the scenario of the project; then the focus shifts to understanding the target segment that is involved in the issue or problem; fourthly, information synthesised and visualised in order to help identify latent patterns within the data and frame insights. The second stage explores the generation of concepts, the framing solutions and realization of offerings focused on generating new ideas, developing them and implementing them within the strategy roadmap of an organisation. In summary, Kumar created a compelling toolkit of research methods that helps to address a wide variety of issues within innovation projects from planning to the implementation of the validated idea into an innovation pipeline.

SENSE INTENT	KNOW CONTEXT	KNOW PEOPLE	FRAME INSIGHTS	EXPLORE CONCEPTS	FRAME SOLUTIONS	REALIZE OFFERINGS
Buzz reports	Contextual Research	Research Participant Mapping	Observations to Insights	Principles to Opportunities	Morphological Synthesis	Strategy Roadmap
Popular Media Scan	Popular Media Search	Research Planning Survey	Observations Sorting	Opportunity Mind Map	Concept Evaluation	Platform Plan
Key facts	Publications Research	User Research Plan	User Observation Database Queries	Value Hypothesis	Prescriptive Value Web	Strategy Plan Workshop
Innovation Sourcebook	Eras Map	Five Human Factors	User Response Queries	Persona Definition	Concept Linking Map	Pilot Development and Testing
Trends expert interview	Innovation Evolution Map	POEMS	ERAF System Diagram	Ideation Session	Foresight Scenario	Implementation Plan
Keyword bibliometrics	Financial Profile	Field Visit	Descriptive Value Web	Concept Generation Matrix	Solution Diagramming	Competencies Plan
Ten types of innovation framework	Analogous Models	Video Ethnography	Entities Position Map	Concept Metaphors and Analogies	Solution Storyboard	Teaming Plan / Initiatives Plan
Innovation Landscape	Competitors-Complementors Map	Ethnographic Interview	Venn Diagramming	Role-play Ideation	Solution Enactment	Vision Statement
Trends Matrix	Ten Types of Innovation Diagnostics	User Pictures Interview	Tree / Semilattice Diagramming	Ideation Game	Solution Prototype	Innovation Brief
Convergence Map	Industry Diagnostics	Cultural Artifacts	Symmetric Clustering Matrix	Puppet Scenario	Solution Evaluation	
From….to exploration	SWOT	Image Sorting	Activity Network	Behavioural Prototype	Solution Roadmap	
Initial opportunity map	Subject Matter Experts Interview	Experience Simulation	Insights Clustering Matrix	Concept Prototype	Solution Database	
Offering-Activity-Culture Map	Interest Group Discussion	Field Activity	Semantic Profile	Concept Sketch	Synthesis Workshop	
Intent Statement		Remote User Research	User Groups Definition	Concept Scenarios		
		User Observations Database	Compelling Experience Map	Concept Sorting		
			User Journey Map	Concept Grouping Matrix		
			Opportunity Framework	Concept Catalogue		
			Design Principles Generation			
			Analysis Workshop			

Table 9 101 Design Methods of Kumar (2012)

THE DESIGN THINKING PROCESS

The design thinking process is grounded upon early Design process models such as Simon's *Science of the Artificial* book in 1969. Design Thinking is not a totally new phenomena, it has built upon the evolution of the principles of Design process research and practices. Table 10 compares seven different Design Thinking approaches in order to identify common practices and or principles. Differences occur in the number of steps, which range from three to seven steps, and to modes of execution. The comparative analysis indicates that some processes are executed as a linear process, while others, like the d.school and Brown's model can work in an iterative way, involving revisiting issues in order to validate, re-validate and evaluate and re-evaluate outcomes (reflective practice). Even though these processes seem different, they share common stages such as ideation, which is at the core of Design Thinking practices to generate, develop and test ideas to deliver a solution (Brown, 2008).

Simon (1969)	Mark Dziersk (2006)	IDEO Toolkit	Brown (2009)	D.School/ D-School (2009)	D.school Bootcamp Bootleg (2010)	Baeck and Gremett (2011)
Define	Define the problem	Discovery	Inspiration	Understand	Empathize	Define the problem to solve
Research		Interpretation		Observe/ Point of view	Define	Look for inspiration
Ideation	Create and Consider options	Ideation	Ideation	Ideate	Ideate	Ideation
Prototype	Refine selected directions Repeat (steps 2 and 3, optional)	Experimentation	Implementation	Prototype	Prototype	Prototyping
Objectives/ Choose	Pick the winner, execute	Evolution		Test	Test	Solicit user feedback
Implement						
Learn						

Table 10 Design Thinking Process Models comparison

The most rationalised and vocalised Design Thinking process is the one advocated by Brown (2009) that is comprised of three stages: inspiration, ideation and implementation of ideas. Although it may seem simple, it summarizes some key stages of Design Thinking that all the other processes showed in the table 1 encompass. For instance, Brown's Design Thinking process contrasts with Simon's (1969), which is split into seven stages and each of them contains a series of tasks that work as milestones to pass to the next stage (stage-gate model). However, in essence, both are founded on the same principles of: (1) research to find inspiration, (2) ideation practices to seek different opportunities and options and (3) implementation of ideas including prototyping and testing. This suggests earlier work tended to focus on breaking down complexity of issues versus a characterization of core activities. Only Simon (1969) suggests a learning stage that includes a discussion on future improvements of the process, success measurement and a proper documentation of the design project (this is typically implied within other models). Considering this was the first established Design process, it is insightful how Simon's (1969) highlighted the importance of reviewing and measuring success in order to avoid the same mistakes and to evaluate if the solution proposed met the set goals (use of success measures). Baeck and Gremett (2011) also emphasize the social (empathic) and experimental side of Design Thinking, linking it to the customer by seeking users' feedback at the end of the Design Thinking Process to critically evaluate the quality of outcomes. In evaluating the seven key Design Thinking models five common stages emerge: (1) definition of need/problem, (2) synthesis of knowledge, (3) ideation, (4) implementation of a solution and (5) an evaluation process.

Table 11 visualises the comparison of models from Creative Problem Solving, Creative Process, Design Methods, Design Process and Design Thinking. What it is relevant from this table is that even though there are multiple models across time and they are split into five categories, it is clear that they common characteristics. It is possible to identify three core phases: (1) definition of the problem, (2) research and (3) ideation. No matter the language and or terminology they use, there is a commonality of activity. This insight highlights the importance given to idea generation across time by demonstrating multiple well-known authors have researched this issue and have focused on finding a systematic process to manage ideas. The highlighted models in Table 11 are the core ones for this project due to their common practices but not common definitions nor language.

CREATIVE PROBLEM SOLVING									
Osborn (1963)			FACT FINDING		IDEA FINDING	SOLUTION FINDING			
Noller, Parnes & Blondi (1976)		PROBLEM SENSITIVITY OBJECTIVE	FACT FINDING PROBLEM FINDING		IDEA FINDING	SOLUTION FINDING ACCEPTANCE FINDING	PLAN	ACTION	NEW CHALLENGES
Isaksen et al (1992)		FACT FINDING	UNDERSTANDING THE PROBLEM		GENERATING IDEAS		PLANNING FOR ACTION		
CREATIVE PROCESS									
Osborn (1963)			FACT FINDING		IDEA FINDING	SOLUTION-FINDING			
Parnes (1967)		PROBLEM, CHALLENGE, OPPORTUNITY	FACT FINDING	PROBLEM FINDING	IDEA FINDING	SOLUTION FINDING	ACCEPTANCE FINDING	ACTION	
Jones (1970)			SEARCH FOR DATA	UNDERSTAND THE PROBLEM	PATTERN FINDING FLASHES OF INSIGHT	JUDGEMENT			
Amabile (1983)		PROBLEM OR TASK	PREPARATION		RESPONSE GENERATION	RESPONSE VALIDATION	OUTCOME		
Couger et al (1993)		OPPORTUNITY, DELINEATION, PROBLEM DEFINITION	COMPILING INFORMATION		GENERATING IDEAS	EVALUATION, PRIORITISING IDEAS	DEVELOPING AN IMPLEMENTATION PLAN		
Isaksen et al (1994)		CONSTRUCTING OPPORTUNITIES	EXPLORING DATA	FRAMING THE PROBLEM	GENERATING IDEAS	DEVELOPING SOLUTIONS	BUILDING ACCEPTANCE	APPRAISING TASKS	DESIGNING PROCESS
Basadur et al (2000)		PROBLEM FINDING	FACT FINDING	PROBLEM DEFINITION	IDEA FINDING	EVALUATE AND SELECT	PLAN	ACCEPTANCE	ACTION
DESIGN METHODS									
Kumar (2012)		SENSE INTENT	KNOW CONTEXT KNOW PEOPLE	FRAME INSIGHTS	EXPLORE CONCEPTS FRAME SOLUTIONS	REALIZE OFFERINGS			
DESIGN PROCESS									
Koberg and Bagnall (1972)		ACCEPT	ANALYSE	DEFINE	IDEATE SELECT	IMPLEMENT	EVALUATE		
Pahl and Beitz (1984)		TASK	CLARIFICATION OF TASK	CONCEPTUAL DESIGN	EMBODIMENT DESIGN	DETAILED DESIGN			
Crawford (1984)			STRATEGIC PLANNING		CONCEPT GENERATION	PRE-TECHNICAL EVALUATION	TECHNICAL DEVELOPMENT	COMMERCIALISATION	
Archer (1984)		STRATEGIC PLANNING DESIGN	RESEARCH		DEVELOPMENT	MANUFACTURING MARKETING START UP	PRODUCTION		
French (1985)		INITIAL STATEMENT OR NEED	ANALYSIS OF THE PROBLEM		CONCEPTUAL DESIGN	EMBODIMENT OF SCHEMES	DETAILING		
Ulrich and Eppinger (1995)			STRATEGIC PLANNING		CONCEPT DEVELOPMENT	SYSTEM-LEVEL DESIGN	DETAIL DESIGN	TESTING AND REFINEMENT	PRODUCTION MAP-UP
Cross (2000)			EXPLORATION		GENERATION	EVALUATION	COMMUNICATION		
Design Council (2006)			DISCOVER	DEFINE	DEVELOP	DELIVER			
Industrial Innovation Process (2006)		MISSION ESTATEMENT	MARKET RESEARCH		IDEAS PHASE	CONCEPT PHASE	FEASIBILITY PHASE	PRE PRODUCTION	
DESIGN THINKING PROCESS									
Simon (1969)		DEFINE	RESEARCH		IDEATION	PROTOTYPING	OBJECTIVES	IMPLEMENTATION	LEARN
Mark Dziersk (2006)		DEFINE THE PROBLEM	CREATE AND CONSIDER OPTIONS		IDEATION	REFINE SELECTED OPTIONS REPEAT STEP 2 AND 3 (OPTIONAL)	PICK THE WINNER AND EXECUTE		
IDEO toolkit			DISCOVERY	INTERPRETATION	IDEATION	EXPERIMENTATION	EVOLUTION		
Brown (2009)			INSPIRATION		IDEATION	IMPLEMENTATION			
D.School (2009)		UNDERSTAND	OBSERVE/ POINT OF VIEW		IDEATTION	PROTOTYPING	TEST		
D. School Bootcamp Bootleg (2010)			EMPATHIZE	DEFINE	IDEATION	PROTOTYIPING	TEST		
Baeck and Gremett (2011)		DEFINE THE PROBLEM TO SOLVE	LOOK FOR INSPIRATION		IDEATION	PROTOTYPING	SOLICIT USER FEEDBACK		

Table 11 The Evolution of Models in Design-Driven Innovation practices, by Author

1.1.3 The Value of Design Practice to Business Success

Posselt and Forst (2013) state there are a vast variety of organisational innovation strategies that businesses pursue to accelerate business growth but this study focuses on one of them specifically being design. Major multinational corporations (P&G, Google, 3M, IDEO, Whirpool) have embraced Design as a key tool to help to develop future innovation strategies for growth, explored by key design and design thinking authors (Brown, 2009; Lockwood, 2010; Borja de Mozota, 2011). Their research has demonstrated the multiple benefits (as discussed in section 1.2.1) that design can have on business performance and how there is an increasing adoption of Design for accelerating innovation activities (Nussbaum, 2005). Since 2000 there have been three different trajectories in which design value has been applied to: (1) research design (Jelinek et al, 2008), (2) strategy design (Brown, 2008, Dunne and Martin 2006) and (3) organizational design (Boland and Collopy, 2004). Its adoption and use has been attributed to the gradual evolution of Design as a practice that has led to it being embedded more into business practices and therefore, more integrated into business strategy, research and organisational matters particularly in large corporate companies.

When it comes to implementation of Design Practice other emergent themes need to be acknowledged, such as the relationship of Design to Innovation. Sir George Cox (2005:2) explored and established a strong connection between Creativity, Design and Innovation. He considers Design as the link between creativity and innovation and its ability to shape ideas that have potential to become practical and attractive propositions for customers. Secondly, he defined Creativity as the generation of new ideas and new ways of looking at existing problems. Thirdly, he defined Innovation as the successful exploitation of new ideas. Innovation is, therefore seen as the process that carries ideas through to new products, services, ways of running the business or even ways of doing business. What can be extrapolated from these definitions is that Cox suggests that the importance of Design lays on bringing ideas to life. It could be argued, based on analysis of Cox's definition, that Design helps translate insights into ideas and Innovation transforms ideas into outcomes. Dusenberry (2005), who is the Former Chairman BBDO, North America, reinforces the notion of the power of design to bring ideas to life by stating that, "A good idea can inspire a great commercial success. But a good insight can fuel a thousand ideas, a thousand commercial successes" and therefore, design is the strategic tool that can accelerate that process.

The challenge many organisations typically face is a lack of definition of the problem and or of the unmet needs (Verganti, 2008) leading them to adopt strategies that look at problems from too diverse a perspective. Design-Driven strategies attempt to seek to explore possible breakthrough innovations in products, meanings and languages that drive socio-cultural and technological settings (Verganti, 2008). Nevertheless, a contributing factor to why Design-Driven Innovation Strategies have not been fully implemented is that there is often a misalignment between the process involved (often they do not follow the traditional methods of product development, such as stage analysis, organizational structures) and the tools used to solve problems (Shane and Ulrich, 2004). Design Business Success is closely linked to the shifting economic markets from the traditional manufacturing processes to knowledge creation (Brown and Katz, 2011). This change highlights the importance of innovation driving competitive advantage by using design as an intellectual approach to understand the changes in culture, society and technology (Verganti, 2008).

Design Thinking has not been universally adopted within business, particularly in small medium enterprises. However, there are successful examples of were key major corporations (Apple, Google, Philips) that have embraced Design Thinking to help them build future strategies (Brown and Wyatt, 2010) and drive growth. Consequently, the market key players are adopting Design as a strategic business tool to teach employees (Clark and Smith, 2008) and managers a more holistic approach to problem solving (Simon, 1996; Boland and Collopy, 2004). However, the key problem area for Design Thinking relates to establishing a common vocabulary that can be used to articulate how design thinking can boost innovation practices.

The link between Design and Businesses focuses on the creative alignment of business objectives to design strategies (Brun et al, 2010) in order to generate multiple solutions, thus enabling more strategic choices to be made. As a conclusion from these arguments, major corporations are implementing design-driven practices as a holistic strategy across the business and deploying design thinking as an intellectual tool that can be taught and adapted to the specific objectives of each organisation to pursue breakthrough innovations.

1.1.4 The Importance of Ideas to Business Success

Ideas are a powerful asset to disrupt products, businesses and markets (Bolton and Perez, 2014). They are considered the engine of innovation (Koc and Ceylan, 2007), but many organizations investing in innovation struggle to generate a stream flow of actionable ideas that become a commercial success (Levitt, 1963; Staw, 1990). Consequently, generating high quality ideas is considered an urgent matter in many organisations (Bouhali, 2015).

As seen in previous sections, the power of ideas is overtaking the concept of creativity, which is defined as a production of novel and useful ideas (Amabile, 1988). Ideas have value and are seen as a key mechanism in delivering a company's objectives (Cummings and Oldham, 1997). These trends highlight the importance that ideas have in delivering creative outcomes. However, some authors such as Bono (2007) and Vangenbosh et al (2006) are contributing to the understanding that ideas' act as a vehicle for driving innovation practices, acknowledging that they serve as mechanism for prompting innovation, which reinforces the value of Design. Specifically, Koc and Ceylan (2007) claim that ideas "are the starting point to all innovations" and a successful idea management processes help organisations to significantly enhance their New Product Development practices.

The performance of major corporations has led to various research studies. Mark J. Perry (2011), Professor of Economics and Finance in the School of Management University of Michigan, analysed the evolution and development of the Fortune 500 over a 50 years period and discovered that 86% of those companies had gone bankrupted, private, merged or disappeared from the list over that period of time. The reason this happened was that they did not invest enough time or resources on innovation, highlighting the importance of innovation for companies to leverage market.

Historically, Design strategies have been attributed as a key business success factor (Borja de Mozota, 2011), however, in the last fifteen years there has been a shift from Design to Ideas and major players in industry, such as Nintendo, P&G, Apple, 3M, Nike, and Nestle, have established idea management processes (Chesbrough, 2003; Hutson and Sakkab, 2006) within their organizations to achieve more effective results. They have focused on the importance of generating, evaluating and selecting quality ideas that feed into their business objectives and result on commercially successful products and services. To do so, these organizations have typically established their idea management processes upon design thinking principles (Wong, 2009) and so are utilising Design strategies and Design Thinking as the vehicle to leverage successful idea management processes.

In the 10-year review of The Product Development & Management Association (PDMA) Barczak et al (2009) established that only 14% of initial ideas generated in organisations typically turn into successful commercial outcomes, which means that only one out of every seven NPD projects hits the marketplace. Barczak et al (2009) highlighted that New Product strategies over the next decade will need to be guided and driven by Idea Management activities due the growing importance of ideas, in delivering organisational success.

Barczak et al (2009) claim that Ideas that are aligned to business strategy achieve higher rates of success in the marketplace (typically generated under a formal process that aim to fulfil a need as well as filling a gap in the product's portfolio, having more chances to become a commercial success (Chesbrough, 2003)). This implies that ideas that are generated informally do not typically address business objectives. However, the concept of Idea Quality is still embryonic in literature.

When it comes to how organisations develop quality ideas, Staw (1990) stated that there needs to be a supportive process with additional resources to develop new ideas within organisations, however, most new ideas tend to fail due not having the appropriate resources to bring them to realisation. Additionally, Barczak et al (2009) suggest that 'time' is one of the critical factors that influence the way that organisations generate ideas. They define two different time factors: (1) the lack of time to try different idea generation tools and (2) the cycle times of processes are plunging dramatically impacting on the effort to develop a quality idea.

In terms of the nature of the idea generation process (whether ideas are generated formally or informally), 50% of ideas developed in NPD processes are generated informally (Barczak et al, 2009) or randomly suggested by someone (Murphy and Kumar, 1997). Therefore, most idea generation activities are developed informally and unstructured even within structure new product development processes. There is a tendency of NPD projects to be carried out as standalone activities under different management, which can difficult the establishment of a coherent process (West, 2002).

In terms of the preparation and planning of idea management activities, Barczak et al, 2009 have demonstrated there is a tendency to undertake this type of activities on an unplanned basis. They claim only a third of NPD activities are planned. The planned activities typically tend to generate radical ideas or fill gaps in their portfolio (Barczak et al, 2009) while unplanned activities lead to less innovative ideas that relate to incremental innovation. What this means is that the two thirds of unplanned planned activities seek to generate incremental rather than innovative ideas (Ahuja and Lampert, 2001).

In summary, there are many factors to consider in Idea Management, such as a coherent formal idea generation process, the required time and resources needed to generate ideas and setting an evaluation criterion for quality (Arthur D. Little, 2005). However, as previous authors have indicated (Boland and Collopy, 2004; Barczak et al, 2009), a key challenge for management is a lack of good quality ideas. They state the importance of good ideas that fulfil human needs rather than the out-dated focus on financial analysis as the key demonstrator of business value. This raises the following questions: (1) what constitutes a quality idea?; (2) How do organisations develop a good quality idea?; and (3) How do they evaluate if an idea is good quality?

1.1.5 Summary of Emergent Issues

This chapter has highlighted a series of emerging issues regarding the current role of Design and Ideas in MNCs Front End activities. The review has established:

- Lack of coherent common language for design, design thinking and ideas, which impacts on the meaning of core concepts and terminology (Koen et al, 2001).
- Lack of agreed common processes, practices and tools or models in Design Driven Innovation. The literature has shed light to the similarities in purpose of activities and outcomes, but with different phases' or stages' names.

- The importance of a good idea management processes as a driver of organisational success (Barczak et al, 2009)**.** However, there is still a lack of understanding of what constitutes a good idea and how organisations can develop one, which is linked to the fourth issue.
- Most organisations struggle to generate a stream flow of high actionable ideas, as they tend to generate lots of ideas but they are not feasible and or distinctive.
- Lack of evaluation criteria for selecting ideas.

1.2 Factors impacting on the dynamics of New Product Development

Introduction

This section is designed to review New Product Development models and themes, key authors in the field that have significantly contributed to the field of study and its development as a discipline. The following areas will be covered in this chapter:

- Introduction to New Product Development
- Factors impacting on New Product Development: Success and Failure
- Factors impacting on The Front End of Innovation: Success and Failure
- Summary of Emergent Issues

The chapter concludes with a summary of Emergent Issues within New Product Development and in particular FEI.

1.2.1 Introduction to New Product Development

New Product Development (also known as NPD) is the process of bringing a new product to market by turning a market opportunity into a sellable product (Krishnan and Ulrich, 2001). The New Product Development process has three principle phases: (1) *the Front End of Innovation* (FEI), which is a set of activities that take place before the formal and structured NPD process; (2) *the Product Design phase*, that includes the development of a new product up to pre-commercialization; and (3) *the Commercialization phase* starts which includes all the production and product market launch activities (Koen et al, 2007).

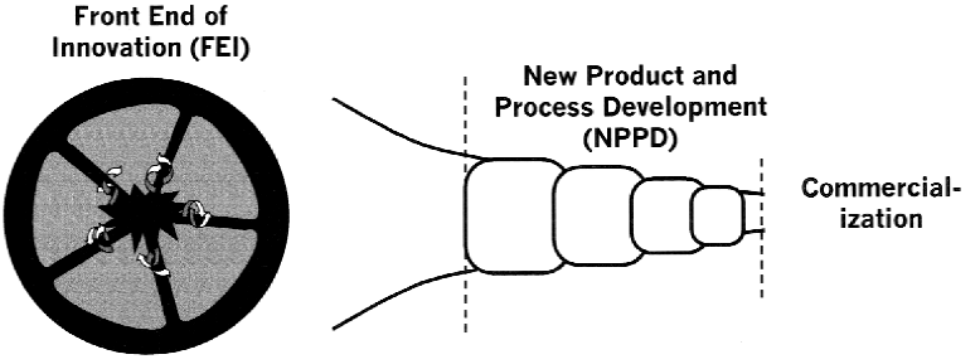


Figure 5 Innovation Process, Koen et al (2007)

NPD MODELS

Booz, Allen and Hamilton published one of the first New Product Development models in 1982 (figure 6). They broke down the process into seven steps: (1) new product strategy development, (2) idea generation, (3) screening and evaluation, (4) business analysis, (5) development, (6) testing and (7) commercialization. The first stage, New Product Strategy Development, is based on a review of mission(s) and objectives of the business It aims to determine if the development of new products fulfils strategically the defined NPD requirements by the organisation. The Idea Generation stage seeks to develop new ideas in a key area of interest for the organisation that address the previously set objectives. The third stage involves the analysis of the generated ideas in order to Screen and Evaluate their potential contributions to delivering business success. This is the stage were only the best ideas are selected to move forward. During the Business Analysis stage the selected ideas are set in context of potential markets, target consumers, and competitor's portfolios to determine if they are feasible. The fifth stage, Development, focuses on refining the selected ideas and turning them into concrete product ideas. The Testing stage, aims to validate product ideas through prototyping and experimenting. The last part of the process, Commercialization, refers to the entire market introduction experience, including feedback from consumers, refinement of product and competitor monitoring. The importance of this model resides in the fact that it is not only one of the first NPD models but it represents the ground base of future activities (Bruiyan, 2011).

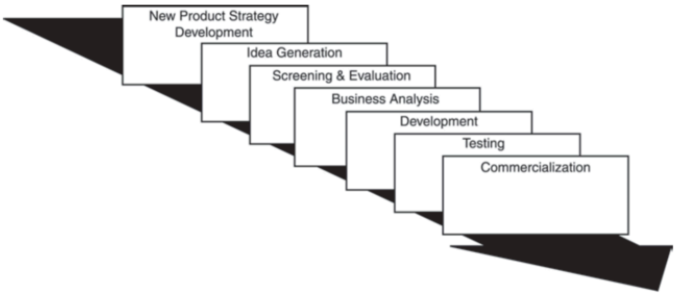


Figure 6 New Product Development Process, Booz, Allen and Hamilton (1982)

Cooper (1990), one of the most important NPD researchers over the last twenty years, developed a stage gate NPD model and process. The uniqueness of this process lies in the fact that it was one of the first models to divide NPD activities into several stages separated by gates. The aim of the stage-gates is to force decisions to be made on the continuation of a project based on the information and opportunities gathered up to that point. The gate assessment can deliver different results: go, kill, hold, recycle or conditional go (Cooper and Scott, 2012). The APQC (American Productivity and Quality Centre) undertook a study in 2010 that claimed 88% of US organizations undertake a stage-gate process to manage the development of their ideas in NPD. The particularity of this model is its up-to-date relevance to improve teamwork, success outcomes, prompt failure detection and shorter cycle time (Kenneth, 2013).

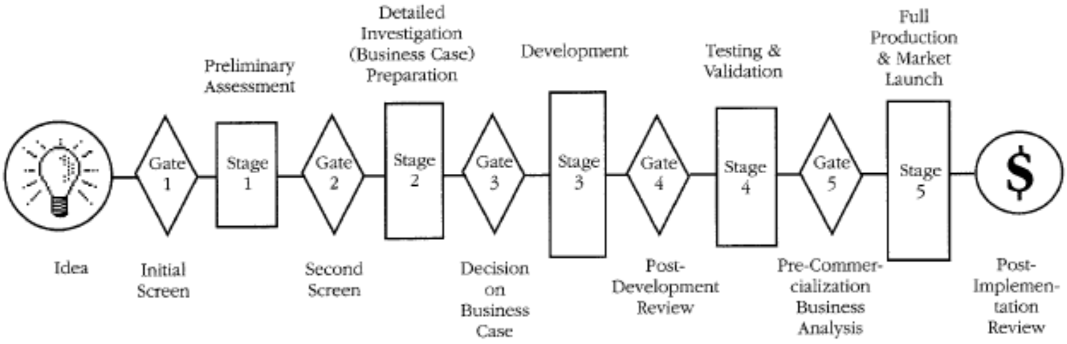


Figure 7 New Product Development Stage-gate System, Cooper (1990)

The multinational design consultancy firm IDEO has developed and adopted a NPD model that is based in five consecutive steps: (1) Understand the market trends, current or future challenges, client needs and potential technologies involved; (2) Analyse and summarise the gathered data; (3) Visualise of customer experience when using the product; (4) Prototype, evaluate and refine the product idea; and (5) Implement the new design idea.

Ulrich and Eppinger (1995) developed a Concept Development Stage (CDS) model, which is one of the most well-established models that has been adopted by major Design corporations such as FROG design and IDEO. It is divided into nine stages in which customer needs, idea generation and selection are at its core. The first step, in the Concept Development Stage, is to generate a Mission Statement. This represents a pre-stage in the process to clarify the objective and focus of the project. It is followed by the identification of user needs, which is a crucial stage within the development process, in order to gather and relevant information for concept generation, selection and refinement.

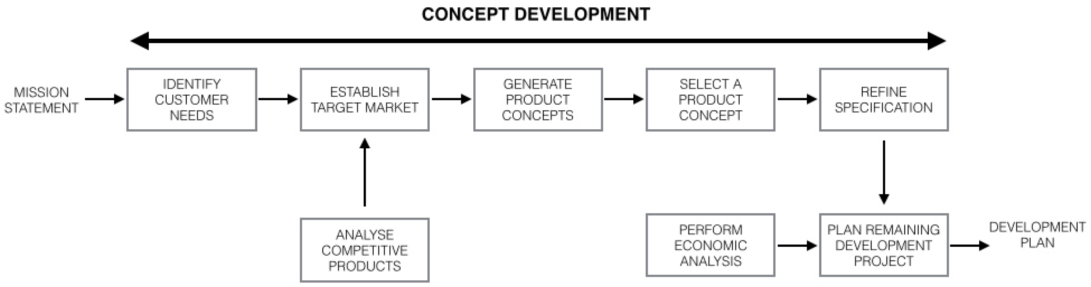


Figure 8 Ulrich and Eppinger (1995) Concept Development Stage (CDS)

1.2.2 Factors Impacting on New Product Development: Success and Failure

Identifying the factors that impact New Product Development processes is significant for this study in order to better understand current practices. This section will investigate a wide range of studies that have preceded this research in order to determine the core factors that are relevant within this exploratory study.

Productivity, referring to how things are produced in relation to time, money and people needed to make it real, is a key factor influencing New Product Development practices. In the work environment, productivity is affected by very diverse factors, Tahira et al (2007) consider that job insecurity increases productivity levels among the employees but creativity, considered as problem-solving skill, decreases drastically. For example, creativity and flexibility decreases during downsizing when employees feel threatened to be laid-off. On the other hand, Steven et al (2008) state the incentives for high levels of creativity can help reduce mediocre ideas during idea generation process, however, it does not increase ideas that will make a radical improvement.

There is an emerging concept called Creative Performance, which Baer (2012) has drawn attention to by defining as the implementation of ideas to achieve business outcomes. The relevancy of this concept is the linkage made between creativity to productivity, as it is not only about idea generation but its relationship to business success. According to Liu et al (2012) the creative performance of employees can be jeopardized by an abusive supervision by their managers, which is easily constrained by performance promotion motives. This view is contradicted by Stobbeleir et al (2011) who argue that in a creative work environment, employees' performance can be enhanced by an active feedback, sought from a wide variety of sources. In this context, employees establish a "positive" behavioural strategy that impacts on their self-regulatory behaviours within their creative processes that helps them to achieve their outcomes. Stobbeleir et al (2011) build upon the work of other researchers such as Zhou (1998) who had already tested a feedback hypothesis in multiple scenarios within a business context. Zhou's study tested four different valence-by-feedback given to random participants: (1) positive feedback and controlling style, (2) positive feedback and informational style, (3) negative feedback and controlling style and (4), negative feedback with informational style. The results from this test showed that individuals with the positive feedback and informational style reached the highest creativity, the opposite being from the ones receiving negative feedback in a controlling style. These results support Stobbeleir's, Shalley and Perry-Smith (2001) who all claim how counterproductive it is for the employees to receive negative feedback.

Muñoz-Doyague et al (2008) tested the individual attributes associated to creative performance, such as (1) motivation, (2) expertise, (3) cognitive style and (4) individual creativity among employees within a Spanish firm. They specifically tested three factors (personality was not included on this test as it is an uncontrollable variable) among 110 employees of an automotive sector organization whose main function is manufacturing. The results showed that the cognitive style (1st) and the intrinsic motivation (2nd), influence an individual's creativity in a quantifiable positive way. According to Zhou and Shalley (2003) employees will have high levels of intrinsic motivation when they feel very self-determined and qualified. These studies reinforce the fact that Creative Performance is closely linked to cognitive and psychological factors.

Amabile (1983), one of the first people researching the social psychology of creativity, developed a conceptual framework around it called *The componential Model of Creativity*. This framework is based on three key components for creative performance: (1) *domain-relevant skills*, which refer to the knowledge in that area; (2) *creativity-relevant processes* that refer to cognitive style, work style and knowledge of creative idea generation; and (3) *task motivation*, which refers to the attitude (intrinsic or extrinsic) toward a given task. On the other hand, a second framework was developed (Woodman et al, 1993) claiming how creative performance can be predicted by the person's disposition and contextual factors. This stressed the importance of the connection between the individual and the situation. Ford (1996) established that individuals have two kind of actions that compete in the work context: creative and habitual, and although creative actions are very important, individuals tend to choose habitual actions. These frameworks and studies suggested that in order to drive ideas forward for business success within an NPD context, both personal and work environment factors should be acknowledged.

In a study carried out in 2002, Ernst identified four key factors impacting on NPD process: (1) quality of planning in NPD, which entitles a thorough preparation of the project; (2) a well-defined target customer and market in order to develop products that represent a clear advantage over others (Barczak, 1995; Song and Parry, 1996); (3) a proper evaluation of ideas based on market driven feasibility studies; and (4) a commercial evaluation of the project in order to demonstrate the value of the proposed product.

A second key factor that has been stated by both Dwyer and Mellor (1991) and Song and Parry (1997) is the need for an evaluation assessment at every stage of the NPD process in order to help organisations to fail fast (Ries, 2011). This way, if they are engaging with projects with no commercial success they can terminate the project before investing additional resources. Cooper and Kleinschmidt, (1995) also support that a timely ending of a project is considered a success factor.

Thirdly, it is critical for NPD to have a clear orientation to market landscape (Souder et al, 1997). This factor refers to the quality of the preliminary market research in terms of industry and consumer needs (Schmalen and Wiedemann, 1999) as well as competitor analysis (Mishra et al, 1996)

Lastly, Ernst (2002) claims their needs to be a clear differentiation between market and consumer needs. As seen in the third factor, it is very important to have an understanding of current market research but it is not the same thing as consumer needs. Consumer needs are identified through primary research with people rather than from secondary sources. What is clear from Ernst study is that he covers the NPD success factors spectrum from the preliminary stage of planning to the actual execution of the process.

SUCCESS AND FAIURE FACTORS IN NEW PRODUCT DEVELOPMENT

Determining the key effective practices and success factors in NPD has been widely explored (Cooper and Kleinschmidt, 1995; Cooper and Handfieled, 1997; Barczack, 2009; Bhuiyan, 2011). There are five main areas in which NPD success factors can be grouped in: organizational, individual, cultural, entrepreneurial and senior management commitment.

The organisational success factors include the commitment of the multidisciplinary team members (Thamhain, 1990), combining people from R&D, marketing and production (Cooper, 1988; Song et al, 1997; Song and Parry, 1997). A secondary organisational factor relates to NPD teams, where everybody has responsibilities, commitment from everybody involved in the project and a robust communication among team members (Cooper and Kleinschmidt, 1995; Tamhain, 1990). Therefore, this set of factors focuses on effective practices at individual level that impact at a group level in NPD teams.

In terms of individual factors that influence NPD practices, research has shown (Barczak et al, 2009) it is decisive to involve a committed project leader who pays close attention to the project objectives (Cooper and Kleinschmidt, 1995), is able to instruct team members and encourages and manages decision making with authority (Schmalen and Wiedemann, 1999). Secondly, senior managers also play a key role, as NPD projects tend to require senior managers' commitment (Cooper and Kleinschmidt, 1995) in order to move the project, and the ideas, forward.

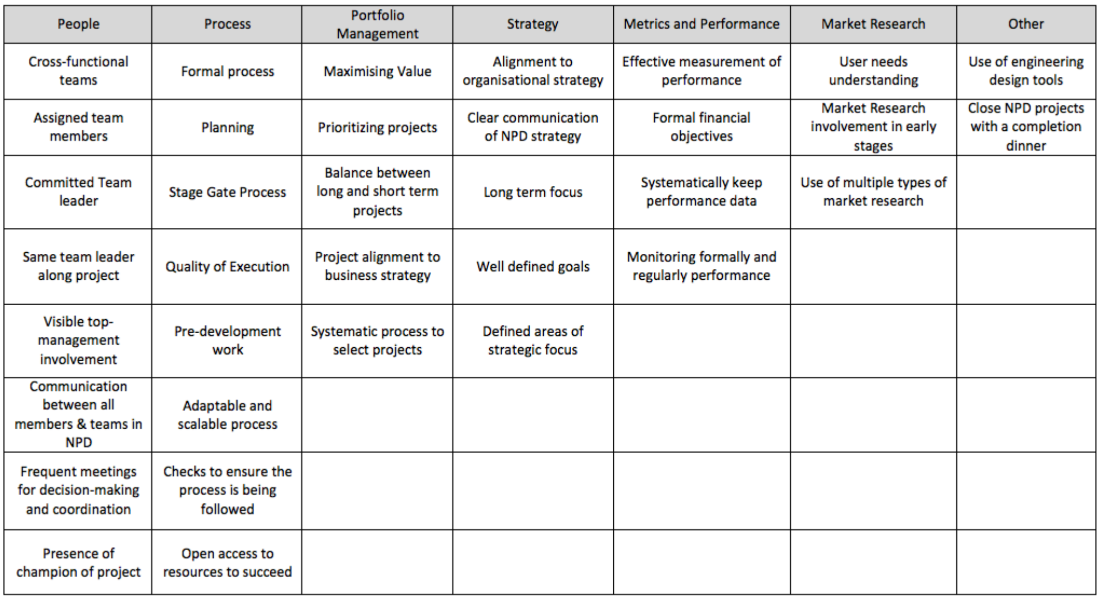
However, even if these just described behaviours and factors are successfully carried out individuals will still fail at delivering successful NPD projects if there is a lack of innovation driven culture. The organisation needs to enable risk taking by encouraging an innovation climate (Voss, 1985) with systematic approaches and methods to bring to market more commercially successful products (Barczak, 2009).

A series of entrepreneurial factors within the company also have a potential impact on the success of NPD projects. They involve encouraging the development of creative ideas and to offer the possibility to employees to utilise a portion of their time to develop their own ideas (Ernst, 2002). Some successful multinationals, such as the 3M Corporation enables its employees to spend 15% of their time on innovation projects that they are interested. Many large and multinational organisations such as Google, T-Nova and Vodafone encourage this behaviour even if the project has been terminated. This approach has demonstrated very positive results, for instance, the famous post-it note was created during this 15% creative projects time allocation.

Barczak et al. (2009) determined several common success NPD characteristics: (a) A formal NPD process and strategy; (b) A clear evaluation of NPD outcomes; (c) the use of multidisciplinary teams. More than 75% of the companies that took part in the research were using multidisciplinary teams for the NPD process; (d) Use of multiple qualitative techniques, including ethnography and consumer immersion; (e) Introducing technological design tools at the early stages of NPD; (f) Defining NPD completions with a dinner. Nevertheless, a factor not identified in the Barczak et al. (2009) report was the importance of the impact of preparation for NPD activities. The preparation activities include an initial screening to evaluate market and technical assessments.

Cooper and Edgett (2012) focus the key success factors for NPD on process attributes: Need of a formal process that is visible and documented, really used, adaptable and scalable, incorporates checks to ensure the process is properly being followed and the company has open access to the necessary resources to succeed. On the other hand, Kenneth (2013) suggests the key success factors in NPD is associated with developing a good understanding of customer needs and wants (Some of the attributes that influence customer needs are the cost of the product, its quality and saving time), competitor landscape and market awareness. Kenneth does not explore any success factors that relate to the process itself, giving an opposite and complementary set of success factors.

Table 12 summarizes the key success factors for NPD grouped in seven categories. People and Process are core, followed by Strategy and Portfolio Management, which involves a wider range of success factors than the other categories. This suggests they are certainly essential for NPD success. The relevancy of this table’s content is its close relationship with Barczak et al. (2009) results of the PDMA 2009 effective practices study, which also includes some of these issues. Nevertheless, this research study has further expanded the categories and their content in order to identify a wider range of NPD success factors. What can be extrapolated from preceding research is the necessity to focus on these four areas, people, process, strategy and portfolio, in order to succeed in New Product Development.



People	Process	Portfolio Management	Strategy	Metrics and Performance	Market Research	Other
Cross-functional teams	Formal process	Maximising Value	Alignment to organisational strategy	Effective measurement of performance	User needs understanding	Use of engineering design tools
Assigned team members	Planning	Prioritizing projects	Clear communication of NPD strategy	Formal financial objectives	Market Research involvement in early stages	Close NPD projects with a completion dinner
Committed Team leader	Stage Gate Process	Balance between long and short term projects	Long term focus	Systematically keep performance data	Use of multiple types of market research	
Same team leader along project	Quality of Execution	Project alignment to business strategy	Well defined goals	Monitoring formally and regularly performance		
Visible top-management involvement	Pre-development work	Systematic process to select projects	Defined areas of strategic focus			
Communication between all members & teams in NPD	Adaptable and scalable process					
Frequent meetings for decision-making and coordination	Checks to ensure the process is being followed					
Presence of champion of project	Open access to resources to succeed					

Table 12 Success Factors in New Product Development, by author

1.2.3 The Factors that Impact on the Front End of Innovation: Success and Failure

The Front End of Innovation (whose acronym is FEI), also known as the Fuzzy Front End, is the first phase of the innovation process in which opportunities are sought and ideas are formed and developed into a precise concept (Koen et al., 2001; Kim and Wilemon, 2007). Smith and Reinertsen popularized the term Fuzzy Front End in 1991. The FEI comprises the set of activities that take place before the more structured New Product Development process (Koen et al, 2007). There is a conception among researchers, such as Koen (2005), that considers the stages of Front End Innovation and the way ideas are generated as something unpredictable and unclear. The reason behind this relates to the issues faced during FEI activities, such as uncertainty, complexity and fuzziness. Kim and Wilemon (2002) do not even consider FEI as a proper process but only a as a series of independent activities. However, Husig et al (2005) contradicts this claim by suggesting FEI can be managed in a structured way. For instance, Carbone (2011) states how using front-end success factors across the process have a positive impact on product success.

There are three types of Front End of Innovation projects: (1) incremental, (2) breakthrough and (3) platform focused. Koen (2004) states stage-gate processes are the most suitable for incremental product development, which can include cost reduction, refinement and improvement of existing products and reposition in different markets. On the other hand, breakthrough projects should consider a strategic vision that embeds technology discovery research. This entitles a five to ten times improvement in performance as well as a minimum of 30% reduction of costs. As for platforms, the organization needs to establish if the project entitles a single product or a set of family ones in order to develop an adequate plan. In summary, when it comes to FEI projects, the organisation should create basic portfolio architecture to determine both the resources scale and the product lines that need to be developed. This is the kind of structured approach to FEI that Husig et al (2005) advocate.

FEI MODELS

The Front End of Innovation is formed by several phases and activities, although it is a very indefinite process (Murphy and Kumar, 1997). Cooper (1988) split the Front End Innovation process into three main activities: (1) idea generation, (2) product definition and (3) project evaluation. In spite of the simplicity of the process, each of these phases include a batch of sub activities: (i) *Idea generation* includes forming a solid product idea, that includes customer voice; (ii) *Product definition* includes product positioning, advantages and product features; and (iii) *Project evaluation* embeds a marketing, technological, manufacturing and financial project evaluation, which is able to establish if the project is worth moving forward. Cooper (1988) established a series of Go/ Non-go decisions stages within this process in order to structure some of the many key decision-making moments in the Front End Innovation (Reid and Brentani, 2004). The Front End of Innovation is not a set scenario so it has been a recurrent process to explore along the years, for instance Khurana and Rosenthal (1998) define the key FEI stages as: product strategy formulation and communication, opportunity identification and assessment, idea generation, product definition, project planning and executive reviews. A few years later Koen et al (2001) challenge previous models by identifying five key phases in Front End Innovation: opportunity identification, opportunity analysis, idea genesis, idea selection and concept and technology development. The first one, opportunity identification, is usually driven by business goals, it can be either incremental or a revolutionary opportunity; during Opportunity analysis technology and market assessments are undertaken; Idea Genesis is the phase in which the opportunity turns into a concrete idea; Idea Selection is based on the choice of the idea that will achieve best business value; and finally, the Concept and Technology Development is the stage in which there are consumer, market, investment and risk assessments involved in the development of the selected idea. It appears very clear that the Front End of Innovation is a complex process; however, all the authors agree that a holistic approach is beneficial to build capabilities for future projects where competitors, tools, relationships and markets are taken into account from the beginning (Kim and Wilemon, 2002). Husig, Kohn, and Poskela (2005) developed a conceptual model of the Front End process divided in three phases: (1) Opportunity identification, in which external changes are decoded and turned into business opportunities; (2) Preliminary definition of the ideas; and (3) A thorough product, project or service definition, which can be also represented by a business plan. They also suggested the key stage-gates in this process are: opportunity screening, idea evaluation and go/non-go for development. Nevertheless, the PDMA (2006) claims the FEI consists of three stages: strategic planning, idea generation and pre-technical evaluation. This simplification of stages in the Front End of Innovation is an example of the lack of clarity of the process.

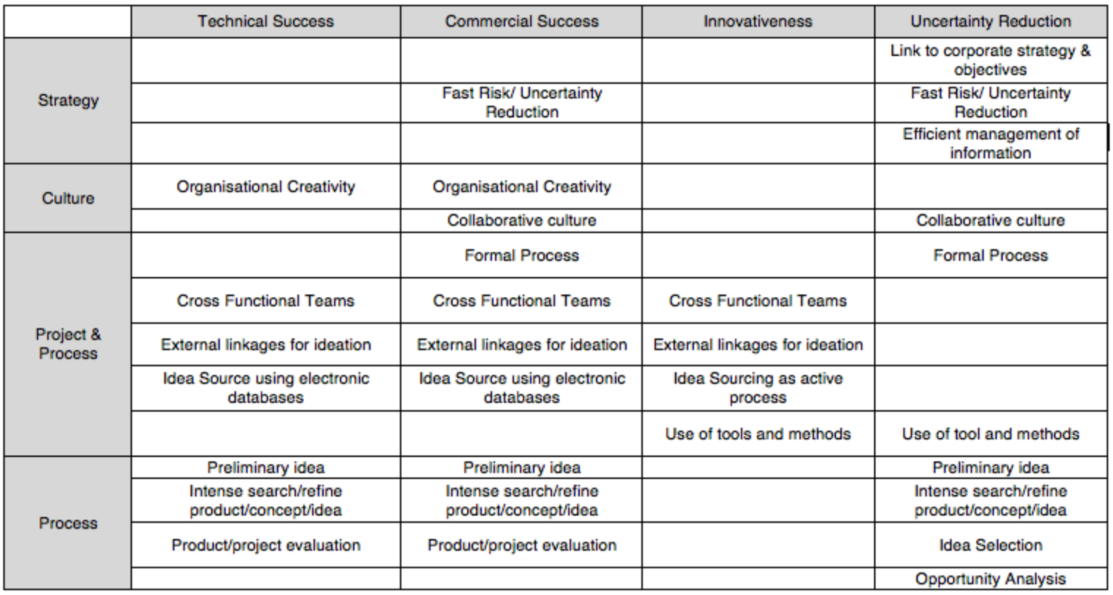
Ulrich and Eppinger (1995)	Cooper (1988)	Khurana and Rosenthal (1998)	Koen et al (2001)	Husig, Kohn, and Poskela (2005)	PDMA glossary (2006)	Cooper and Edgett (2008)
Identification and collection of user needs	Idea Generation	Product strategy formulation and communication	Opportunity Identification	Opportunity Identification stage	Strategic Planning	Preliminary Market Assessment
Establishing Target Market	Product Definition	Opportunity identification and assessment	Opportunity Analysis	Preliminary definition of ideas	Idea Generation	Technical Assessment
Competitor evaluation	Project Evaluation	Idea generation	Idea Genesis	Product, project or service thorough definition	Pre-technical evaluation	Source of Supply Assessment
Product deign requirements generation		Product definition	Idea Selection			Market Research
Generation and selection of product design concepts		Project planning	Concept and technology Development			Product Idea Testing
Testing and prototyping of new product ideas		Executive reviews				Customer Value Assessment
						Product Definition
						Business and Financial Analysis

Table 13 Front End Innovation Models

The multiple studies carried out by these researchers (Table 13) demonstrate that FEI has had attention and is no longer considered as a pre-stage to development but an essential part of Product Development and it needs as much attention as NPD in order to deliver successful outcomes. All the FEI research carried out over the last twenty years has demonstrated that a product will potentially be more successful if the Front End Innovation activities have been thoroughly managed (Cooper, 1988). Back in 1988, Cooper and Kleinschmidt (1988) established that successful organisations spend more time and money on the FEI activities than the ones that are less successful so why is there still the conception that FEI lacks focus and importance?

SUCCESS AND FAILURE FACTORS IN FEI

Hüsig and Kohn (2003) identify five main internal factors that influence Front End Innovation Practices: strategy, culture, organisation, senior management and process. As FEI is part of NPD process, they show clear commonalities with NPD success factors in terms of topic, technical, commercial, innovative level and uncertainty reduction, and characteristics. Hüsig and Kohn (2003) consider both technical and commercial successes entitle an organisational culture that empowers creativity. This can be demonstrated by the use of multidisciplinary teams across technical and commercial issues, which typically brings innovativeness success. This compelling model (Table 14) highlights the importance of tools and methods as a key success factor for uncertainty reduction and innovative success. It also highlights the relevancy of FEI success factors has to do with the specific context within the project.



	Technical Success	Commercial Success	Innovativeness	Uncertainty Reduction
Strategy				Link to corporate strategy & objectives
		Fast Risk/ Uncertainty Reduction		Fast Risk/ Uncertainty Reduction
				Efficient management of information
Culture	Organisational Creativity	Organisational Creativity		
		Collaborative culture		Collaborative culture
Project & Process		Formal Process		Formal Process
	Cross Functional Teams	Cross Functional Teams	Cross Functional Teams	
	External linkages for ideation	External linkages for ideation	External linkages for ideation	
	Idea Source using electronic databases	Idea Source using electronic databases	Idea Sourcing as active process	
			Use of tools and methods	Use of tool and methods
Process	Preliminary idea	Preliminary idea		Preliminary idea
	Intense search/refine product/concept/idea	Intense search/refine product/concept/idea		Intense search/refine product/concept/idea
	Product/project evaluation	Product/project evaluation		Idea Selection
				Opportunity Analysis

Table 14 Success Factors in Front End Innovation. Adapted from Hüsig and Kohn (2003)

The outcomes of Front End Innovation and New Product Development processes are different as their scope and objectives differ from each other. However, in spite of this, research has shown they do have three common success factors: (1) a formal process; (2) the use of multidisciplinary teams; and (3) the alignment of the process to the business strategy and objectives. Underpinning these factors are three common key areas that impact on the process success factors: culture, senior management involvement and organizational practices. This sheds light to the fact that both although processes have different outcomes, there are common grounds and success factors to deliver quality outcomes.

1.2.4 Summary of Emergent Issues

The factors that impact on New Product Development range from individual to formal organisational factors. The creative performance (Baer, 2012) and motivation (Zhou and Shalley, 2003) of employees during the NPD process is crucial to determining the productivity of their tasks. There is overreliance on formal processes has led to low innovative outcomes (Barczak et al, 2009), which has raised the importance of the quality of data as a key driver in NPD (Kenneth, 2013). In terms of organisational factors, many authors have explored the importance of planning (Ernst, 2002), the consistency of objectives of the project (Song and Parry, 1997) and a market landscape focus (Souder et al, 1997) that discerns among many different angles and sources or research (Schmalen and Wiedemann, 1999). These factors are both process driven, customer centred and team based, creating a wide spectrum of things that need to be looked at when undertaking a New Product Development project.

The factors influencing Front End Innovation practices have been grouped into four groups: strategy, culture, process and project and process altogether (Hüsig and Kohn, 2003). However, they are also split into four categories regarding the success pursued: (1) technical, (2) commercial, (3) innovative or (4) seeking uncertainty reduction. What it is very interesting from these factors is how they are repeated across categories, highlighting how the core issues impact on the project success at very different levels. Some of these factors are: formal process, multidisciplinary teams, external linkages for ideation, active idea sourcing process, use of tools and methods, the concept of a preliminary idea and an intense search and refinement of ideas. From this diagram (Table 14), we can extrapolate the importance of the process and project factors while NPD process gives more importance to team and individual as key success factors.

SUCCESS factors in NPD	**SUCCESS factors in FEI**
Formal Process	Formal Process
Team and project leader	External linkages for ideation
Multidisciplinary team	Multidisciplinary teams
Innovation culture & wide range of research tools across the process	Use of tools and methods
	Active Idea Sourcing Process
	The concept of a preliminary idea and an intense search and refinement of ideas

Table 15 Comparison of Success Factors in New Product Development and Front End Innovation, by Author

The literature review has helped to discern a shift in NPD success factors from a focus on the process and organizational matters (Barzcak, 2009; Cooper and Edgett, 2012) to a quality of data focus based on a deep understanding of the target market and customer segment (Kenneth, 2013). Although both New Product Development and Front End Innovation have a wide range of factors impacting on them, and literature has shown they share three core success factors: a formal process, the use of multidisciplinary teams and a process alignment to business strategy. Although multidisciplinary teams are typically a robust factor for NPD and FEI success, there are controversies between what is more effective, generating ideas individually or collectively (Girotra et al, 2010; Björk and Magnusson, 2009; Tung, 2005). However, iterative idea generation in which participants generate ideas individually and then develop them collectively has shown to improve performance and outcomes (Girotra et al, 2010)

COMMON SUCCESS FACTORS IN NPD AND FEI		
Formal process	Multidisciplinary teams	Process alignment to business strategy

Table 16 Common Success Factors in NPD and FEI, by author

1.3 Factors Influencing Idea Generation Practices

Introduction

This section focuses on the generation, evaluation and selection stages of the FEI process, and will attempt to pinpoint the factors that impact on the generation of quality ideas. Specifically, this chapter will critically look at:

- Idea Management
- The idea management process
- Creative Confidence in Idea Generation Practices
- Factors that impact on Idea Quality
- Planning for Idea Generation practices
- The role of the group Facilitator
- Summary of Emergent Issues

1.3.1 Idea Management

This section focuses on establishing and understanding the current context of idea management. It will explore the precedent research that has been carried out in the area in order to identify a series of issues that typically impact on the quality of ideas.

Idea management is a structured process that includes generating, capturing, discussing and improving, organizing, evaluating and prioritizing valuable ideas (Rozwell, 2011) whether they are visual, concrete or abstract (Jonson, 2005). In spite of the importance of idea management for business growth (Dahl and Moreau 2002), little attention has been paid to understand and well define the phases of generation and selection of ideas, how companies generate ideas, judge success, select ideas or the factors sought to define the quality of an idea.

This study will particularly focus on the generation, evaluation and selection of ideas, as they are the core areas of idea management within FEI practices (see *Table 11)*.

Idea Generation

Ideation has been considered a crucial part of the design process for a long time (Broadbent, 1979). Dean et al (2006) highlight the relevancy of idea generation to drive better innovation practices in organisations as it drives the development of problem-solving capabilities. One of the first models for Idea Generation was the TOTE (Test, operate, test, exit), which is an iterative problem-solving model by Miller, Galanter and Pribram (1960) and it is based on feedback loops. TOTE has four stages: (1) *Test* - which relates to the representation of the given problem; (2) *Operate* by altering the problem; (3) *Test for a second time* to verify the problem has been solved. If this is not the situation, get back to Operate step and if it has go to (4) *Exit* -which relates to the completion of the project. This model has been widely used across iterative disciplines such as psychology and engineering.

In the last twenty-five years there has been a change in the way organizations generate ideas (Sowrey, 1990). One of the key considerations is the source of ideas, meaning - where do organizations get their ideas from? There has been a shift from closed innovation, which means generating ideas within the organization, to open innovation which aims to get input and ideas from external parties (Chesbrough, 2003). Chesbrough (2003) suggested that ideas can be sourced from two differing parties: (1) *innovation investors*, who typically belong to Research and Development department within the organization, or (2) *benefactors*, third parties that invest in the early stages of some innovation projects. Some mayor corporations such as Microsoft, IDEO and Cisco, have chosen an open innovation approach in order to try to obtain valuable contributions from outside of their organizations.

King and Lakhani (2013) identified a challenge that influences business performance when it comes to open innovation, which is the shift of costs. Whilst traditional idea generation practices have typically focused on generating ideas via primarily utilising internal capabilities and resources, open innovation practices look to maximise the use of external capabilities and resources to provide solutions, which aims to reduce risk. To do this, the NASA partnered with the InnoCentive tool, which helps the organisation to get more input on open innovation projects via crowdsource (King and Lakhani, 2013).

In terms of innovation methods, rather than tools to generate ideas, Graham and Bachmann (2004) identified nine commonly used innovation methods to generate new ideas: (1) *Problem Solution approach*, which is typically used when someone has identified problem and needs to find a solution to it; (2) *Derivative idea method* that helps to explore the evolution of an existing idea or product; (3) *Symbiotic idea* refers to a combination of different ideas to create a new one; (4) *Revolutionary idea* opens a new possibility that has nothing to do with the previous perspective; (5) *Serendipitous discovery* refers to ideas that have been created without intention; (6) *Targeted innovation approach* seeks to find an innovation about a focused issue; (7) *Artistic Innovation* adopts a very open and free approach in which there is a lack of constraints; (8) *Philosophical idea* is the one that can never be proven; and the (9) *Computer-assisted discovery* is an approach in which a computer can seek for more possibilities due to its numeric nature. These innovation methods can be used to generate ideas in multiple idea generation scenarios.

Idea Evaluation

The evaluation of ideas is a core stage within idea management with one of the key issues being 'who should evaluate ideas', exploring the emergent theme of specialised versus non-specialised people. Some authors, such as Anon (2008) promote the use of non-specialized people when it comes to idea evaluation as they tend to be less biased. This approach is based on the belief that when people do not have significant knowledge in an area is more objective when it comes to evaluate the ideas. King and Lakhani (2013) advocate this approach in open innovation practices. On the other hand, some organisations focus on striving evaluation processes from informed sources within the organisation, meaning informed and knowledgeable employees, building a community of experts for idea evaluation (Björk and Magnusson, 2009). Hornitzky (2009) agrees by stating that multiple experienced and knowledgeable perspectives on an area helps to evaluate and prioritize ideas.

Barczak et al. (2009) claimed the closer the idea is aligned to business strategy, the more likely it will lead to a successful product in the marketplace. However, in terms of evaluation of ideas, there is still a lack of common criteria. Some organisations pursue idea maps to visualise organisations objectives (Hornitzky, 2009), which helps to determine the business strategy but this is not a common practice. Gamlin et al (2007) highlight the need for a systematic idea management and to do this they claim the five elements that an organisation should have in order to implement an effective systematic idea management process: (1) the idea generation session should have a clear business objective; (2) understanding the business opportunity: (3) collecting ideas from multidisciplinary teams: (4) addressing challenges from a new lens, and (5) pursue idea implementation.

Some of the most common criteria to evaluate ideas found in literature relate to: (1) novelty (Dean et al, 2006; MacCrimmon and Wagner, 1994), which refers to rare, original and unusual ideas; (2) feasibility (Diehl and Stroebe, 1987) of how viable it would be to implement the idea; (3) its ability to solve a problem (Taylor et al, 1958); and (4) the ideas alignment to business objectives (Valacich et al, 1994).

Nevertheless, the core issue in Idea Evaluation is the lack of attention organisations pay to this stage. It appears many organisations only engage with ideas when they are sure the resources invested will pay off (Reitzig, 2011). Both this lack of engagement and the challenges in idea generation represent a complex set of issues within the Fuzzy Front End of Innovation that need more attention (Barczak et al, 2009), especially when dealing with radical market success uncertainty (Reid and Brentani, 2004).

Idea Selection

The selection of ideas, the last stage of the Idea Management process, is both a difficult and costly part of the process (Toubia, 2006). Reitzig (2011) claims that Idea Selection is the most difficult part of Idea Management as it is about choosing what ideas will be moved forward into implementation. He studied more than 10,000 innovation proposals within a large organisation to understand the way ideas are screened and selected. He found that senior managers delegated to subordinate managers to evaluate the ideas they considered less important and passed the ideas they considered of great importance to top management. This behaviour suggests that the decisions to take an idea forward are not based on criteria foundations but on a managers' choice (Desouza et al., 2009).

Barczak et al (2009) highlight that many organisations do not have a formalised selection process and therefore are prone to wasting promising ideas because they are not able to identify them. Due to this issue, they highlighted the need to invest more in the idea selection stage in order to improve innovation performance in organisations by learning how to select the best ideas.

Organisations often struggle with making ideas available to others within the organisation due to a lack of sharing of ideas. Barczak et al (2009) claim that there is a lack of idea sharing that results in half of the ideas generated in New Product Development being only known by the person who generated them.

1.3.2 The Idea Management Process

There are three models in literature that are of special interest in terms of the Idea Management for this exploratory study. There is an evolution across them from the general (1) NPD process to the specifics (Ulrich and Eppinger, 1995), (2) Design (*Double Diamond Design Process, 2005)* and (3) Design Thinking processes (Baeck and Gremett, 2011) to generate ideas and solve complex problems.

Ulrich and Eppinger's (1995) Concept Development Stage (CDS) (Figure 8) model acts as the basis for the Case Study Framework. The CDS is divided into nine stages in which customer needs, idea generation and selection are at its core, which is why it has been selected as the core model for this study. Their starting point in the Concept Development Stage is to generate a Mission Statement to help them focus on key issues to be targeted, avoiding a lack of focus. Secondly, the information gathering takes place by targeting competitors and market understanding. The third stage focuses on the generation, selection and refinement of product concepts, highlights the importance these phases have in order to generate high quality ideas that can be taken into the New Product Development process to launch successful products to market.

The Design Council developed in 2005 a visualisation of the Design Process (Figure 4). They divided it in four core linear phases: discover, define, develop and deliver. The Design Council carried out a thorough research on the Design Processes used in global corporations in 2007 and published a report in which they expanded their Double Diamond information process. The visualisation of the process conveys the convergent and divergent types of approaches designers go through when dealing with a problem. It is divided in four stages that include several activities each. The first stage, (1) Discover includes some preliminary data gathering via market research, user research and information management. The key aspect of this stage is that the organisation is to generate the core question and identify the problem via data gathering from diverse sources; the second stage, (2) Define, focuses on idea generation that is triggered from the data gathered during the process; (3)

Develop stage is based on the refinement and development of the ideas; and (4) Deliver aims to prototype and select the winning ideas.

The reason why this model has been chosen for the Framework is that it conveys complex information in a very simplistic way. There are only four key phases but they have very clear activities, purpose and outcomes. Although this 4D Design Process is a well-established model it only highlights the stages within the processes. It does not shed light on the actual starting point of the process as well as the planning for the Design Process, which is something the Idea Generation Framework has aimed to highlight in order to develop better performance and outcomes results. Due to the exploratory nature of the Framework, the last stage, *Deliver* has been emitted from this study as its focus is not pursuing the final prototyping of an idea, but its generation, development and selection to feed into the corporation's innovation pipeline.

Thirdly, the Framework is also based on the Baeck and Gremett (2011) Design Thinking Process (Figure 9). They claim defining business challenges need empathy, creativity and users' feedback, placing idea generation at the core of problem definition in Design Thinking.

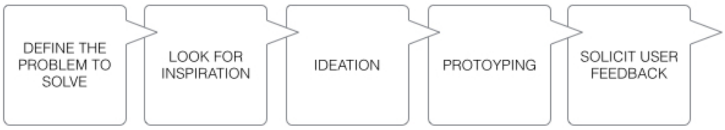


Figure 9 The Design Thinking Process by Baeck and Gremett (2011)

This model was very relevant for this study as the first step is to *Define* the problem to solve, which it is considered at the core of this exploratory study, and the importance put into requesting user feedback after the idea generation, ensuring the ideas meet a user need or insight. Baeck and Gremett (2011) model is not only about solving problems, but about defining business challenges and finding new ways to address them. The ideation process needs to generate holistic solutions that meet user needs and generate revenue.

Figure 10 shows the interrelationship among the core models and creates the bases for developing an Idea Generation Framework. Figure 10 shows the common phases they comprise, which can be grouped under three main phases: (i) defining the problem, (ii) preparation of data and information and (iii) generation which comprises idea generation and development. In summary, the reasons why these three models have been chosen as the key models in literature as the base for the Framework are: (1) They are all well-established; (2) To follow common phases; (3) The have common outcomes; and (4) The focus on ideation to solve problems.

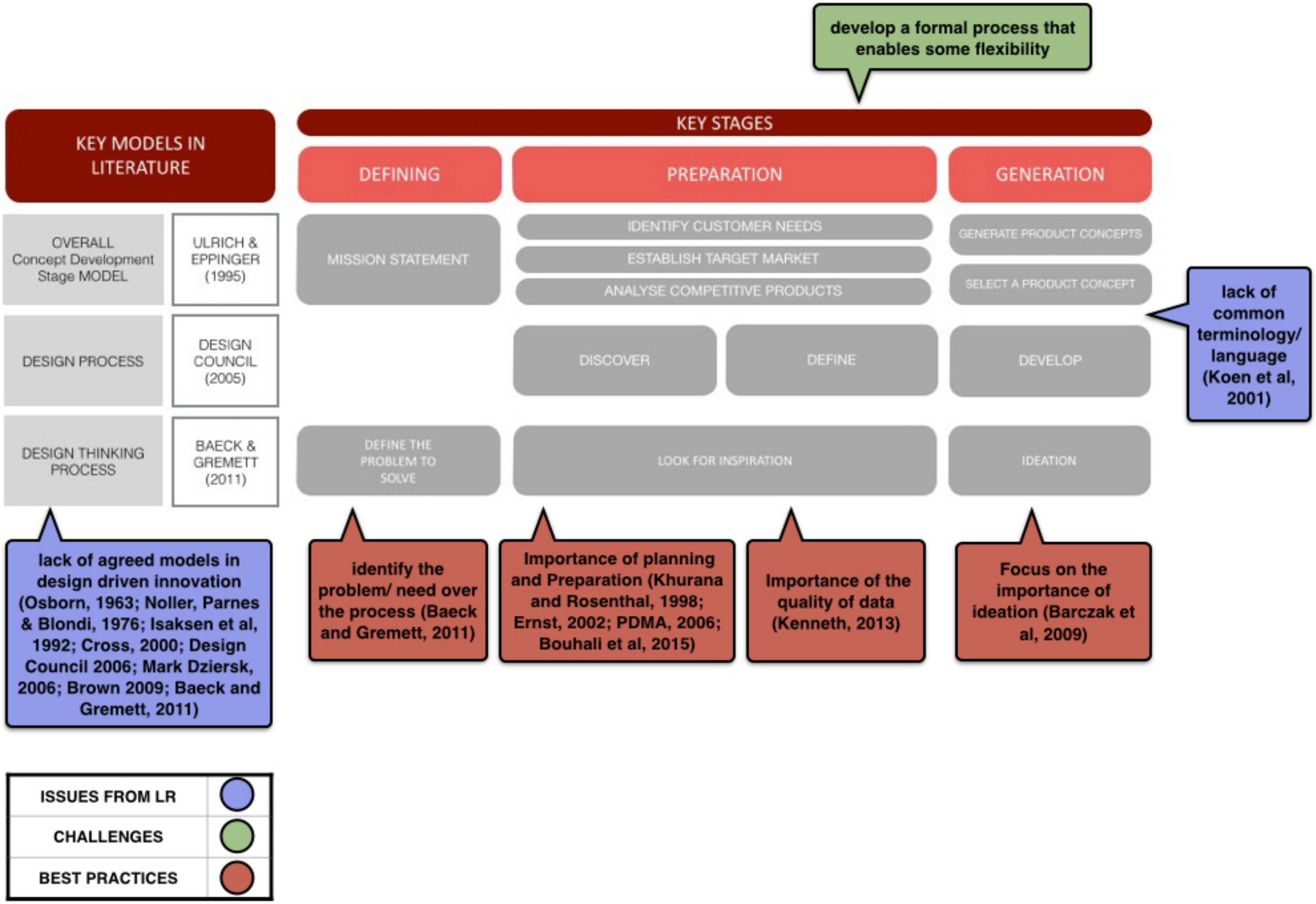


Figure 10 Key Models in literature, Author

1.3.3 The Role of Creative Confidence in Idea Generation Practices

Creative Confidence is an emerging issue that is closely linked to idea generation and creativity. This section will inform about its evolution across the last few decades and will also inform its relevancy within idea generation practices.

Creative Confidence and Self-Efficacy

Kelley and Kelley (2012) first introduced the term Creative Confidence in the Design Thinking field and defined it as the ability to come up with breakthrough ideas, combined with the courage to act. They claim Creative Confidence is closely linked to Design Thinking and Idea Generation practices. Their approach focuses on its impact on creative practices and how people who are not used to engage in creative tasks behave when going through one.

The concept of Creative Confidence has been explored since the 1970s, however, the term used was *'self-efficacy'*, which is defined as the belief in a person's abilities to carry out tasks and achieve objectives and goals (Ormrod, 2006). Albert Bandura (1977) was the first to undertake research about this concept, a psychologist and Stanford professor, who has contributed to the fields of social cognitive sciences and psychology for the last six decades. He started exploring self-efficacy when researching about alleviating phobias to determine the impact of self-efficacy in human functions. During the 1980s Bandura's research focused on human cognition in the social learning context and developed the Social Cognitive Theory, typically used in psychology, education and communication. This theory suggests behaviours are not only learnt by own experimentation but also by observing a behaviour and its consequences, can trigger remembering the sequence of events and trigger our understanding of following behaviours as well as to engage with the learnt behaviour (Bandura, 1986). The relevancy of this theory for self-efficacy and creative confidence topics is the correlation between self-efficacy and behavioural change this theory points out. Social Cognitive theory claims learning occurs when there is a close relationship between the observer and the 'behaviour model increasing when the observer has high levels of self-efficacy. At the same time, individuals that consider they have mastered a behaviour or task will typically become more active and motivated performers (Bandura, 1993). Bandura defines Self-Efficacy in the following terms:

> “Perceived self-efficacy is defined as people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives. Self-efficacy beliefs determine how people feel, think, motivate themselves and behave. Such beliefs produce these diverse effects through four major processes. They include cognitive, motivational, affective and selection processes.”
>
> Bandura, 1994.

Bandura also determined four key factors that impact on self-efficacy: (a) *Experience and success improve self-efficacy*, it also improves when we see someone succeeding and we think by (b) *Modelling,* considering “If he can do it, I can do it”; (c) *Social Persuasion* which occurs when we are encouraged or discouraged by someone else; and (4) *Physiological factors* such as shaking, sweating, experiencing fear when carrying out a task can have an impact on one’s self-efficacy, typically lowering it. His studies on this subject draw upon social insights in common situations but do not focus on the work environment specifically. In fact, during the last decade, his interest lies on the cognitive side of self-efficacy in education where he claims self-efficacy is the trigger to students for being up to date with technology but also avoid being overwhelmed by it, positively influencing their cognitive capabilities as well as their flexibility to embrace change (Caprara et al, 2008). Nevertheless, Bandura’s insights can be extrapolated to the work environment, with reference to the work of contemporary authors, such as Kelley and Kelley (2012).

However, as previously explored, many other authors (Luszczynska, Gutiérrez and Schwarzer, 2005; Ormrod, 2006; Caprara et al, 2008; Chong and Ma, 2010) have explored the impact of self-efficacy in the work environment. Within a business context, self-efficacy has an impact on human functions when performing work tasks. For instance, a lack of self-efficacy makes making choices rather difficult, as people avoid performing tasks when there is low self-efficacy. This issue triggers patterns in erratic behaviour, where individuals consider the tasks are harder than they are. On the other hand, when the levels are high and self-efficacy overcomes ability, individuals are willing to undertake challenging tasks (Csikszentmihalyi*,* 1997). When this happens, individuals with high self-efficacy typically complete a given task and try harder to achieve their goal feeling more motivated.

Chong and Ma (2010) explored the role or Self-Efficacy in the work environment and identified a series of factors that impact on idea generation. They consider two core factors that impact on self-efficacy: individual and organizational. In terms of individual, they consider attributes such as ethnicity or cultural heritage and managerial experience influence someone's belief of being able to carry out a task or function. As for the organizational factor, Chong and Ma suggest that employees who seek support from their supervisor tend to have a predisposition to taking risks, which is a sign of self-efficacy. Furthermore, they claim self-efficacy is purely influenced by the work environment and not by cognitive skills or psychological factors.

While self-efficacy studies focus on social cognitive factors and both common and work environment situations, Creative Confidence approaches focus on its implication on idea generation and design thinking practices. Kelly and Kelly introduced the concept of Creative Confidence in the Harvard Business Review Blog and in a TED talk by Tom Kelly in 2012, followed by their book launch *Creative Confidence: Unleashing the Creative Potential Within Us All* in 2013. Their approach has the psychological point of view based on Bandura's (1977) phobias studies. They identified a series of fears that affect creativity: (1) *Fear of the messy unknown*, which is related to the anxiety individuals undergo when dealing with an unfamiliar topic; (2) *Fear of the first step*, which refers to individuals avoiding being the first ones to make a suggestion, give an opinion or make a decision to avoid blame; (3) *Fear of being judged*, for which reason people usually do not take risks when sharing ideas to avoid rejection by the group. This fear has a direct impact on the quality of ideas generated, if there is not a willing to share the best ideas for the fear of being rejected, they will not be able to be moved forward in the process; and (4) *Fear of losing control*. This fear appears in individuals that have difficulties letting go bad ideas and struggle to leverage fresh perspectives.

There is also an anthropological and social approach to creative confidence. Authors like Chandler (2012) suggest we were all very creative during our childhood and reminding people they are creative beings can enhance their Creative Confidence. This approach is sustained by the belief that creative behaviours are innate but we become non-creative over time (Land, 1992). He undertook an experiment to measure the levels of creativity comparing children and adults. He compared results from a creativity test performed on 1600 children at the age of five, ten and fifteen years old and compared the results with those of 280.000 adults. The result showed a 96% plunge in the levels of creativity from 5-year-old children to adults.

This section has shed light onto Creative Confidence as an emerging factor that can have an impact on better idea generation participants' performance. If employees are able to overcome fears that block their creative confidence and are better trained to develop their creative skills and capabilities, the literature suggests the creativity levels would raise, impacting on better idea generation performance.

1.3.4 Factors that Impact on Idea Quality

How do we judge what is a good idea? How do we define the qualities of an idea? The relevance of these concepts is at the core of this research study. There is a significant interest in determining the value of idea quality in literature. This study aims at enhancing the quality of ideas generated in FEI practices; which is why the treatment and analysis of Idea Quality in academia are of particular importance.

What is a 'quality idea'?

In an idea generation session, the objective should be to generate high quality ideas (Reinig and Briggs, 2008), however, organisations tend to pursue the generation of a large number of ideas no matter their quality (Diehl and Stroebe 1987; Fjermestad and Hiltz 1999).

The quality of ideas is at the core of commercial market success (Goldenberg et al., 2001). Many authors have looked into this topic and have identified similar characteristics of what constitutes a Quality Idea: (1) its feasibility and implementation aspects (Diehl and Stroebe, 1987; Briggs and Reining, 2007), (2) its relevance to the given problem (Aiken et al, 1996), and (3) its ability to solve this problem or situation (Kramer and Kuo, 1997). A different point of view of how to identify a quality idea is suggested by Reinig and Briggs (2008), who propose that high quality ideas are the ones that can drive successful outcomes, enabling the right decisions, while low quality ideas are unable to achieve successfully the objectives.

In terms of the objective of a quality idea, Briggs and Reining (2007) state the need for a quality idea to attain its goal while Shah et al (2002) and Nelson et al (2009) focus their concept of idea quality on its ability to meet a design specification.

Therefore, it appears that current thinking within design disciplines is fragmented, with individual researchers assigning different meanings and values to idea quality criteria: novelty, feasibility, applicability and effectiveness. This lack of agreement on what constitutes a quality idea highlights the importance of establishing a common evaluation criteria that can be used at the beginning of an idea generation session in order to determine the nature and characteristics of a successful outcome – i.e. a quality idea. Although there is a dissonance surrounding the issue of Quality in Idea Management (Dean et al, 2006), specifically in Design and Design Thinking, metrics exist within Management research (Vandenbosch et al, 2006) to determine and assess the quality of an idea, helping to define quality. The next section will explore them.

Idea Quality Evaluation

In spite of the importance of quality ideas, little attention has been paid to this issue (Bjork and Magnusson, 2009). Shah et al (2002) suggest four alternative metrics to evaluate ideation effectiveness: novelty, variety, quality and quantity. However, quantity of ideas generated does not lead to better quality ideas or a more successful idea generation session. Dean et al (2006) agree on novelty but add three more metrics: workability, relevance and specificity. They consider the rareness or uniqueness of an idea as not a valid measure from which to determine an idea quality if it lacks feasibility and relevance for the organisation's business objectives.

Dean et al (2006) explore a wide range of different studies and authors and identify different ways to measure the quality of ideas, thus demonstrating the lack of common criteria applied to evaluate idea quality. However, by undertaking a thorough literature review, this study has been able to identify most common idea quality metrics: (1) *feasibility* (Diehl and Stroebe, 1987) also known as reliability, which refers to the capacity of the idea to be implemented; (2) *novelty* (MacCrimmon and Wagner, 1994), which refers to the uniqueness and rareness of the idea; (3) *problem solving capabilities* (Taylor et al, 1958), which refers to very specific problem-solving idea generation triggers; (4) *intrinsic value* (Boehm et al, 2001); its (5) *alignment to business strategy* (Valacich et al, 1994); (6) applicability (Dean et al., 2006); (7) effectiveness (Reinig et al., 2007).While there is not a single common parameter to define quality on its own, this study has synthesised the multiple metrics that have been proposed in the literature, grouped them into three groups. This has helped to identify the three most common success parameters that, when combined, can contribute to determining the quality of an idea in Front End Innovation practices (Figure 11).

1. **<u>GROUP 1:</u>**
   1.1. SUCCESS PARAMETER: Uniqueness of idea
   1.2. SUCCESS METRICS:
   - Novelty
   - Intrinsic value
   - Problem solving

2. **<u>GROUP 2:</u>**
   2.1. SUCCESS PARAMETER: Viability of idea
   2.2. SUCCESS METRICS:
   - Feasibility
   - Applicability
   - Effectiveness

3. **<u>GROUP 3:</u>**
   3.1. SUCCESS PARAMETER: Business Fit of Idea
   3.2. SUCCESS METRIC:
   Alignment to Business Objectives

Within these three groups there are still multiple metrics that form each of them, however, in this research study Idea Quality will be defined by the potential (a) feasibility, (b) novelty, and (c) alignment to business objectives of the idea. These three metrics have been selected because they have the advantage of being able to be used to determine: (1) the viability of an idea to be potentially implemented, (2) determining how original and unique an idea is and (3) how well the idea aligns with business or project objectives.

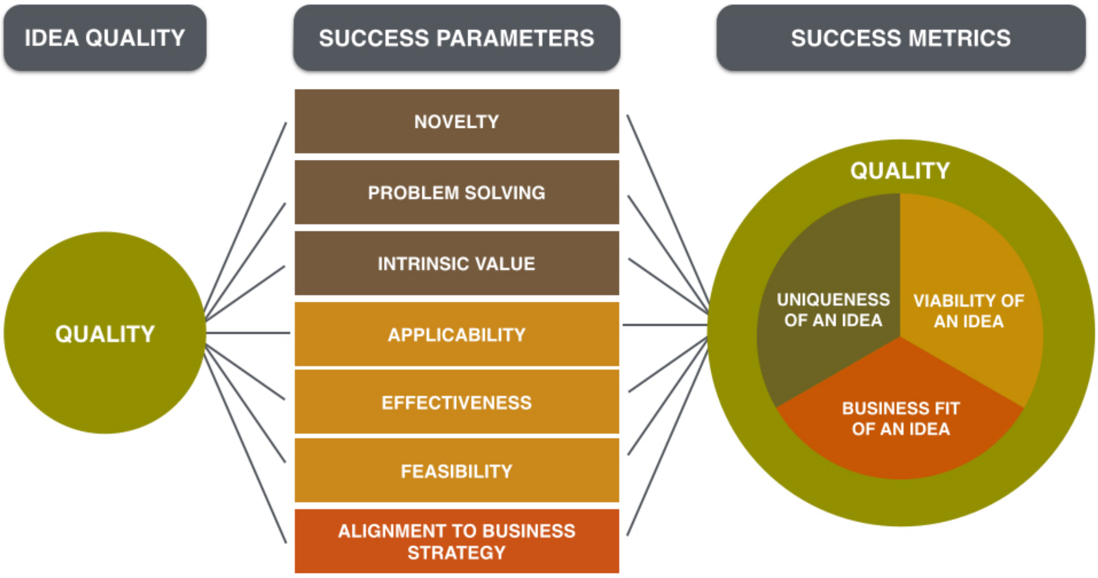


Figure 11 Success Metrics for assessing Idea Quality, by Perez and Bolton (2016)

The Dilemma between Idea Quality and Idea Quantity

Historically, the typical approach to Idea Generation has been to generate a large number of ideas in order to find a suitable solution to the problem (Goldenberg et al 1999). In the 1960s and 1970s there was an interest in pursuing strategies based on the quantity of ideas generated, advocated by authors like Osborn (1963) and Chohan (1979), who considered generating as many ideas as possible would increase the chances of finding a good quality idea. However, other authors argue that not all ideas will lead to innovations or be creative enough (Vandenbosch et al 2006). This is the reason Ulrich and Eppinger (2000) state how seeking quantity lowers the quality of the ideas. This behaviour motivates people to say every idea that crosses their mind, no matter how good or bad it is.

A key question to emerge is how many ideas do you need to generate in order to have a very good one? This is a topic that many authors have researched. There are two contrasting views. Stevens and Burley (1997) suggest organisations need to generate 3000 ideas in order to generate one quality idea that will lead to innovation. However, other researchers consider 3000 ideas too many, for instance, Cooper and Edgett (2007) state only 100 ideas are needed to get to a quality idea. Over a 10-year period of research into this issue the quantity of ideas needed to generate a successful idea has decreased significantly. Barczak et al (2009) demonstrate this trend by stating that only 6.6 ideas are needed to generate a good quality idea that will represent a market success. These numbers represent guidance for idea generation, but in order to enhance the way ideas are generated there needs to be the right people, process, strategy, tools, data and methods involved in the practice.

Extensive research by Ulrich and Eppinger (2000) and Barczak et al (2009) claim there is no need to generate more ideas. Their work suggests that more emphasis should be placed on generating fewer higher quality ideas that have more chance of achieving new product success. However, there are still many organisations that focus their idea generation practices based upon generating a large number of ideas rather than fewer quality ones (Girotra et al, 2010), believing that the more ideas generated the more likely it will lead to generation of more quality ideas. However, the challenge is to create a selection process and criteria that will improve the organisation’s performance to choose the best ideas to implement (Reitzig, 2011). There are differences in addressing idea quality across industries. For instance, manufacturing organisations settle for ideas that achieve good quality production numbers rather than one extraordinary products with potentially many failures (Girotra et al, 2010), however there is no consensus in literature and it is still catalogued as the dilemma between quality and quantity.

Measuring Idea Quality

Reining and Briggs (2006) claim there are three types of quality measurement. Their strategy lies on assigning scores to an idea based upon its features relating to: (a) the total number of scores of the idea in an idea generation session (Jung et al, 2005); (b) the average of quality scores of all the ideas generated in the session (Valacich et al, 1994); and (c) the count-of-good-ideas generated in the session (Dennis et al, 1997). Reinig and Briggs argue that the first two approaches can suffer from bias as random ideas can be misinterpreted by summing scores and raises the illusion of a higher number of quality ideas, On the other hand, average-quality-scores can negatively impact on quality ideas by lowering the overall scoring due to the bad ideas.

Girotra et al (2010) suggest there are four different ways to measure Idea Quality: (1) To establish an average quality of the ideas generated; (2) the total number of ideas generated; (3) the variance in the quality of ideas generated, ranging from the best to the worst ideas; and (4) the ability of the group to discern the quality of ideas, which relies on the participants in the session. However, Girotra et al (2010) do not suggest evaluation criteria to determine quality of ideas.

Other authors such as Dennis et al (1997) and Reinig and Briggs (2006) claim the quality of ideas generated in an ideation session refers to the count-of-good-ideas, which is about totalling the ideas that meet a set evaluation criteria. These researchers advocate this is the most reliable method to measure idea quality because it only records the total number of quality ideas and does not include the bad ideas in the scoring.

1.3.5 Planning for Idea Generation Practices

Planning is defined as the process of establishing tactics to achieve something. Planning's importance lies in its worth to shape both strategy and allocation of resources during innovation projects (Bluedorn, Johnson, Cartwright, & Barringer, 1994; Mumford, Schultz, & Osburn, 2002a). Planning has been linked to effectiveness (Kanigel, 1997) when dealing with creativity and innovation projects, however, the effectiveness of planning needs to be based on a wide portfolio and project range (Mumford et al, 2008). Mumford et al (2008:3) raised the question if organisations: "Could or should organisations attempt to plan for innovation?" suggesting planning could or could not be linked directly to the innovation of new products or the generation of ideas to develop those products (Amabile & Conti, 1999; Mumford & Gustafson, 1988). Planning has been advocated as a key success factor for NPD (Ernst, 2002), which also plays a key role in FEI (Khurana and Rosenthal, 1998; PDMA, 2006) projects.

In the context of Idea Generation planning Mumford, Bedell-Avers and Hunter (2008) point out the importance of planning in generating high quality ideas. Woods and Davies (1973) state there are two planning models which relate to effective idea management: (i) planning the actions to generate ideas and (ii) planning for developing the ideas to become a commercial success. Therefore, the quality of the planning in the previous stages impacts on the idea generation session outcomes, (Castrogiovanni, 1991). Mumford, Bedell-Avers and Hunter (2008) disagree by claiming that the level of uncertainty in idea generation and development is very high, planning does not represent the only basis for success. Teamwork and collaboration have also been identified to contributing to success (West, 2002).

Research shows planning is considered a mental simulation to guide actions (Xiao, Milgram, & Doyle, 1997; Patalano & Seifert, 1997). Mumford, Bedell-Avers and Hunter (2008) agree and suggest that planning stimulates future actions in two ways: (a) focusing attention on challenges, resources and causes; or (b) creating a *plan b* so that people can confidently carry out the actions. It is in turbulent and complex environments, with less resources or differences among departments, where planning tends to enhance performance the most according to Dean & Sharfman (1996).

Planning in innovation practices has been attributed to three factors: material, financial and human resources (Claver et al, 1998). Therefore, organisations that invest time in planning the process and the methodology of an innovation process but lack a constant culture will fail at their innovation performance (Letamendia and Marzo, 1993).

1.3.6 The Role of the Group Facilitator in Idea Generation Practices

In Idea Generation there needs to be a person to facilitate the session in order to manage the timings, the objectives, the people and the outcomes. It is of relevancy for this exploratory study because of its implications within the process and methodology. This section will explore what is the specific role of the group facilitator, what are the factors that impact on successful idea generation practices.

To facilitate is considered to make an action or process easier, for example, in order to undertake and complete a task whether it is in a meeting, in educational or training or in idea generation sessions. Doyle and Kaner (2007) defined the role of the facilitator as: *"An individual who enables groups and organizations to work more effectively; to collaborate and achieve synergy. He or she is a 'content neutral' party who by not taking sides or expressing or advocating a point of view during the meeting, can advocate for fair, open, and inclusive procedures to accomplish the group's work",* focusing on managing the content in order to meet the goals of the session. On the other hand, Kaner (2007) considers the focus of a facilitator is to manage the process, not the content, as *"The facilitator's job is to support everyone to do their best thinking and practice. To do this, the facilitator encourages full participation, promotes mutual understanding and cultivates shared responsibility. By supporting everyone to do their best thinking, a facilitator enables group members to search for inclusive solutions and build sustainable agreements".* Therefore, a facilitator should guide thinking during the activity or session and help to reach agreement among participants. They are also there to help enhance the use of processes, methods, tools and the group dynamics to properly manage the situation. Bens (2012) brings both definitions together by stating the facilitator is the person that enables effective high-quality decisions, which brings a new dimension to the role that the facilitator plays in Idea Generation practices.

There are two types of group facilitators: process based and content based (Miranda and Bostrom, 1999). Process based facilitating focuses on: (1) methods and procedures, (2) how relations are maintained, (3) how the tools are being used, (4) setting up the norms and rules, the dynamics of the group and (5) the climate of the session. The group facilitation that concentrates on content is more concerned about: (1) the tasks to carry out, (2) the problem being solved, (3) the topic being discussed, (4) the decisions being made and (5) the goals to be achieved. Consequently, process based facilitation is focused on how smoothly the process and practices are carried out while the content based facilitator is more concerned about driving thinking toward an agreed solution to the problem.

Bens (2012) claims enabling the group facilitator to ease effectively high-quality decisions helps to guide thinking and reaching closure, which includes reaching objectives, decisions, set criteria and agreement among participants. In relation to this matter, Doyle (2007) identified two current problems in organisations when it comes to group facilitation: (1) a lack of agreement on the solution to the problem leads to a failure in implementation, since participants had not bought in the idea or had misunderstood it; and (2) organisations that fail to harness the intellectual capital of their employees also fail to get focus. He claims that overcoming these two challenges via successful facilitation turns the corporation into the *learning organisation*. The first issue is closely linked to reaching consensus and making group decisions, which Doyle (2007) considers the *best hope for solving difficult problems*.

Kaner et al (2007) suggest that developing a shared vocabulary and terminology increases the level of agreement for group facilitation. This highlights the importance of a common shared terminology, discussed in previous chapters, in order to enhance performance and results in idea generation sessions.

Skills of the facilitator:

Research suggests that group facilitators need to have some basic skills such as timekeeping, following the agenda and keeping a record of issues, however, there are higher levels of competencies such as listening skills, which include the ability to paraphrase, to stack a conversation, to draw people out, to balance participation and to make space for introvert group members (Kaner et al., 1996). There is a consensus (Kaner, 2007; Bens, 2012) that one of the key skills of the facilitator is being able to guide convergent and divergent thinking. However, the facilitator has another crucial mission, which is to help participants to leave behind old patterns of behaviour and be opened to benefit from new habits (Doyle, 2007).

Facilitation became a formal career and profession when the International Association of Facilitators was founded in 1993, demonstrating its importance and the skills and competencies necessary to perform it well. The International Association of Facilitators stated that there are six core objectives that a facilitator must achieve: (i) To create collaborative relationships; (ii) To create and develop a participatory atmosphere; (iii) To plan the process; (iv) To promote and sustain professional knowledge; (v) To guide the group towards set outcomes and objectives; and (vi) to promote positive attitudes among participants.

1.3.7 Summary of Emergent Issues

Idea Generation is at the core of the Front End of Innovation practices (Broadbent, in Fowles, 1979) and it plays a key role in addressing challenges in this area (Dean et al, 2006).

Idea Generation Practices

The literature suggests it is the social aspect of Idea Generation practices that help drive the motivation and performance of participants (Bandura, 1993). Idea Generation focuses not only on the process but also in the people who take part in the session(s), as they are the ones that need to be able to generate the ideas, evaluate them and select them. An emergent issue is that by observing a new Idea Generation methodology, participants can learn the behaviours on how to perform at this type of session and learning how to address difficulties and challenges, as well as evaluating and selecting the best ideas. Iterative processes in Idea Generation allow participants to work individually for some time and then work together, which helps to improve idea quality (Girotra, 2011).

Idea Management

The literature has shown that the generation of ideas represents a complex set of tasks within FEI that needs more attention (Barczak, Griffin and Kahn, 2009). It has also shown there is a lack of agreement around the nature of Idea Management processes to achieve best results: (1) Systematic approaches are suggested to enhance employees' creativity and improve their innovation performance (Baer, 2012); (2) "Systematic and structured idea generation practices can help encourage an innovation culture within the organization" (Staw, 1990) but this can lead to reduction in levels of creativity (Boeddrich, 2004) however, there is a lack of systematic methodologies (Hubbard, 2010) in practice. Non-systematic processes typically help to generate multiple ideas but they "tend to happen by serendipity or managers' choice" (Murphy and Kumar, 1997; Desouza et al., 2009) and, on the other hand, very systematic approaches negatively impact on the levels of creative outcomes (Barczak et al, 2009). In summary, research suggests (Bolton, 2014) a balance of these type of processes might be the key to help to generate better quality ideas that are both creative and aligned to business objectives.

Creative Confidence

Research has shown Creative Confidence is growing in importance within organisations and can have an impact on idea generation outputs. It has highlighted a series of factors which draws attention to the person's capabilities and social cognitive abilities (creative confidence) rather than the methodology. However, there is not a set process or methods to improve Creative Confidence, which raises the questions: how can Creative Confidence be enhanced? How can it be measured? The literature review has highlighted how Creative Confidence is an emerging theme in Idea Generation practices and represents an opportunity to explore its potential to help generate better quality ideas, improve idea generation practices and evaluate individual versus group performance in idea generation sessions. A second factor that influences Idea Generation practices is planning of the NPD projects. The literature has established planning can lead to effective innovation outcomes (Kanigel, 1997), reinforcing it as a success factor not only in NPD (Ernst, 2002) and FEI (Khurana and Rosenthal, 1998) but also Idea Management.

Facilitation

When it comes to facilitation of Idea Generation practices the literature suggests that a lack of shared terminology decreases agreement, which impacts negatively on decision-making (Kaner et al, 2007). Furthermore, Michael Doyle (2007) has identified a core problem in organisations is that failures in implementation are typically driven by a lack of agreement on the solution due to poor facilitation of group Idea Generation practices.

1.4 The Impact of Uncertainty on Decision-Making in FEI

Introduction

This section is about the role of Decision-making in Front End Innovation practices and aims to provide the study with a deep understanding of its core areas, emerging themes, key players that have contributed to the development and further knowledge of this area. The key trajectories explored are as follow:

- Uncertainty in the Front End of Innovation
- The benefits of Reflective thinking in FEI
- The Role of Decision-making in FEI practices
- Summary of Emergent Issues

This section concludes by making a summary of emerging issues within the explored trajectories.

1.4.1 Uncertainty in the Front End of Innovation

The Front-End of Innovation is very sensitive to several sources and levels of uncertainty as it deals with challenges and questions in which there are more than one possibility (Hubbard, 2010). Uncertainty is associated to the concept of risk, which is attributed to a state of uncertainty, where some possibilities involve a loss, or other undesirable outcomes (Hubbard, 2010); in fact, uncertainty is considered a crucial factor in slowing down New Product Development processes (Carson, Wu and Moore, 2012) and a core driver for the need for problem solving and innovation (Nelson and Winter, 1982; Dosi, 1982; Boudreau et al, 2011).

Complex issues within innovation practices raises the level of uncertainty (Treacy, 2004) as they often involve serendipity and experimentation through trial and error (Sommer and Loch, 2004). Many authors believe that uncertainty is at the core of problem solving, and therefore of innovation (Nelson and Winter, 1982; Dosi, 1982; Boudreau et al, 2011), often driven by the practice of combining knowledge and ideas, which can lead to ‘recombinant uncertainty’ (Taylor and Greve, 2006; Katila, 2002). In Front-End activities uncertainty varies according to the complexity of the type of project (Griffin, 2011; Olson et al, 1995).

The more advanced and complex the project, the more the uncertainty teams experience (Fleming, 2001). Complexity can be interpreted as a cross-functional problem that requires expertise and knowledge from very diverse range of areas (Kavadias and Sommer, 2009). Jeppesen and Lakhani (2010) claim if the problem trying to be solved is not related to the area of expertise of the people involved, i.e. a higher the level of uncertainty, the more likely they will be successful. The reason this happens is because a potential solution to a problem can have multiple approaches and this type of scenario raises the level of competitiveness among participants to achieve a successful outcome.

The level of uncertainty is typically linked to the level of complexity of the project so the more complex the project, the more uncertainty people experience (Fleming, 2001; Griffin, 2011; Olson et al, 1995). This is the reason why in New Product Development uncertainty is often addressed by increasing the level of information around an issue. For instance, Souder and Moenaert (1992) claim some insights on the target market help to reduce uncertainty, while others such as Boundreau et al (2011) consider increasing knowledge around the problem is more effective. On the other hand, Stockstrom and Herstatt (2008) claim it is not the information around market research but an assessment on the originality of the idea what helps address uncertainty in NPD.

In addition, managers perceive the level of uncertainty around an issue (Reid and Brentani, 2004) to be crucial when attempting to develop strategies to address it.

Causes of Uncertainty

Zimmermann (1999) claims that a lack of information is the most frequent cause of uncertainty, who defines uncertainty as a situation in which a person does not have enough information about a given problem or behaviour to address it. This definition links uncertainty to the amount of information and knowledge needed to solve a problem. However, Newell and Simon (1972) have previously disagreed with this notion by suggesting that uncertainty can occur when there is too much data to be processed. These demonstrate the full spectrum of the drivers of uncertainty.

The different types of uncertainty also determine the type of NPD activities, for instance, when dealing with market success uncertainty (Reid and Brentani, 2004), idea generation should focus on addressing the uncertainty caused around market research.

In the context of Front End of Innovation, uncertainty can be related to a number of different issues. Herstatt et al. (2003) state that decision-making in Front End Innovation is a critical factor in success and Franke (2011) claims decision-making, within FEI, is typically influenced by four aspects: volatility, uncertainty, complexity and ambiguity of the problem.

Uncertainty can relate to a struggle when a person tries identifying user needs (Souder and Moenaert, 1992), assessing the level of innovativeness of a new product (Stockstrom and Herstatt, 2008), gathering the knowledge required for solving the problem (Boundreau et al, 2011), lack of expertise to undertake a process (Chapman and Ward, 2002) or lack of ideas (Fields, 2011).

Tversky and Kahneman (1974) explored uncertainty within the context of problem solving and suggested there are three main techniques to approach it. The first one, representativeness, refers to judging the likeliness that A belongs to B; the second one is availability, referring to participants determining the frequency of a development; and the third one is numerical prediction in economic contexts. However, this approach seems to lead to systematic errors because it does not engage with a better understanding of the problem-solving situation.

In summary, the literature has highlighted seven causes of uncertainty in New Product Development practices: (1) Lack of information (Zimmermann, 1999); (2) Too much data that people are unable to process (Newell and Simon, 1972); (3) Inability to identifying user needs (Souder and Moenaert, 1992); (4) Inability to assess correctly the level of innovativeness of a new product (Stockstrom and Herstatt, 2008); (5) Lack of quality of the knowledge gathered for solving the problem (Boundreau et al, 2011); (6) Lack of expertise to undertake a process (Chapman and Ward, 2002); and (7) Lack of ideas (Fields, 2011).

1.4.2 The Benefits of Reflective Thinking in FEI

There is a lack of common definition for the concept of reflective thinking (Freese, 1999; Ross, 2002). Schön (1983) previously defined it as “the capacity to reflect on action so as to engage in a process of continuous learning”.

Argyris and Schön (1978) were the first ones to suggest there was a loop in learning in which a person recognizes and amends an error. They claim there are two different types of ‘learning loops’ people follow: (1) the single learning loop error occurs when the practitioner keeps relying on the same attributes that led to the initial error which subsequently results in a repeat mistake; and (2) the double learning loop takes place when a practitioner changes the characteristics of something in order to avoid making the same mistake twice. One of Schön’s major contributions to new knowledge was to identify two kinds of reflection: (1) *on-action* thinking, which occurs after the event; and (2) *in-action* thinking that take places during the doing of an action. Reflection in-action relates to the practitioner connecting with their own feelings to address a given situation while reflection on-action refers to the analysis and exploration of the reaction after the situation. One of the core insights of Schön's (1983) reflective practice theory is that it identifies the importance of critical thinking. He suggests that the ability to question someone’s actions is crucial to discerning all the possibilities to address the issue. The reason this happens is that the person involved is able to develop critical thinking by evaluating if the decision made was the best action to sort out the situation. Prior to Schön's work, Kolb (1975) had created a model of reflective practices, which claimed the importance of experiential learning in turning information into knowledge. It is similar to reflection on-action by Schön (1983) as it seeks to gain an understanding of an experience and apply the knowledge gained to future experiences. Proceeding Schön's influential work (1983) several other models of reflective thinking have built upon and developed the theory. Gibbs (1988), whose work draws upon Kolb’s experiential learning cycle, added a structured debriefing stage which he split into a series of steps: description, feelings, evaluation, analysis, conclusions and action plan that provides a more complete set of stages to enhance the learning process. The first step, *Description*, focuses on describing the situation or experience without any subjective judgment; *Feelings* relates to describing reactions and feelings without analysis; *Evaluation* seeks to understand the reasons behind that situation, what really happened and how people involved felt; *Conclusions* connect to the personal situation of the individual;

and the *action plan* seeks to determine the changes and learnings from the situation that has just occurred. Johns (1995) built upon Gibbs (1988) by introducing a new factor: *shared reflection*. He claims how a joint understanding of a situation has a fast positive impact on the learnt knowledge. He develops a model that follows *five patterns of knowing*: aesthetic, personal, ethical, empirical and reflexive. All of which he claims need to be addressed by the practitioner through experience of the given situation.

Rolfe's model (2001) attempts to simplify the reflective cycle by asking three core questions: What? So What? Now what? By answering these apparently simple questions, it aims at providing a thorough description of the situation and therefore building up the key learnings from the situation or experience. Driscoll (2007) cycle of reflection is based on Rolfe's (2001) three key questions but he builds up a series of explanations to guide each of the questions. For instance, between the first question (What?) and the second one (So What?) Driscoll includes a sub-step in which the practitioner reflects on a series of selected aspects of the experience. This enhances the understanding of the issue before moving onto the next one; Because of this, during the second question (So What?) there is a better understanding of the learning outcomes from the reflective practice and after the third question (Now What?) an action plan with multiple learning outcomes is put in place. Consequently, with this cycle of reflection Driscoll (2007) promotes a deeper understanding of the situation around Rolfe's (2001) questions.

Reflective practice helps to focus on a specific encounter or issue during a given experience, representing a useful tool for practice-based professional performance, since thought and theory can be applied to work tasks (McBrien, 2007). A key idea in Reflective Thinking is to embed experiences into the process of building up new knowledge and therefore, enhancing the level of understanding around an issue (Paterson and Chapman, 2013). In the last fifteen years, research has shown a trend (Loughran, 2002; Bolton, 2010) that focuses on reflecting on personal experiences, providing knowledge and insight development, in order to achieve a determined outcome. This has an impact on current leadership roles, and coaching programs in organisations, since there is an opportunity for leaders to engage with reflective thinking and apply it in an organizational learning context (Avolio et al, 2010). Furthermore, Paterson and Chapman (2013) have developed one of the latest definitions of Reflective Thinking and present it thus: "*a conscious and* *systematic approach to thinking about experiences with the aim of learning and changing behaviours*". This exploratory study will adopt this definition of Reflective Thinking within the multinational business context.

Reflective practice has been explored across a number of disciplines from teaching to professional environments in relationship to developing an individuals' learning. Van der Schaarf et al (2013) tested the impact of feedback dialogues on school childrens' reflective thinking. The results showed a positive correlation on the students thinking stimulation for those who had interacted with the teacher during the dialogue feedback. Exploring this issue in the work environment, Stobbeleir et al (2011) demonstrated that employees' performance can be enhanced by an active feedback. Hence, there appears to be an agreement on the positive influence of feedback across disciplines and how it can be explored beyond professional learning. Driscoll (2007) focused on reflective thinking within the health sector but stated the principles of reflective practice extrapolate any discipline, as it is focused on promoting learning from experience and encouraging an active feedback to improve understanding and knowledge around behaviours, attitudes and values.

Reflective Practice and Design Thinking

Based on Schön's (1983) theory, Gänshirt (2007) attempted to apply reflective practices to the Design process. He suggests a circular Design Cycle structure exists that underpins all design processes. According to Gänshirt (2007) this manifests itself in three ways: (1) a practitioner starts by thinking about an idea and expressing it via design tools; (2) the idea is shared and perceived by others; and (3) the cycle starts again by enabling those individuals to think about the idea in a new loop, always keeping the idea as the main focus of the critical thinking. Gänshirt (2007) circular Design Cycle structure is based on a reflective framework that focuses on the expression and perception of the ideas to complete the reflective cycle and is embedded in the design thinking process.

Gänshirt's (2007) practices have been explored within business leadership positions to enable design thinking (Avolio et al, 2010). Organisations appear to be able to benefit from reflective practice by offering leaders and managers the opportunity to learn from practice-based projects both on the success factors and future improvements (Helsing et al, 2008).

This is typically achieved through training both the emerging and established leaders within the company together (Avolio et al, 2010), enabling them to learn from each of other rather than from purely their own groups experiences, which tends to be a drawback (Fisher and Gallagher, 2011).

Reflective Thinking and Uncertainty

Schön (1983) attempted to explore the connection between reflective thinking and uncertainty, specifically considering how reflective thinking could enhance the understanding of a situation and help to address uncertainty. He stated "The practitioner allows himself to experience surprise, puzzlement, or confusion in a situation which he finds uncertain or unique. He reflects on the phenomenon before him, and on the prior understandings, which have been implicit in his behaviour. He carries out an experiment which serves to generate both a new understanding of the phenomenon and a change in the situation" (Schön (1983: 68)). Schön's (1983: 68) statement helps to highlight the close relationship between the concepts of reflective thinking and uncertainty. Ghaye (2000, p.7) states reflective practice can help us to "make sense of the uncertainty in our workplaces". The same belief has been further developed by Nevalainen et al (2010), who studied the mental strains uncertainty can have on first year medical students. The results showed how uncertainty causes a major mental strain but can be mitigated by reflective writing (both for positive and negative feelings).

1.4.3 The Role of Decision-Making in FEI practices

Piotrowski (2011) claims decision-making is comprised by a thorough reflection and critical thinking and belongs to the last stage of a problem-solving process. The Front End of Innovation involves several opportunities in where decision-making can take place (Reid and Brentani, 2004). Making decisions involves making a choice among a series of available options and when it comes to a business context, it can represent a difficult task.

Piotrowski (2011) splits the decision-making process into a series of steps, which he suggests helps break down complexity: (1) *Identifying the problem among a series of people to recognize the actual issue that needs to be sorted out*; (2) *Identifying multiple solutions for an identified problem without settling for the first one* in order to pursue multiple options; (3) *Evaluating alternatives against a set criteria*, which can relate to the resources needed, the business strategy and how the ideas address that set criteria; (4) *Selection of the best available option against the evaluation criteria*; (5) *Decision Implementation*, which can range from a simple to a complex process; and (6) *Evaluating and or monitoring of results achieved from a decision*. These steps can be applied to decision-making with different levels of complexity, although the key issue is to have enough information about the problem to tackle it in order to minimise the chances of making the wrong decisions (Nonaka and Takeuchi, 1995).

Reid and Brentani (2004) suggest that there are three key interfaces within decision-making in FEI: (1) boundary interfaces, (2) gate keeping interfaces and (3) project interfaces (see Figure 12). Boundary interfaces, relates to the stage in the project were a person, called a boundary spanner, exchanges knowledge between the organization and the outside environment (Ancona et al. 2002). During this stage, project participants are often overwhelmed with information and frequently need to try to understand and extrapolate the emergent issues. The second decision-making interface, that of gate keeping, occurs when an individual (typically the boundary spanner) comes back to the organization with a large set of information. Higgins (1995) has stated that innovation often requires a social context to take place and that the gate keeping boundary is the first one that offers these conditions. Reid and Brentani (2004) agree upon this as they consider innovation a social process, while invention, which can occur in the boundary interface, is a cognitive process that happens at an individual level. The gate-keeping interface is still at an individual level and it aims at providing information to be analysed and evaluated by the organization. Two typical gatekeeper roles are the technological (Nochur and Allen, 1992) and marketing gatekeeper (Roberts, 1977), the reason behind it is that in the early stages of the FEI activities the role technology plays has a more important role, in terms of feasibility and potential possibilities, while the market becomes more important when attempting to identify key market gaps (Colarelli O'Connor, 1998). The final interface involves applying the information gathered relating to a specific project. Once the information has been gathered from the gate keeping stages, the process undertaking decision-making practices begin. Figure 12 highlights the different types of decisions made at the different stages of the model. For instance, at the first two interfaces (boundary and gate keeping) the decision-making is carried out at an individual level while at the project interface, the decision-making process becomes an organisational level matter.

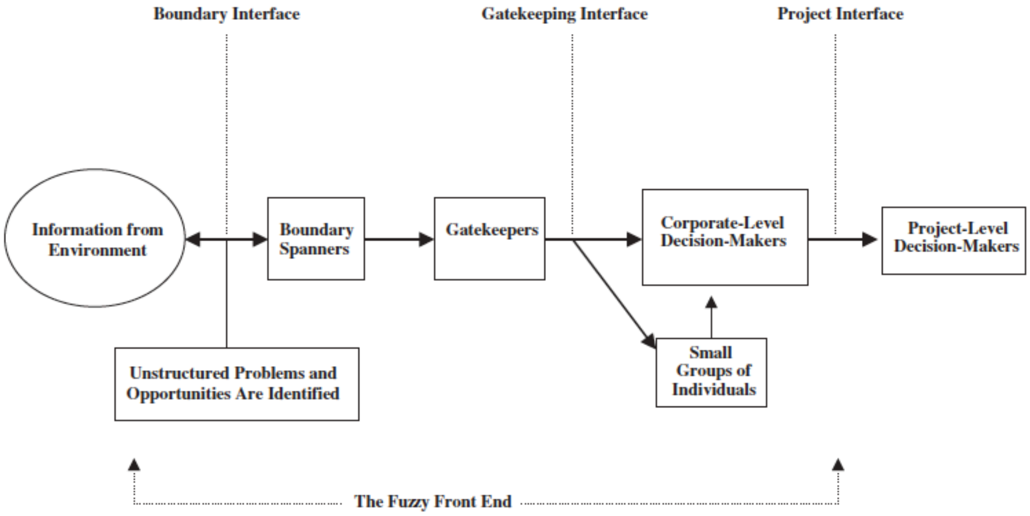


Figure 12 Decision Making Flow in Front End Innovation, Reid and Brentani (2004)

Decision-making in the FEI can be carried out by both individuals and or by an entire group. This brings to light differences and conflicts due to the fact individuals and groups undertake decision-making in different ways, for example groups behave differently from individuals when they make judgments (Kerr et al, 1996; Bottom et al, 2002) when dealing with Front End Innovation activities or matters. Previous studies (Kocher and Sutter, 2005; Blinder and Morgan, 2006; Charness et al, 2007) have suggested that group decision-making tends to outperform individuals by claiming that collective interaction of sharing a problem enhances the decision-making process. However, other researchers (Gong et al, 2009) argue the opposite, that collaborative decision-making made under uncertainty works better in low risk situations but it does not in high risk ones, and the other way around, individuals perform better when uncertainty is involved in high risk situations but not when the risk level is low. They suggest groups make very chaotic choices with they feel uncertain about the outcome while individuals keep a more sensible conduct. Nevertheless, this raises the question of why this happens? Uncertainty is a factor that influences group decisions for two reasons: responsibility roles and conformity outcomes. When dealing with uncertain outcomes team members tend to feel guilty and they typically blame the pressure they were put on that unconsciously forced them to make the safest choices (Gong et al, 2009).

When attempting to compare group and individual decision-making performance many researchers have used a series of novel approaches. Kocher and Sutter (2005) compared the way groups learn when it comes to guessing at an experimental beauty-contest game and found that they learn more quickly than individuals when it comes to decision-making, however, it does not mean they perform smarter *per se*. Another example is the research that Cooper and Kagel (2006) carried out by analysing the performance of individuals and two-player teams in pay-off games, which suggested teams tend to play more strategically than individuals, disagreeing with Kocher and Sutter (2005), who, after their 2005 study claimed individuals outperform when making decisions when it comes to payoffs. Consequently, Charness et al (2007) support Kocher and Sutter (2005) view, claiming the larger the group, the lower the error rate, then again disagreeing with Cooper and Kagel (2006) experiment by suggesting that social interaction enhances the decision-making process. Charness and Levin (2005) evaluation of decision-making among individuals indicated that they have a tendency to choose the first option at hand rather than making decisions with a more strategic focus for the organisation, which within a business context can lead to erroneous judgments (Kagel and Levin, 1986).

Herstatt et al (2003) assessed 28 Front End Innovation projects comparing Germany and Japan collective behaviours, which were dealing with uncertain outcomes. The results from this exploratory study aim to explore if there were any different approaches between the two nationalities to confront and address uncertainty in the Fuzzy Front End. Most of German teams integrated other departments (R&D, marketing, customer services, sales) in order to consider all the information and different perspectives to reduce uncertainty from the first idea generation activity in FEI activities while most of Japanese groups behaved differently by focusing on a thorough planning of front end activities to improve decision-making. With these very different approaches to uncertainty they both achieved the same outcomes. This shows how uncertainty can be split into diverse factors that can be further explored.

Nonaka and Takeuchi established the theory about Knowledge Creation in organisations in their influential 1995 book The Knowledge-Creating Company, where they identified the importance of knowledge creation and its link in supporting decision-making. They define organisational knowledge creation as "…the capability of a company as a whole to create new knowledge, disseminate it throughout the organisation, and embody it in products, services and systems" (p. 3). They identified that individuals drive the first stage of knowledge creation before it becomes organisational knowledge, derived from their own experience, which they defined as tacit knowledge. Their theory is comprised of five phases that contribute to making better and more informed decisions: (1) Sharing tacit knowledge; (2) Creating concepts; (3) Justifying concepts; (4) Building and archetype; and (5) Cross-levelling knowledge. These linear stages follow similar steps as other well-established concept development models, such as Booz, Allen and Hamilton (1982) and Ulrich and Eppinger (1995).

When dealing with uncertainty, its root must be considered as well as its level (Carson, Wu and Moore, 2012). Identifying the source of uncertainty can help to address it by strengthening the weakness of the area by providing more information or resources. Secondly, in relationship with the level of uncertainty being experienced, a measurable issue can more easily be dealt with in order to accelerate the approaches to New Product Development. This approach can help to reduce the complexity of the problem and as Charness et al (2007) claim, by reducing the level of complexity of the problem, the rate of errors tends to reduce accordingly.

Consequently, in New Product Development, the organization and its departments way of functioning have an impact on team members' decisions (Madhavan and Grover, 1996). They state rigid processes make it more difficult for employees to make the right decisions. Therefore, there needs to be a flexible process or organizational knowledge that enables individual decision-making rather than impacting negatively on employees' perceptions and judgments troubling their decisions. Doyle (2007) considers the impact of the poor team members' decisions is caused by a lack of agreement that leads to failure in idea implementation.

In summary, when it comes to uncertainty within an idea generation there are a series of emerging themes that have appeared in this section. Firstly, the way teams and individuals behave when dealing with uncertainty needs to be considered as research has shown they make different decisions depending on risk involved. Consequently, innovation has been established as a social process (Reid and Brentani, 2004) in which the different personalities, behaviours and attitudes must be taken into account while ideation is considered a cognitive process that only impacts at an individual level, not collaboratively. Secondly, this section highlights the difference between facing rigid or flexible processes when dealing with uncertainty and how they impact on the decision-making process.

Flexible processes facilitate decision making at an individual level, opposite to rigid processes.

1.4.4 Summary of Emergent Issues

Multiple issues have emerged from the previous research review in this section. These include the close relationship between Decision-making and Uncertainty within organisations. The following themes are identified and summarised:

This study has identified several causes for uncertainty in Front End Innovation practices: (1) Lack of information (Zimmermann, 1999); (2) Having too much data individuals cannot process (Newell and Simon, 1972); (3) Identifying user needs (Souder and Moenaert, 1992); (4) Assessing the level of innovativeness of a new product (Stockstrom and Herstatt, 2008); (5) Gathering the knowledge required for solving the problem (Boundreau et al, 2011); (6) Lack of expertise to undertake a process (Chapman and Ward, 2002); (7) Lack of ideas (Fields, 2011). As a summary of these issues, research has shown (Zimmermann, 1999; Newell and Simon, 1972) that uncertainty can be partially addressed by providing relevant and the right amount of information in idea generation.

The literature review process has identified several core issues regarding Decision-making within the Idea Management process, such as how a lack of agreement in making decisions can lead to failure in the implementation of an idea (Doyle, 2007). This raises the question is it better generate ideas individually and then evaluating them collectively in order to reach consensus? (Charness and Levin, 2005).

In relations to Reflective Thinking, it is has been possible to identify several key emerging issues and the importance of: (1) experiential learning in the workplace in helping to turn information into knowledge (Kolb, 1975); (2) Developing a joint understanding of a situation among individuals has a positive impact on the learnt knowledge (Johns, 1995); (3) Establishing a strong agreement during decision-making in Idea Selection (Doyle, 2007) in order to achieve successful outcomes; (4) Importance of asking the right questions in order to better understand a situation and therefore, build up the key learnings from the experience (Rolfe ,2001); and (5) the significance of allocating reflective thinking time within Idea Generation sessions to help address uncertainty (Ghaye, 2000).

In summary, the review of the literature has shed light onto the potential of Reflective Thinking to drive creative outputs. It enables a better understanding of the situation by building upon past experiences in order to confront it, which drives agreement in idea selection. Furthermore, reflective thinking has shown it helps to address uncertainty in idea generation sessions by improving shared decision making in teams leading to better outcomes. For all these reasons, reflective thinking will be further explored within practice in this exploratory research study.

1.5 Tools and Techniques in Idea Generation

Introduction

In this sub chapter of the literature review the focus is on the tools and techniques used in idea generation sessions, which are workshops in which the objective is to generate ideas around a given topic in order to achieve an objective, which is usually a problem or need. It fits at the end of the FEI process as it works upon the research stage. It represents the core activity to develop initial ideas that would fit into the innovation pipeline of the organisation. In this section, key authors, theories, themes and concepts that contribute to this topic area and the development of idea generation practices will be introduced and explored. The following trajectories are covered:

- Purpose of Idea Generation in FEI
- Idea Generation Techniques
- Tools in Idea Generation practices
- Summary of Emergent Issues

1.5.1 Purpose of Idea Generation in FEI

Idea generation is a core stage of the FEI process (Koen et al, 2001). However, the idea generation techniques play a key role in this stage. Many authors have claimed the selection of the idea generation technique is as important as the idea generation session itself (VanGundy 1988, Gallupe et al. 1992, Amabile et al. 1996, Couger et al. 1993). Therefore, its value should not be underestimated.

Idea generation techniques formalise idea generation practices through a series of rules and the visualisation of design thinking via different means (Shah et al, 2001). Idea Generation techniques also help to stimulate structured thinking among participants, which is linked to promote fluid idea generation (Nijstad et al, 2003) and better decision-making (Bos et al, 2008).

Factors involved in the selection of Idea Generation Techniques in FEI

The idea generation techniques are chosen accordingly to the challenge faced in FEI. Drucker (2008) suggests there are four types of problems: (1) *Truly generic,* which are the most common issues in the work environment; (2) *Generic,* but unique for the organisation in which it is appearing; (3) *Truly exceptional*, which relate to unique situations; and (4) *truly exceptional problems* that represent early manifestations of a new generic problem because they have happened several times. Consequently, not every problem will have the same solution or the same way to approach it. This is the reason why there are different Idea Generation Techniques, which pursue a different objective.

A second factor is the purpose of the idea generation session within FEI. Geschka (1983) identified two types of idea generation techniques according the objective of the session: (1) *Working principle* in which ideas are generated by stimulating the intuition of participants or idea generation based on systematically attacking the problem; and (2) *Idea triggering principle* where the ideas are the result from other ideas development or they are the result of confrontations with impressions unconnected with the problem in hand.

Lastly, a core factor when choosing an Idea Generation technique is the skill-sets of the session members. Some authors have explored people's capabilities for type of problem solving, such as Kirton (1994) who identified two kinds of characters when it comes to idea generation: the *innovators* and *adaptors*. He stated the innovators tend to create a clear overview of the problem and then tackle it from diverse points of view, consider a lot of ideas to address it and make assumptions. This approach enables the innovators to understand the problem or need to be solved, the factors involved and to create informed ideas and solutions for it. On the other hand, the adaptors lack these skills as they do not typically produce a large amount of ideas, nor they pay too much attention to detail in fact, they tend to look for robust and approved ways to solve the problem in a very pragmatic approach, tackling problems only from their own point of view. However, Kirton claims that people should combine skills from both of them as they both have relevant advantages for idea generation. However, moving away from ideation, López-Mesa and Thompson (2006) extrapolate the skills from adaptors and innovators to a design context in which adaptive methods refer to the improvement of existing solutions and innovative methods to the seeking of a radical new solution. In summary adaptors would perform better in incremental NPD practices while innovators would perform better in breakthrough innovation NPD projects.

1.5.2 Idea Generation Techniques

The way ideas can be generated has been an explored issue since the 1930s when Osborn pioneered the investigation of idea generation to solve a given problem. This section will focus on acknowledging the most common idea generation techniques in order to evaluate their strengths and weaknesses and determine the benefits of supporting tools that work as additional constructs to enhance the quality of outcomes.

BRAINSTORMING (Group Brainstorming)
Brainstorming is an idea generation technique invented in the 1930s by Alex Osborn, when researching about problem-solving methods. It was developed to address the observation that his employees often struggled to generate ideas. He decided to host group sessions to trigger creative thinking and observed an improvement in the quality of the ideas generated. The first time Osborn wrote about this technique was in the book Your Creative Power (1948), specifically in the chapter *How to Organize a Squad to Create Ideas*, however, it was in his book *Applied Imagination* where he further developed this technique.

Osborn (1963) considers there are two main attributes that determine effective ideation: (1) deferring judgement and (2) reaching for quantity. He proposed Brainstorming as an Idea Generation technique to increase creativity within organizations. He suggests four basic rules for the Brainstorming Sessions: (1) do not criticize, (2) quantity is very important, (3) combine and develop suggested ideas and (4) say whatever idea crosses your mind. He also suggests a person can potentially generate twice the ideas when working in a group than alone, contrary to numerous authors (Stroebe and Diehl, 1994; Paulus, Brown and Ortega, 1996; Girotra et al, 2010) who have researched about the controversies around the productivity of this technique (Diehl and Stroebe, 1987).

Sutton and Hargadon (1996) identified six important consequences from the use of Brainstorming from IDEO’s case study: (1) Brainstorming supports organisation’s memory of technical solutions; (2) It provides a variety of skills for the generation of ideas; (3) Supports wisdom attitude in and out of the session by bringing together participants with diverse levels of knowledge and expertise; (4) Creates an atmosphere that focuses on product design; (5) The brainstorming technique impress clients; and (6) it is still a very profitable technique.

On the other hand, Diehl and Stroebe, (1987) claim there are three key factors that explain creative productivity loss in Brainstorming sessions: (1) apprehension of judging ideas due to worry about other's opinions (also supported by Mullen, Johnson, and Salas, 1991); (2) delegating the task to others reduces the individuals personal effort to generate ideas, and (3) listening to ideas of others reduces the time an individual has to think of their own ideas (Stroebe and Diehl (1994) and Paulus et al (1996). However, group face-to-face brainstorming has indicated some positive consequences against nominal groups due to participants: (1) Feeling more satisfied and confident with their performance; (2) Perceiving that time passed faster; and (3) Considered that quantity and quality of ideas were generated was better (Mullen, Johnson, and Salas, 1991; Stroebe and Diehl. 1994; Paulus, Brown, and Ortega, 1996).

Group Brainstorming	
Advantages	**Disadvantages**
Includes a variety of skills	Production Blockage
Idea Combination	Free-riding
Impresses clients	Worry about others' opinions
Encourages a focus on product design	Relies on participants' skills & knowledge
Generates income	Focus on quantity rather than quality
Supports wisdom in and out of the sessions	

Table 17 Advantages and Disadvantages of Brainstorming

Brainstorming has also evolved into electronic activities, which are based on a computer-aided approach to generating the ideas via the computer. For example, GroupSystems, TeamFocus, Vision-Quest, and Software-Assisted Meeting Management, which have all the same basic functions of generating, developing, evaluating and implementing ideas. Valacich et al (1994) encouraged the use of the electronic brainstorming to facilitate the production of ideas (not its production blocking) generating a large number of ideas per person and seem to be as good as iterative process. However, there are several types of variations from the traditional group Brainstorming Technique:

Nominal (Iterative) Brainstorming

Delbecq and Van de Ven (1971) developed a variation of the traditional group brainstorming: the Nominal Brainstorming. The core attribute of this variation is the iterative thinking approach involving three key stages: problem understanding, decision-making and identification of solutions. The technique works as follows: participants of the session generate ideas individually and write them in a piece of paper, the facilitator collects the anonymous ideas and shares them with the larger group. People vote for their favourite ideas in a round-robin technique that fosters equal participation (Vedros, 1979) and the chosen ones are sent back to the groups to develop them. This type of technique has demonstrated an increase in idea generation output (Delbecq et al, 1975).

Sutton and Hargadon (1996) state people generate better ideas when generating ideas alone than when generating them in a face-to-face group practice. However, few studies examine quality rather than quantity. The use of an iterative technique for Brainstorming has been widely advocated since authors like Stroebe and Diehl (1994) have demonstrated group brainstorming produces less and worse ideas than nominal groups (iterative idea generation). Paulus et al (1996) agree with this idea and support the lack of productivity of ideas during group brainstorming as people are more concerned about their turn to talk and listen to others ideas than generate their own ones as well as an apprehension of ideas being judged and the worry about other's opinions (Mullen et al, 1991. Therefore, there is enough evidence that iterative idea generation has a positive impact on the quality of Idea Generation.

Nominal Brainstorming	
Advantages	**Disadvantages**
Encourages iterative thinking	Production blockage
Helps introverts to participate	Relies on participants' skills & knowledge

Table 18, Advantages and Disadvantages of Nominal Brainstorming

Brainwriting Technique

It is an idea generation technique in which people share written ideas in silent in a structured way (time and sequence format). Heslin (2009) supports the type of brainstorming in which writing is involved. It can help stimulate idea generation blocking the embarrassment of speaking up (Paulus and Yang, 2000).

Brainwriting	
Advantages	**Disadvantages**
Helps introverts to get involved	Production blockage
	Relies on participants' skills & knowledge

Table 19, Advantages and Disadvantages of Brainwriting

Group Passing Technique

The group passing technique seeks to focus on idea development. Sekhar and Lidiya (2012) defined the principles of the technique. Each participant writes down an idea and passes the paper to their next peer, each person builds upon their colleagues' ideas until they get back their own initial idea. One of the advantages of this technique is that all participants have read everybody's ideas and have a clear understanding of all of them.

Group Passing Brainstorming	
Advantages	**Disadvantages**
Focus on idea development	Production blockage
Addresses weaknesses in ideas	Relies on participants' skills & knowledge
All participants have a clear understanding of al the ideas	Builds upon ideas no matter how good or bad they are
Helps introverts to get involved	

Table 20, Advantages and Disadvantages of Group Passing Brainstorming

Guided Brainstorming Technique

This type of Brainstorming technique seeks to generate ideas under a series of specifications. It aims to develop critical thinking performance from participants, who need to play a specific role on each idea. Is the role-play what makes participants to identify solutions easily (Aldsersey-Williams et al, 1999). This technique involves ranking for a further brainstorming and a clear plan of action on what to do next.

Guided Brainstorming	
Advantages	**Disadvantages**
It develops critical thinking	Relies on participants' skills & knowledge
It improves idea development	Relies on the assigned role of each participant
It promotes structured idea evaluation	

Table 21, Advantages and Disadvantages of Guided Brainstorming

Breaking the Rules Technique

This variation of the Group Brainstorming is focused on determining a series of rules that need to be taken into account in the process. Participants of the Idea Generation session try to overcome those challenges (Plesk, 2014).

Breaking the Rules Brainstorming	
Advantages	**Disadvantages**
Encourages to find new solutions	Relies on participants' skills & knowledge
Improves idea developing	Free riding
	Production blockage

Table 22, Advantages and Disadvantages of Breaking the Rules Brainstorming

Team Idea Mapping Method

This Brainstorming technique variation, explained by Plesk (2014), starts as a nominal brainstorming in which individuals generate ideas individually and then put them together on a large idea map. The key point of this technique is the 'association among ideas' that leads to a common understanding of issues and idea explanation. The final stage of this technique is to prioritise ideas and develop an action plan.

Team Idea Mapping Brainstorming	
Advantages	**Disadvantages**
Builds upon the advantages of nominal brainstorming	Production blockage
Encourages idea development	Relies on participants' skills & knowledge
Encourages prioritisation of ideas	

Table 23, Advantages and Disadvantages of Team Idea Mapping Brainstorming

Individual Brainstorming

It is a technique that involves free writing, speaking or drawing a mind map. It is typically used in creative writing and has demonstrated increased individual performance when generating ideas over group brainstorming (Furnham and Yazdanpanahi, 1995; Diehl and Stroebe, 1991).

Individual Brainstorming	
Advantages	**Disadvantages**
Increases performance	It does not tackle idea evaluation
Encourages individual critical thinking	It does not tackle idea development

Table 24, Advantages and Disadvantages of Directed Brainstorming

Directed Brainstorming

Santanen et al (2004) suggest this type of Brainstorming triples the productivity of the session compared to group brainstorming. The technique is based on giving participants a piece of paper in which they write down their idea around a given question. The facilitator then gathers the papers and randomly gives them back to participants. They have to develop the new idea by fixing the problems they identify according to set criteria. The swap happens several more times so participants systematically improve the given ideas. This is a blended process that combines principles from iterative brainstorming and individual brainwriting that blends advantages from both techniques.

Directed Brainstorming	
Advantages	**Disadvantages**
More productive than group brainstorming	It pursues any idea not based on quality
Good for introvert participants	Production blockage
Combines effective practices from various techniques	Relies on participants' skills & knowledge

Table 25, Advantages and Disadvantages of Directed Brainstorming

Question Brainstorming

This type of Brianstorming technique focuses on brainstorming the questions around the issue rather than to generate ideas. It encourages an active participation for both the loud and the shy (Gumble, 2003), as there is no need to come up with solutions. Once the list is ready, the questions are prioritized in order to identify the best solution in a structured manner (Perry, 2000). This type of approach can be used to encourage Creative Confidence in groups where there are introvert members who struggle to speak up due to different fears (Kelley and Kelley, 2012).

Question Brainstorming	
Advantages	**Disadvantages**
Encourages active participation	Only focuses on idea development
Encourages evaluation of ideas	Free riding
Good for introvert participants	Production Blockage

Table 26, Advantages and Disadvantages of Question Brainstorming

6-3-5 BRAINSTORMING

The 6-3-5 Brainstorming is very similar to Brainstorming but it sets a target in the session: to generate 108 ideas in 30 minutes. Rohrbach (1968) developed this technique that involves a moderator and 2 teams of 3 people. Each member of the team has to generate three ideas every five minutes that their next colleague will build upon. After six rounds of ideas, 30 minutes later, the total of ideas generated needs to be 108. Although this technique focuses on quantity rather than quality Linsey and Becker (2010) suggest 6-3-5 Brainstorming outperforms nominal brainstorming by generating a larger number of ideas while quality does not decrease.

6-3-5 Brainstorming	
Advantages	**Disadvantages**
Idea development and combination	It focuses on quantity not quality
Ideas build upon others'	Free riding
Structured way to collect ideas	Production Blockage

Table 27 Advantages and Disadvantages of 6-3-5 Brainstorming

Summary of Issues Around Brainstorming

This section has highlighted the different variations from the original Group Brainstorming that have emerged over the years. It has shown how some of them could be defined as blended techniques, as they combine advantages from different variations in order to strengthen the type of Brainstorming.

These blended practices aim to defer judgement, focusing on the generation of ideas without intercepting it with judgements. They also help to block embarrassment from speaking out (Paulus and Yang, 2000) by promoting writing, for instance, on post it notes and promoting critical thinking performance from participants' association of ideas (Aldsersey-Williams et al, 1999), such as in Guided Brainstorming.

The best advantage of Nominal Brainstorming is the iterative approach by which people generate better ideas alone, which has shown evidence (Sutton and Hargadon, 1996) that iterative idea generation has a positive impact on the quality of the ideas generated. On the other hand, Plesk (2014) created a variation of Nominal brainstorming, the Team Idea Mapping Brainstorming that shows the benefits of collective performance, demonstrating that after individual idea generation a collective stage of common understanding of issues and idea explanation helps to prioritise ideas in a structured manner. This way Plesk (2014) utilised effective practices from individuals and enhanced group performance in order to encourage an active participation and overcome fears from Creative Confidence (Kelley and Kelley, 2012).

SCAMPER

The SCAMPER technique is considered a variation of brainstorming (questioning brainstorming) in which there are a series of set questions used to try to solve a problem or to identify an opportunity (Eberle, 1996). A similar more basic technique was suggested by Alex Osborn (1963) and was developed further by Eberle (1996). SCAMPER is a mnemonic acronym that stands for the actions that need to take place during the session Substitute, Combine, Adapt, Magnify or Modify, Put to other use, Eliminate and Rearrange or Reverse. Serrat (2009) has refined the technique through his thorough examination of each of the steps of this technique which have led to improved definitions of each stage: *Substitute* aims to substitute components, materials, process; *Combine* seeks to merge two or more things about a product or process creating something new; *Adapt* refers to identifying parts that can change the product or process; *Magnify or modify* seeks to make a radical change in the product; *Put to other use*, aims to determine other uses that can be relevant to the item; and *Eliminate,* which reflects on what would happen if some parts of the product or process are eliminated and what would be that impact. This technique is aimed at product or process improvement but it does not seek breakthrough innovations (Kudrowitz et al, 2014).

SCAMPER	
Advantages	**Disadvantages**
Questions stimulate thinking around opportunities	It seeks incremental innovation, not radical
Encourages original idea generation	
It uses action verbs as stimuli	

Table 28 Advantages and Disadvantages of Scamper

MORPHOLOGICAL ANALYSIS

It is a technique that explores solutions to a complex given problem. Zwicky and Wilson (1967) developed this technique to address complexity of issues as it clarifies connections that are not evident. Therefore, the Morphological Analysis aims to reduce uncertainty around the given problem by providing relevant information around it (Zimmermann, 1999).

> "Attention has been called to the fact that the term morphology has long been used in many fields of science to designate research on structural interrelations - for instance in anatomy, geology, botany and biology. ... I have proposed to generalize and systematize the concept of morphological research and include not only the study of the shapes of geometrical, geological, biological, and generally material structures, but also to study the more abstract structural interrelations among phenomena, concepts, and ideas, whatever their character might be."
>
> Zwicky, 1966, p. 34

The above quote from Zwicky summarizes the core of this technique. It aims to explore the connections among concepts and ideas in order to identify ways to combine issues.

Ritchey (1998) explains how this technique starts by identifying key parameters around the problem and giving them a score range. They are then set against each other. The participants examine the connections among parameters to identify feasible, novel or consistent links and then eliminate ones that are not feasible, novel and or aligned. The next step is to synthesize the process by selecting the ones to analyse further and develop a discussion around those configurations.

Ritchey (2009) further developed his research around Morphological Analysis and evolved its use into multiple purposes so it could be used to: (1) Develop and build scenarios; (2) Develop strategies; (3) Analyse risks; (4) Discern between means and ends; (5) Develop models for subsequent analysis; (6) Evaluate organizational structures; and (7) Visualize complex issues into comprehensible visual models.

MORPHOLOGICAL ANALYSIS	
Advantages	**Disadvantages**
Creates links among parameters	It relies on the chosen parameters
Discovers links that are not evident	

Table 29 Advantages and Disadvantages of Morphological Analysis

HIT

HIT is the acronym that stands for Heuristic Ideation Technique. Tauber first introduced this technique in 1972, when looking at systematic ways in which organizations could generate ideas. He suggested HIT relies on three key rules for idea generation: (1) combination of very diverse items leads to more innovative ideas and (2) new ideas typically come from combining several ideas, since the key of new ideas typically relies in blending two different attributes. No number 3?

VanGundy (1988) described HIT in detail for problem solving development purposes. The technique is based in choosing two novel products of any kind. The individual then writes a list of their parts, components or characteristics and map them in a matrix with two columns, one for each good’s characteristics. The final step is to find opportunities in the combination of these attributes to generate a new product by crossing out the combinations that exist already and identifying the ones that are novel and can represent a potential market opportunity. Some of these can be further developed and combined to create better ideas.

HIT	
Advantages	**Disadvantages**
Creates connections among parameters	It is constraint by the product characteristics

Combines unexpected factors	Relies on the ability to identify relevant factors
Not need of special training	Can lead to unfeasible ideas

Table 30 Advantages and Disadvantages of HIT

CONCEPT FAN

The Concept Fan technique was introduced by DeBono (1990) under the principle that ideas carry out concepts by which this tool expands the number of concepts associated with an idea and, therefore, creates a wide range of ideas generated. The technique is driven by the development of a *'question set'* (How do I do this? and What is this idea doing?) triggered by the initial ideas.

CONCEPT FAN	
Advantages	**Disadvantages**
Systematic expansion of ideas and concepts	Can lead to a very general landscape of issues
	Relies on participants' level of analysis

Table 31 Advantages and Disadvantages of Concept Fan

SIX THINKING HATS

This is an idea generation technique developed by DeBono (1985) in order to stimulate parallel thinking in groups. DeBono (1985) claims the human brain works well when it is challenged and therefore, this technique allows structuring focussed thinking around specific aspects of idea generation practices.

In this technique a team of six participants adopts different roles around the idea and each one focuses on identifying ways to develop the idea around their role. Each of the six participants has a 'coloured hat' that relates to the aspect they need to focus on. The categories are: Blue for focusing on *the end goal*; White to focus on *facts and information*; Green *inspiring creativity* and provoking further *investigation*; Black seeks to *identify reasons behind the decisions*; Red is focused on *gut reactions and emotions without justification*; and Yellow relates to positivism and logic applied to the *benefits of the idea*.

With this technique DeBono seeks to motivate systematic critical thinking in order to build robust ideas.

SIX THINKING HATS	
Advantages	**Disadvantages**
Builds upon same idea to strengthen it	Relies on participants' knowledge and expertise
Active collaboration among participants	There is no evaluation criteria
Takes advantage of multiple perspectives	

Table 32 Advantages and Disadvantages of Six Thinking Hats

SCENARIO BUILDING

This technique for idea generation is based on creating a situation or scenario for the present or future to understand the way people would interact with the product or service idea. It has been widely used as in product development (Suri and Marsh (2000) and it has received many different definitions according to the point of view or the way it was being used. For instance, from a design context Carroll (1995) and Welker et al. (1997) define scenarios as the exploration of the future while Nardi (1992) defines it as group of users in context that perform a task and that generates a description of present and future actions of the situation and suggest how technology can improve a present scenario. However, within the context of this research it will adopt Suri and Marsh (2000) definition of scenario building as a series of "fictional portrayals –stories- involving specific characters, events, products and environments, which allow us to explore product ideas or issues in the context of a realistic future". This definition has been considered the most appropriate for this exploratory research study because it encourages the generation of multiple situations to trigger ideas.

There are many different ways scenarios can be visualized: photographs, sketches, video recordings, written narrative or cartoons. However, Scenario Building does not tend to be a standalone tool but an integrated user-centred ideation tool.

SCENARIO BUILDING	
Advantages	**Disadvantages**
Focus on evaluation of ideas	Scenarios can be too simple or easy
Enhances multidisciplinary performance	It is not very demanding, bad ideas can work
Adopts a user centred approach	Danger to focus on the situation rather than idea

Table 33 Advantages and Disadvantages of Scenario Building

LOTUS BLOSSOM METHOD

Matsumura created this idea generation technique in the Clover Management Research (Japan), although there is not a clear date when it took place. The Lotus Blossom technique is based on a variation of brainstorming that uses free association of words in order to generate ideas. Michalko (1994) agrees by stating the Lotus Blossom Technique helps organize thinking to identify unusual opportunities and ideas.

The technique is built upon a core word that is key to the idea and seeks to generate other eight associated words around it. Each of the words become the core of another lotus blossom, consequently, one single word expands into many ideas.

LOTUS BLOSSOM	
Advantages	**Disadvantages**
Stimulates novel idea generation	Relies on the participant skills
Improves idea development	Lack of idea development or evaluation

Table 34 Advantages and Disadvantages of Lotus Blossom

5WH

The technique 5WH comes originally from journalism (Mott, 1942) and it seeks to answer the questions: Who did it? What happened? Why did it happen? Where did it happen? When did it happen? How did it happen? Gathering these five answers represents a solid base to understand the problem, define the idea and to fill gaps in knowledge and expertise.

5WH	
Advantages	**Disadvantages**
Helps problem definition	Relies on participants' knowledge and expertise
Enables opportunity definition	
Considers multiple perspectives	

Table 35 Advantages and Disadvantages of 5WH

RANDOM STIMULI

This technique seeks to generate ideas from combining two stimuli, which prior have nothing in common, in order to generate novel ideas. Developed by Michalko (2004) but triggered by DeBono (1990) this technique seeks to provoke the participant to generate disruptive ideas by 'connecting the unconnected'. They typically associate two images or words to generate ideas that come up from the relationship between the two of them.

RANDOM STIMULI	
Advantages	**Disadvantages**
Enables creative thinking via visual images	Subjectivity of the random stimuli
It stimulates creative thinking	Lack of focus of best solution for the problem
It enables generation of unique ideas	Lack of control over the activity

Table 36 Advantages and Disadvantages of Random Stimuli

TRIZ

Altshuller and his colleagues first created this technique in 1946 as a holistic theory that comprises a series of tools and methods for problem solving using a technology based in available knowledge. Altshuller reviewed 40,000 patent abstracts to identify the way innovation was taking place (pattern recognition). By 1969 Altshuller had developed several principles: technical contradictions, the contradiction matrix, the ideality of a system and 40 principles of invention. By identifying the key principles that relate to the specific problem they can help facilitate a solution to a technical problem. It is still considered as the core technique for inventive problem solving (Barry et al, 2010; Sheng and Kok-Soo, 2010). The principle behind this technique is that problems typically come from two contradictory factors (Ahshuller, 1996; Savransky, 2000) and TRIZ helps to systematically find solutions to those contradictions.

Altshuller (2007) states the key issue is to define a contradiction that will lead to a 'Typical Solution' (Figure 13) and consider which of the 40 principles can offer a solution under which a contradiction can be overcome, moving closer to the final result.

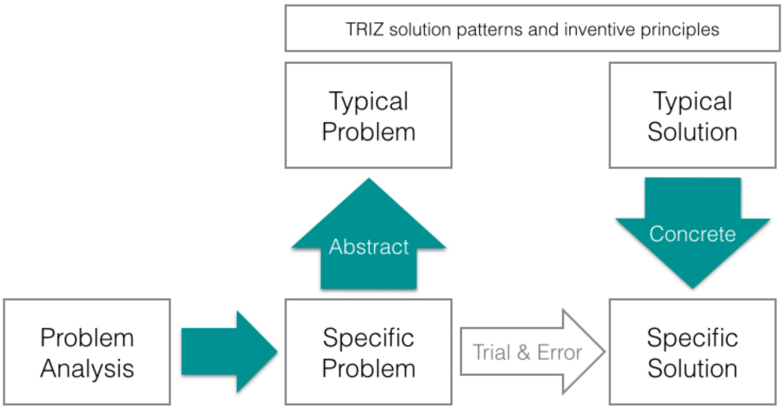


Figure 13 TRIZ idea generation technique process

The key points that stand behind this technique are: (1) problems are typically repeated across industries, (2) technological evolution is also repeated across industries, and (3) innovations utilize scientific results in different areas that differ from the starting point (Altshuller, 1997). This technique has been widely used by multinational companies such as Ford, Xerox, IBM, Samsung and Kodak, to drive problem-solving activities in their technically driven Front End Innovation projects.

TRIZ	
Advantages	**Disadvantages**
Systematic method for problem solving	Relies on the contradictions suggested
Seeks unusual solutions	

Table 37 Advantages and Disadvantages of TRIZ

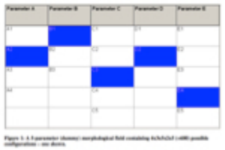
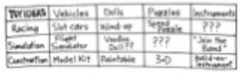
SUMMARY OF IDEA GENERATION TECHNIQUES

This section has identified the most common and explored Idea Generation techniques in literature. This exploratory research aimed to define the core concepts of the techniques as well as identifying their core advantages and disadvantages according to the desired objectives to be achieved. The following table summarises such findings establishing a compilation of informed idea generation techniques.

Firstly, each of the Idea Generation Techniques described in this chapter is subject to a different focus, such as helping breakdown uncertainty of issues, facilitate agreement and decision-making or help to strengthen the ideas in order to generate better ideas. It is this aspect the one that often determines its selection for use, for instance, in a project where the focus of idea generation is to address the complexity of a problem the Morphological Analysis (see table 29) would be a suitable technique, but if, on the other hand, the need for the IG session lies on the understanding of the ideas in order to promote better explanation and evaluation 5WH (see table 35) or Scenario building (see table 33) could provide with the attributes to do so. Therefore, there are no right or wrong Idea Generation Techniques, but there needs to be an acknowledgement and understanding of the different focus they have in order to select the most appropriate one in each situation.

Something that also differentiates these techniques is the nature of the process. Some of them are of a very structured nature so the process if very formal, as it happens with the lotus blossom technique (see table 34), 6-3-5 brainwriting (see table 19), triz (see table 37) and six thinking hats (see table 32). These techniques promote a systematic flow in the IG session and focus on the structure that the technique owns. On the other hand, some of the techniques, such as group brainstorming, scenario building and random stimuli, rely on the informal and unstructured nature of the technique, which enhances reflective thinking of participants.

The following table visualises the Idea Generation techniques in terms of definition, method of use, advantages, disadvantages and example in order to build up the understanding and knowledge around them to apply their principles in future sections.

TECHNIQUE	**DESCRIPTION**	**ADVANTAGES**	**DISADVANTAGES**	**TYPES/EXAMPLE**
BRAINSTORMING	Technique that involves a group of people that gather together to generate and build upon other's ideas. It is currently being used in both traditional and electronic format.	- Idea Combination - Iterative process generates more and better ideas - Supports organisation's memory of technical solutions - Provides a variety of skills - Supports wisdom attitude in and out of the session - Creates an atmosphere that focus on product design - It impresses clients - It generates income - Electronic brainstorming improves production blockage	- Production blockage - Free-riding - Worry about others opinions - Focus on quantity instead of quality - Relies on participants creative skills and knowledge	- Nominal (iterative group) - Question (ask the right questions) - Breaking the rules - Group passing technique - Directed (known solution/ evaluation criteria second stage similar to group passing technique)
6-3-5 BRAINWRITING	Involves a group of 6 people and a moderator. They need to generate 3 ideas every 5 minutes. The next participant will build upon those ideas. After 6 rounds (30 min) they will have generated 108 ideas.	- Idea development and combination - Ideas build upon other's - Structured way to collect ideas	- It focusses on quantity, not quanlity	
SCAMPER	It is considered a brainstorming in which there are a set of questions to solve the problem/meet the opportunity (Substitute, combine, adapt, magnify, modify, put to other uses, eliminate, rearrange or reverse)	- The questions stimulate thinking to find alternatives around a product/opportunity - It is good for generating original ideas - It uses action verbs as stimuli - Suitable for Incremental Innovation	- It seeks a product improvement or opportunity exploration but not radical innovation.	
MORPHOLOGICAL ANALYSIS	It is a method for exploring multiple solutions to address the complexity of problems. It helps to discover new relationships that are not evident.	- Discovers new relationships that are not evident - Creates links among parameters	- It relies on the parameters chosen	
HIT (HOLISTIC IDEATION TECHNIQUE)	It builds upon two chosen products and seeks to combine its characteristics in order to find creative ideas	- It combines factors that are unexpected - Creates links among options - Useful for product development	- It is constraint by the product characteristics	
CONCEPT FAN	Idea questioning that bounces from ideas to concepts and viceversa using two kind of questions: How do I do this? What is this idea doing?	- It systematically expands the range and number of ideas and concepts	- It can result a very general approach - Relies on participants level of detail and analysis	

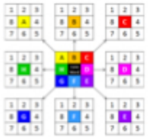
TECHNIQUE	DESCRIPTION	ADVANTAGES	DISADVANTAGES	TYPES/EXAMPLE
SIX THINKING HATS	There is a team of 6 participants and each one of them think about one aspect of the idea: creativity, benefits, negatives, emotions, facts, process.	- Builds upon the same idea - Participants develop an idea collaboratively - It helps building a solid idea but looking at multiple perspectives - Suitable for idea development	- It relies on people's skills and knowledge to build the idea - It lacks a set evaluation criteria	
SCENARIO BUILDING	Technique for product/service concept generation in which a fictional situation/ scenario for the future is built to address how would people interact with this product / service idea.	- Evaluation of early design ideas - Creates a fictional testing view about the future - Stimulates user-centered ideation - Enhances multidisciplinary teams performance because it is not owned by any discipline in particular	- Participants can generate too simple and easy scenarios - A product might be related to a single scenario instead of creating multiple ones. - Focus too much on the scenario and loose focus on the initial idea - It helps to make bad ideas work	
LOTUS BLOSSOM METHOD	It builds upon a core word relating the idea and aims to generate 8 free words around it that are associated with it. These words become the core of the next lotus blossom. It seeks to generate ideas by expanding on trigger words.	- It stimulates free association to create novel ideas - It helps extend ideas	- It relies on people's skills and knowledge to drive the technique	
5WH	It is an activity to define a problem or idea by answering the 6 journalism questions: Who has the problem? What does the problem seem to be? When does the problem occur? Where does the problem occur? Why does the problem occur? And How does the problem occur? How can the problem be solved?	- It helps defining a problem - Helps generate topic ideas - It seeks to define opportunities	- It relies on peoples skills and knowledge to answer the questions	
RANDOM STIMULI	Random stimuli act as a provocation for idea generation. With two unexpected random stimuli one changes the patter n and, therefore, has a new development path to generate ideas by relating the stimuli.	- It guides creative thinking with visual material - It creates unexpected combinations - It stimulates novel ideas	- It relies on the random stimuli to deliver a solution than may not be the best one to address that problem	- Words - Images
TRIZ	This theory is based on the assumption that most problems that need a creative solution come from two contradictory factors. It is a systematic method to find multiple solutions to those contradictions.	- It is a systematic method - It seeks to find not typical solutions - Useful when the starting point is a defined problem	- Relies on the set contradictions	

Figure 14 Idea Generation Techniques comparison Table, by author

1.5.3 Innovation Tools in Idea Generation Practices

Previous section has shown there is a need for techniques to be used in Idea generation practices, in order to structure thinking and stimulate idea generation and decision-making (Nijstad et al, 2003; Bos et al, 2008). However, it is not the only attribute needed in an idea generation session. Chesbrough (2003) argues that idea generation practices do not tend to rely only on techniques but innovation tools typically accompany them to frame information and offer more input about previous research. Some corporations still lack a systematic creative process that includes these type of tools and processes and keep relying on serendipity (Brennan and Doodley, 2004) by holding unstructured idea generation practices without a clear focus.

There is no common agreement on the use of innovation tools in idea generation as some authors state tools improve team performance (Von Hippel, 2001) while others, like Eppler et al. (2011) state tools decrease creativity in participants and, therefore, do not improve idea generation success (over reliance). Nevertheless, Martinsuo and Poskela (2011) advocate how integrating success criteria into the idea generation tools can improve business performance in these activities. All in all, decision-making is at the core of Front End Innovation practices (Krishman and Ulrich, 2001) and tools could represent the way to achieve better results.

VISUAL TEMPLATES

When it comes to Idea Generation, visual templates are suitable tools to address the need to record the ideas. As seen in the previous section (Idea Generation Techniques), writing down ideas enables introverts to actively participate (Paulus and Yang, 2000) as well as promotes idea development (Aldsersey-Williams et al, 1999) and idea sharing (Bresciani and Eppler, 2009).

Suther et al (2003) define visual templates as representational guidance that focuses knowledge to the discussion topic, representing a suitable support to idea generation practices when combined with an idea generation technique. They help participants to externalise thoughts and build upon each other ideas (Mengis and Eppler, 2006; 2008). Therefore, visual templates help to narrow the scope when recording the ideas, as well as avoiding off-topic discussions. Visual templates are considered visual objects that combine cognitive, social and emotional benefits (Eppler and Platts, 2009) by acting as an enabler of strategic planning, which focuses on defining the strategy and allocating resources to pursue it. There are two different types of visual templates: guiding and generative.

Guiding Visual Templates were introduced by Suthers (2001) to provide guidance on the structure and focus of the session, helping to constrain off-topic discussions or ideas and to "make some of that knowledge more salient and hence a likely topic of discussion" (Suthers, 2003).

Generative Visual Templates focus on enabling idea development. Mengis and Eppler (2008) state the core benefit of generative visual templates is to help to build upon each other's ideas, offering the opportunity to develop ideas and externalise participants' thoughts (Mengis and Eppler, 2006). This type of templates can also help to evaluate ideas by integrating areas of exploration of the ideas according to the evaluation criteria.

Visual Templates are not a new phenomenon they have been used in different scenarios and with different purposes for many years, dominated by technology. Phaal et al (2001) developed the Technology Roadmap, which is based on mapping short-term and long-term plans linked to technology opportunities to reach the objectives. Prior to this, Garcia and Bray (1997) had made an attempt to define the uses this template can have: (1) It helps forecast technology development to address the need; (2) It seeks agreement among participants and (3) it helps to create an action plan.

Osterwalder and Pigneur (2010) introduced the Business Model Canvas, which is a strategic management template that focuses on describing the characteristics of a business model (customers, finance, value proposition and infrastructure), which are split several categories were activities, and or attributes can be recorded. The Lean canvas (2014) was developed, based on Osterwalder's Business Model Canvas, targeting start-ups, seeking to reduce the amount of time that it takes to write a business model.

Authors such as Eppler et al (2011) have advocated the key role visual templates play in enhancing collaboration and creativity in innovation activities. Furthermore, when it comes to idea generation they advocate how these tools help to shape interactions among participants and improve idea generation outputs.

Templates help create a structured visual practice because they allow to visualise the issues explored around the idea, for instance, who is the idea targeted to, what is the best advantage of the idea, etc. Nevertheless, visual templates, as representational guidance (Suther et al, 2003) are typically seen as a useful tool not only to generate ideas but also to share information and knowledge (Alexander et al, 2014). Bresciani and Eppler (2009) undertook an experiment with 131 managers and looked at the way they shared information during meetings. What type of information were they sharing and for what purpose?. The results showed that productivity had increased in groups that used templates by quantity of ideas shared, the variety of ideas and the teams remembered more information shared during the meetings. However, participants using templates did not feel they had performed better than the groups without templates, which highlights a dysfunction between business performance and individual satisfaction perception. This finding has also been supported by Comi and Eppler (2011). A second challenge for visual templates, highlighted by Eppler et al (2011), is the perception of decreased creativity among participants using templates while the outcomes from the session are still very creative. Consequently, visual templates represent a useful tool to improve the performance in idea generation practices but represent a drawback for participant satisfaction but paradoxically, when undertaking in idea generation session with visual templates participants outperform but they tend to perceive their creativity decreased, which is the opposite of what happened.

There is an emerging trend, over the last five years, on the benefits of using bespoke visual templates. For instance, Comi and Eppler (2012) highlight the need of crafting suitable and bespoke visual templates to facilitate the emergence of patterns. If there are specific issues to be tackled in the idea generation session, the visual template should refer to it so this emergence of patterns can rise from the responses and the ideas of the participants. Al-Kassab et al (2014) built upon this issue adding the importance of using suitable templates in order to achieve focused results. This is of great importance when it comes to designing visual templates as the researcher is the one that selects the pieces of information that need to be explored in order to fill out the visual template, therefore defining the scope of the idea generation session and focusing on the results that are aimed to be achieved.

The purpose of deploying Visual Templates is to facilitate not only idea generation, but also revision and refinement in order to enhance the ideas generated (Bresciani and Eppler, 2009), so that the visualisation of ideas enhances sharing and understanding (Holloway, 2009; Williams, 2010).

The Visual Templates used in this research study have common objectives but also have other focussed functions such as the important role of visualisation of ideas, which has been demonstrated to lead to better performance (Bresciani and Eppler (2009).

WEB TOOLS

At the early stages of idea generation many businesses are integrating digital and web-based technologies to create a robust data base of initial ideas. According to Gordon (2008), technology usage on the first stages of the fuzzy front end helps internal teams to collaborate and exchange the information for solutions, analysis, simulation and visualization, in summary, as a communication tool for ideation. This can be integrated on both online and offline strategies. In fact, some companies are integrating social networks to enhance their new product development from idea generation to idea evaluation (Kijkuit, 2007).

The increasing use of online tools to generate ideas (both for closed or open innovation) ranges from the traditional *brainstorming* to other web tools, such as *Brain Juicer* used by Nike and Nestle to generate ideas across the organization. This is a test that the organisation of the same name uses to identify creative employees within organisations and utilise their opinions about new ideas for New Product Development.

The Brainstorming sessions have been explored in terms of collective idea generation versus iterative approaches in Idea Management to demonstrate its benefits when dealing with a team structure in Idea Management (Diehl and Stroebe, 1987). The second key use of web tools is for submitting ideas in an anonymous way, so people do not feel the pressure of what their managers and colleagues may think (Gumble, 2003). He identified two advantages web tools have over traditional idea generation processes: (1) Introvert participants can submit ideas without worrying about others opinions; and (2) Web tools are a cost-effective way to gather ideas and feedback from employees that usually took a long time and at expensive price. Nevertheless, there are still many organizations that lack a system or process that their employees can contribute with ideas to (Burt, 2004).

STIMULUS DATA: ANALISED DATA TO STIMULATE IDEA GENERATION

Within the context of Front End Idea Generation practice the role of stimulus is closely linked to idea generation techniques as a supporting tool. The reason for this is that is that they represent the analysis and decoding of all the previously data gathered, therefore extrapolating the most important and relevant issues to generate ideas around. Stimulus data is an emerging theme that is starting to be mentioned in research but is till not fully understood. Howard et al (2011) define stimulus as pieces of information used to relate to the problem with the intention of inspiring new solutions.

Eberle (1996) or Michalko (2004) advocated that the use of stimuli can be very useful in guiding thinking by providing visual material, such as images, words and research data, in idea generation practices. Building upon the advantages of using stimulus data, López-Mesa et al (2011) claim the benefit of using image stimulus that relate to the desired outcome, in intervals, during the idea generation process is that it helps team members to keep generating ideas for partial solutions. They suggest that teams that pursue a series of solutions should be inspired by visual stimuli, as well as when creative teams seek reflective thinking would benefit from the use of stimulus.

Howard et al (2011) introduce the concept of the *Sweeper* tool, which reuses concepts from previous projects as stimulus that should be used in a company with a consistent design process to improve its success. This tool is used in an electronic way by mining the ideas, concepts and briefs previously used and stored in software. It is based on the principle that the ideas stored from other projects can be used to inspire and improve the quality of the concepts in the idea generation stage. The stimulus are alternated along the process, for example, there is common brainstorming in which people generate ideas freely from a brief and afterwards they are shown a series of stimulus to help them shape the ideas that will be further developed separately and put together again to refine, evaluate and select them. Nevertheless, it is important to avoid over-relying on old data, which is something organisations tend to do (Hubbard, 2010). In summary, the value of stimulus data influences both the generation and the development of ideas (Howard et al, 2011).

1.5.4 Summary of Emergent Issues

This section has provided with a review of the tools and practices typically involved in Idea Generation practices. From this section, some themes have emerged raising questions about the relationship between theory and practice that could be further explored during the data collection and analysis of this exploratory study.

After critically reviewing the most cited idea generation techniques it has enabled the identification of their current key uses and their advantages and disadvantages when attempting to achieve effective idea generation in FEI activities. Osborn's (1953) Brainstorming has become the standard technique for Idea Generation practices. Highlighting the issue: people use it systematically due to its effectiveness or because it is the only one most people know. The use of systematic thinking has been linked to fluent ideation in brainstorming (Nijstad et al, 2003) and better decision-making (Bos et al, 2008), which is the reason brainstorming has been modified and turned into diverse range of adaptations in order to focus on delivering specific outcomes. For instance, some techniques foster unexpected combinations and exploration of unrelated elements in order to help generate new scenarios that comprise of more novel ideas (deBono, 1990; Muchalko, 2004) while other set the objective of solving a given problem, such as TRIZ (Altshuller, 2007) or developing an idea, such Six Thinking Hats (DeBono, 1985).

Nevertheless, this section has highlighted the benefits of blending practices in Brainstorming, which is seen through the variations of Brainstorming, which address weaknesses and create strong Idea Generation Techniques, such as Nominal

Brainstorming (Sutton and Hargadon, 1996) and Team Idea Mapping Brainstorming (Plesk, 2014), which have an impact on the quality of ideas generated.

In terms of Visual templates research has shown the importance of using bespoke visual templates to enhance not only idea generation but also idea development and idea selection (Bresciani and Eppler, 2009). Suther et al (2003) have suggested visual templates allow idea generation session participants to identify and isolate the critical issues and opportunities to generate a portfolio of ideas. Nevertheless, in spite of the benefits visual templates offer in idea generation performance, some studies (Eppler et al, 2011) have shown visual templates are perceived by users as a creativity constraint, lowering their satisfaction from the session.

The value of stimulus data is closely related to the emerging trend of quality-of-data-driven NPD processes (Kenneth, 2013), as they are pieces of analysed data that pursues to inspire new ideas and solutions (Howard et al, 2011). Since the information that is gathered and utilised in NPD processes has turn into a core issue for success, the generation of stimulus data is slowly becoming crucial in Idea Generation practices. Research has suggested the importance of crafting and selecting relevant pieces of information to build up the stimulus (incentive, arousing interest, causing a physical response) data (gathered factual information) – One issue that stimulus data flags is that the notion of data implies that it is 'containing truthful and accurate facts', which is not always the case. This reinforces the need for validation, which will be built into the new idea generation framework, rather than relying on old out-of-date data (Hubbard, 2010) in a systematic way.

1.6 Literature Review Summary and Conclusions

The main aim of the literature review was to provide a deep understanding of the factors that are currently impacting on Idea Generation practices within Front End Innovation processes. In summarising previous research, several themes have emerged, influencing the focus of the investigation.

The knowledge gained from the literature in relation to design practices has highlighted a lack of common language in design driven innovation practices. It has established the evolution from creative problem solving to design processes to design methods to design thinking and although there are multiple models they all have similar phases and objectives. Therefore, the lack of a coherent common model in the literature has shed light onto the need for a framework that brings together the most effective processes and models.

The literature has also demonstrated the growing importance of ideas as a competitive advantage for organisations to drive innovation. Therefore, it is at the core of the business strategy to create, develop and implement an idea management process that can generate quality ideas. However, the literature has suggested the lack of attention that idea quality has had in the past but it is becoming more important.

Common success factors within New Product Development and Front End Innovation processes have been attributed to three core areas: a formal process that does not result in constraining methods, the use of multidisciplinary teams to carry out the tasks and the need are needed in order to articulate an effective idea generation and selection practice.

There are a number of issues that have emerged during Idea Management research. Literature has shown the benefits of blending systematic practices with reflective thinking in Idea Management in order to bring the best from the two of them, therefore, it will be the type of practices that this research study will develop. Literature has also highlighted four key factors that influence Idea Generation practices: creative confidence, the quality of ideas, the role of the facilitator and the planning and preparation stage. What is interesting in this set of factors is that each of them is related to a different aspect of Idea Generation, for instance Creative Confidence relates to the capabilities of people; the quality of ideas relates to the criteria that should be established at the beginning of the projects and the determination of seeking quality over quantity; planning and preparation represent an entire stage within Design Driven Innovation processes; and the facilitation plays a key role to enable agreement and decision-making. Therefore, these factors will be further explored to determine their implication in practice.

In terms of Decision-Making, research has shown the benefits of Reflective Thinking, which is based on transforming latent information into valuable knowledge (Kolb, 1975). It encourages asking questions in order to develop a joint understanding among participants (Johns, 1995) and therefore, it helps to pursue strong agreements and decision making (Doyle, 2007).

The nature of Idea Generation practices still tends to be very unstructured, contrasting with the formalised NPD process, which raises a need to put more attention to optimise this stage. An emerging trend in Idea Generation is the use of iterative practices to strengthen ideas and improve idea quality. This chapter has shown Idea Generation techniques are crucial for fluid idea generation and the facilitation of decision-making. It has also shown blending techniques represents a great opportunity to address weaknesses and turn them into very robust techniques that contemplate different issues, such as generation, sharing, development and evaluation of ideas. These blended practices positively impact on the quality of the ideas generated. But research has suggested an idea generation technique is not enough in Idea Generation practices, supportive tools such as Visual Templates and Stimulus Data are also needed. Visual templates enable the isolation of critical issues, enhancing the quality of the ideas and the sharing and development among participants while Stimulus data works as the fuel to generate informed ideas, since they are pieces of analysed information from previous research that targets the critical issues of the project.

In summary, the Literature Review has highlighted the need for a New Idea Generation Framework that is able to bring together effective practices in Design Driven Innovation processes, Idea Generation tools and enhances idea quality in FEI.

ISSUES	CHALLENGES	EFFECTIVE PRACTICES
Over structured processes (Barczack et al, 2009)	Inability to generate a flow of quality ideas (Ahuja & Lampert, 2001; Levitt, 1963; Staw, 1990; Koc and Ceylan, 2007)	Use of a formal process (Barczack et al, 2009)
lack of common terminology/ language (Koen et al, 2001)	Inability to establish the importance of the role of the facilitator (Kaner, 2007)	Use of multidisciplinary teams (Barczack et al, 2009)
over reliance on process leads to low innovative outcomes (Barczack et al, 2009)	Inability to understand the constructs to prepare for innovation (Bluedorn, Johnson, Cartwright, & Barringer, 1994; Mumford, Schultz, & Osburn, 2002a)	Undertaking planning (Khurana and Rosenthal, 1998; Ernst, 2002; PDMA, 2006; Bouhali et al, 2015)
lack of understanding of what is a good idea (Björk and Magnusson, 2009)	The lack of a common terminology difficults decision making (Kaner et al, 2007)	Establishing a set evaluation criteria (Barczack et al, 2009)
uncertainty difficults decision making (Gong et al, 2009)	To achieve a balance between structured and informal practices (Bolton, 2014)	Use of iterative idea generation (Girotra et al, 2010)
brainstorming is still the main idea generation technique (Stroebe and Diehl, 1987)	To develop a formal process that enables some flexibility (Boeddrich, 2004; Barczak et al, 2009; Baer, 2012)	Identifying the problem/ need over the process (Baeck and Gremett, 2011)
dilemma between seeking quality or quantity (Osborn, 1953; Majaro, 1992; Reitzig, 2011)	The ability to generate relevant stimulus data rather than relying on old data (Hubbard, 2010)	Use of stimulus data helps shape and develop ideas (Howard et al, 2011)
lack of agreed models in design driven innovation (Osborn, 1963; Noller, Parnes & Blondi, 1976; Isaksen et al, 1992; Cross, 2000; Design Council 2006; Mark Dziersk, 2006; Brown 2009; Baeck and Gremett, 2011)	The inability to plan the idea generation sessions and prepare quality data as a key input for idea generation (Ernst, 2002; PDMA, 2006)	importance of the quality of data (Kenneth, 2013)
		Use of bespoke visual templates (Comi and Eppler, 2012; Al-Kassab et al, 2014)
		The ability of the facilitator to guide thinking & enable decision making (Doyle, 2007; Kaner, 2007; Bens, 2012)

Figure 15 Summary of Emerging themes in Literature

The main outcome from the literature is the need to blend effective practices in order to generate an Idea Generation Framework that brings together core models in literature in order to optimise processes, practices and tools to enhance Idea Quality in FEI in multinational organisations.

Principles to Build the Framework

This section summarises the constructs of the Idea Generation Framework in terms of (1) the synthesised phases of idea generation process (2) notion and issue of activities within the phases; and (3) the role of the tools in each activity grounded on literature review.

This exploratory Framework combines three models: Ulrich and Eppinger (1995) Concept Development Stage, the Design Process of the Design Council (2006) and the

Design Thinking Process by Baeck and Gremett (2011) in order to generate a Synthesized Study Model that the case studies will follow.

The Idea Generation Framework has adopted the key stages in these processes in order to generate a new model that combines them and synthesise them into a new framework for Innovation Processes in Front End Innovation practices. It has tried different set of activities and methods that have proved their workability or lack of performance within the framework and have been changed for other ones. The outcome from the study is a well-established framework to improve Idea Generation practices in FEI.

The framework has four levels of depth: phases, activities, methods and outcomes. It has been crucial in this study to establish a clear meaning for each concept in order to understand the hierarchy and differences among them.

PROCESS	Series of actions or steps to achieve an end
PHASES	Specific steps within a development
ACTIVITIES	Specific undertaken tasks to achieve an action
METHODS	Mode for carrying out a task
TOOLS	Instruments to accomplish a function
STIMULUS	Something external that influences an activity
OUTCOMES	End results of a completed task

Figure 16 The Framework meaning of key concepts

Before going through the *modus operandi* of the process, it is crucial to define the four key points of this model: (a) the *purpose* of this process is to activate the corporation innovation pipeline by turning strategic objectives into innovation opportunities; therefore; (b) the *starting point* is a lack of enough ideas to feed into the innovation pipeline and the need to find strategic opportunities; (c) the *objective* of this process is to ensure a flow of relevant, novel, feasible and innovative ideas for the innovation pipeline so the (d) outcome of the process is a series of defined validated pipeline ideas.

The purpose of this study and the specific projects is to ensure a flow of feasible, novel and relevant ideas that will feed into the innovation pipeline of these organisations.

Figure 17 Purpose of the Idea Generation Framework, adapted from Bolton (2014)

Figure 17 shows how the core of this process, turning business objectives into defined innovation opportunities, comes from identified strategic objectives and it aims to generate validated pipeline ideas as the key outcome.

The process model for this study is based on four key stages that break down into four key activities. Each of the projects will follow the same structure, for instance, the starting point of the process is a lack of enough ideas to feed into the innovation pipeline and the need of organisations to find strategic opportunities.

The case study adopts the use The Framework, which is split into four stages: (1) Establishing the problem or need; (2) Discovering the issues; (3) Defining the opportunities; and (4) Developing the ideas. Each of the stages has a key activity that represents the core task to carry out in that stage. For the Establishing Stage the activity is planning and develop the brief; for Discovering Stage is data collection; for Defining is to decode the data gathered and come up with key insights; and for the Developing stage is to map the opportunities in the form of idea generation and selection (Figure 18). The Framework below was the one that came up from literature and that has evolved across the case studies in order to address strengths and weaknesses of processes practices and tools.

<table>
<tr><th colspan="4">Idea Generation Framework</th></tr>
<tr><td>Establishing the problem</td><td>Discovering the issues</td><td>Defining the opportunities</td><td>Developing the ideas</td></tr>
</table>

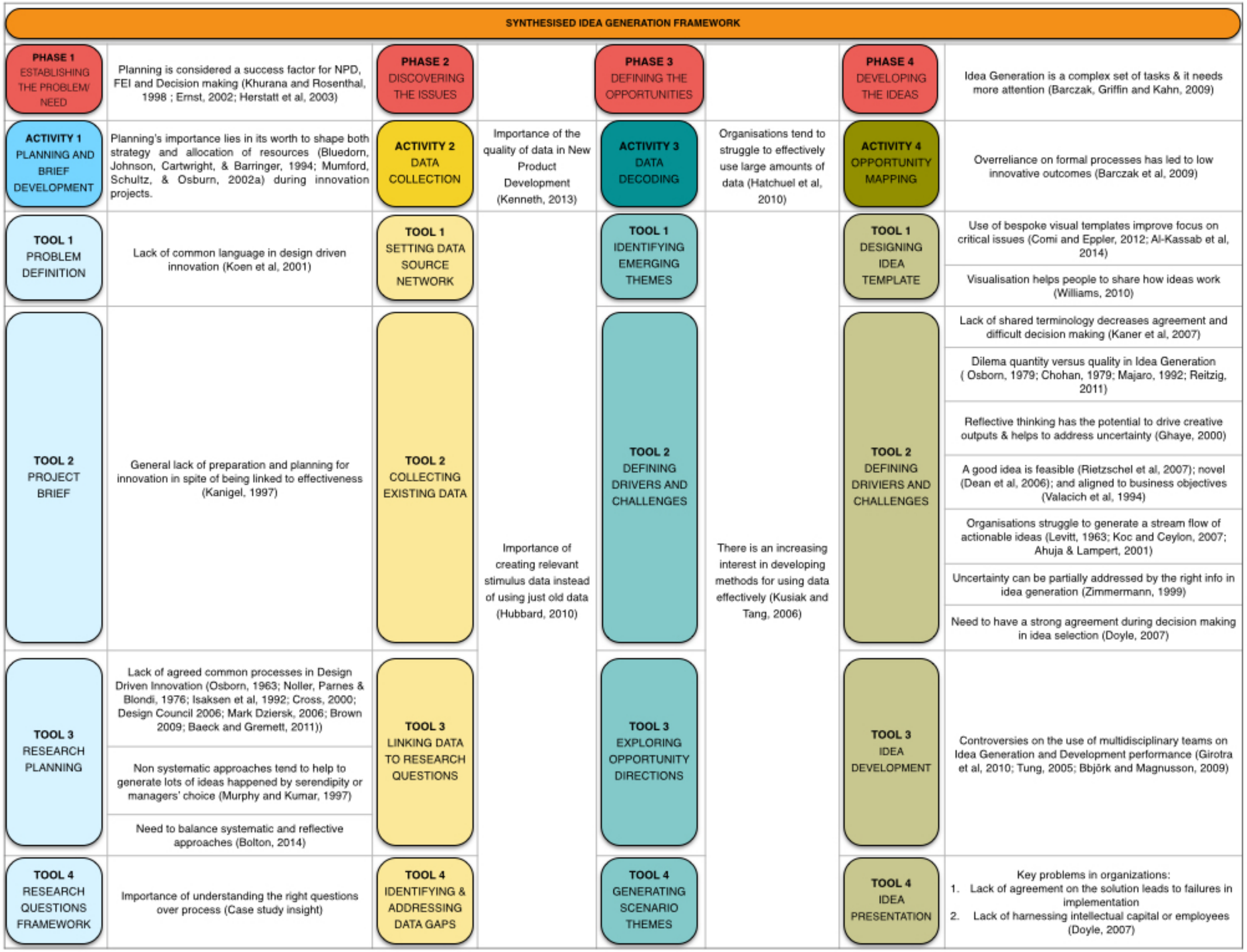
Figure 18 The Synthesised Phases of the Idea Generation Framework

Each of the four stages has a very defined outcome that will represent the starting point for the following stage. In the case of (1) Establishing Stage the outcome will be a project brief with a clear defined project objective; the (2) Discovering Stage has identified issues that impact on the problem or need as its key outcome; the (3) Defining

Stage’s outcome is to determine key insights from data analysis and decoding that will trigger the idea generation session; and the outcome of the last stage (4) Developing is a series of feasible, novel and relevant ideas to achieve the project objective. This clarifies the specific purpose of activities and stages within the innovation process.

Prior to carrying out the case studies it is very important to clarify that the process, stages and activities are immovable, however, the methods and tools are flexible and change due to the variation of the process outcomes. This sheds light to the dilemma in Design Project Driven processes (Koen et al, 2001), in which there is never a single process neither a same language, which is the reason why organisations have to constantly tailor it.

In summary, the Idea Generation Framework has been based on synthesising of existing effective processes, practices and tools and the identification of gaps in knowledge within current literature. Figure 19 visualises and explains the phases, activities and tools from the new framework linked to literature review. The purpose of this mapping is to highlight the way unaddressed issues and effective practices in literature have helped build the Idea Generation Framework process, activities and tools.



SYNTHESISED IDEA GENERATION FRAMEWORK

PHASE 1 ESTABLISHING THE PROBLEM/ NEED	Planning is considered a success factor for NPD, FEI and Decision making (Khurana and Rosenthal, 1998 ; Ernst, 2002; Herstatt et al, 2003)	**PHASE 2** DISCOVERING THE ISSUES		**PHASE 3** DEFINING THE OPPORTUNITIES		**PHASE 4** DEVELOPING THE IDEAS	Idea Generation is a complex set of tasks & it needs more attention (Barczak, Griffin and Kahn, 2009)
ACTIVITY 1 PLANNING AND BRIEF DEVELOPMENT	Planning's importance lies in its worth to shape both strategy and allocation of resources (Bluedorn, Johnson, Cartwright, & Barringer, 1994; Mumford, Schultz, & Osburn, 2002a) during innovation projects.	**ACTIVITY 2** DATA COLLECTION	Importance of the quality of data in New Product Development (Kenneth, 2013)	**ACTIVITY 3** DATA DECODING	Organisations tend to struggle to effectively use large amounts of data (Hatchuel et al, 2010)	**ACTIVITY 4** OPPORTUNITY MAPPING	Overreliance on formal processes has led to low innovative outcomes (Barczak et al, 2009)
TOOL 1 PROBLEM DEFINITION	Lack of common language in design driven innovation (Koen et al, 2001)	**TOOL 1** SETTING DATA SOURCE NETWORK	Importance of creating relevant stimulus data instead of using just old data (Hubbard, 2010)	**TOOL 1** IDENTIFYING EMERGING THEMES	There is an increasing interest in developing methods for using data effectively (Kusiak and Tang, 2006)	**TOOL 1** DESIGNING IDEA TEMPLATE	Use of bespoke visual templates improve focus on critical issues (Comi and Eppler, 2012; Al-Kassab et al, 2014) Visualisation helps people to share how ideas work (Williams, 2010)
TOOL 2 PROJECT BRIEF	General lack of preparation and planning for innovation in spite of being linked to effectiveness (Kanigel, 1997)	**TOOL 2** COLLECTING EXISTING DATA		**TOOL 2** DEFINING DRIVERS AND CHALLENGES		**TOOL 2** DEFINING DRIVIERS AND CHALLENGES	Lack of shared terminology decreases agreement and difficult decision making (Kaner et al, 2007) Dilema quantity versus quality in Idea Generation (Osborn, 1979; Chohan, 1979; Majaro, 1992; Reitzig, 2011) Reflective thinking has the potential to drive creative outputs & helps to address uncertainty (Ghaye, 2000) A good idea is feasible (Rietzschel et al, 2007); novel (Dean et al, 2006); and aligned to business objectives (Valacich et al, 1994) Organisations struggle to generate a stream flow of actionable ideas (Levitt, 1963; Koc and Ceylon, 2007; Ahuja & Lampert, 2001) Uncertainty can be partially addressed by the right info in idea generation (Zimmermann, 1999) Need to have a strong agreement during decision making in idea selection (Doyle, 2007)
TOOL 3 RESEARCH PLANNING	Lack of agreed common processes in Design Driven Innovation (Osborn, 1963; Noller, Parnes & Blondi, 1976; Isaksen et al, 1992; Cross, 2000; Design Council 2006; Mark Dziersk, 2006; Brown 2009; Baeck and Gremett, 2011)) Non systematic approaches tend to help to generate lots of ideas happened by serendipity or managers' choice (Murphy and Kumar, 1997) Need to balance systematic and reflective approaches (Bolton, 2014)	**TOOL 3** LINKING DATA TO RESEARCH QUESTIONS		**TOOL 3** EXPLORING OPPORTUNITY DIRECTIONS		**TOOL 3** IDEA DEVELOPMENT	Controversies on the use of multidisciplinary teams on Idea Generation and Development performance (Girotra et al, 2010; Tung, 2005; Bbjörk and Magnusson, 2009)
TOOL 4 RESEARCH QUESTIONS FRAMEWORK	Importance of understanding the right questions over process (Case study insight)	**TOOL 4** IDENTIFYING & ADDRESSING DATA GAPS		**TOOL 4** GENERATING SCENARIO THEMES		**TOOL 4** IDEA PRESENTATION	Key problems in organizations: 1. Lack of agreement on the solution leads to failures in implementation 2. Lack of harnessing intellectual capital or employees (Doyle, 2007)

Figure 19, The Idea Generation Framework linked to Literature

Research Questions

Critically analysing the emerging topics from the literature themes (Design Driven Innovation context, Idea Quality and current Idea Generation processes, tools and practices) has allowed an identification of a series of research questions. They have been generated around the development, testing and retesting of an Idea Generation Framework. This new process was at the core of establishing the central questions:

(R1) How can Front End Idea Generation practices in Multinational Organisations be enhanced to improve (a) the quality of idea generated and their (b) alignment to business objectives?

(R2) What are the strengths and weaknesses of current methods and approaches in Idea Generation and Selection practices?

(R3) What are the critical factors that impact on Idea Quality?

2 Operationalisation of the Study - Methodology, Tools and Approaches

Introduction

The aims of this chapter are to establish and explain the thinking behind the methodology for the study. This section will discuss the methodology deployed for the data collection and analysis stages of the study, and will move on to discuss the elaboration and development of that methodology for the wider application in Discussion section of the study. The chapter is structured around five topics:

- Orientation to the study
- Methodological Approach
- Data Analysis
- Discussion and conclusion
- Limitations of the study

2.1 Orientation to the Study

This part of the chapter outlines the philosophical positions and concepts that have aided in orientating the study.

Barczak et al, (2009) identified over the last few years that organizations have adopted very ‘systematic’ new product development processes (including idea generation) and suggest the consequences of these changes are currently impacting negatively on the levels of creativity in FEI (very strict and disciplined processes that can constrain creativity). This observation by Barczak et al, (2009), combined with my personal working experiences, was the trigger for this research. As a design researcher and practitioner for the past five years I had also observed that organizations, even with the adoption of systematic and semi-systematic processes, frequently rely too heavily on ‘reflective’ practices (free thinking activities in which participants frequently rely on their own experiences and knowledge instead of a process or methodology) and this typically leads to outcomes from their idea generation practices being creative but ineffective in delivering business objectives. In addition, my observations confirmed that uncertainty (the existence of more than one possibility [Hubbard, 2010]) and complexity (dealing simultaneously with a sizable number of factors that are interrelated into an organic whole [Weaver, 1948]) are fundamental factors that influence the New Product Development (NPD) process in large corporations.

These observations have helped to frame and focus this research. The study has been designed to develop a critical understanding of the factors that impact on effective idea generation processes and practices and to identify new approaches to overcome these challenges in FEI practices in large corporations.

The literature review undertaken before starting this study has explicated current academic and professional limitations and issues, suggesting how ideas will play a key role in the future of business innovation. However, it has also highlighted the current struggle that many organizations face in generating quality ideas that can deliver market successes.

To achieve the above objectives, an exploratory research framework was developed (Figure 19) to better understand the current front-end innovation practices in a sample of large multinational organizations to determine (1) current idea generation practices and (2) factors impacting on idea quality. According to the literature review, three factors were identified as influential elements in effective idea generation practices: (a) building creative confidence in individual and teams, (b) planning and preparation for innovation (transformation of insights into innovative solutions) and (c) the role of the group facilitator has on delivering effective idea generation sessions.

This research study was therefore designed to aid in developing an understanding of the factors that impact on: (1) FEI idea generation processes and practices in large multinational organisations; (2) the processes, practices and tools typically used in FEI idea generation activities and (3) the quality of the ideas generated via their idea generation processes, practices and tools. This study has been orientated to gather rich qualitative data on understanding attitudes, perceptions and beliefs of Idea Generation participants (Denzin and Lincoln, 2005) as well as their knowledge, expertise and competences and how these influence behaviour.

During this research study a ‘process’ was defined as a series of actions designed or undertaken to achieve an end; ‘practices’ were defined as the actions performed for a specific purpose, and ‘tools’ were defined as instruments that aid in accomplishing a function.

The importance of establishing these core concepts lies on the fact that this research was based on the identification of more effective Idea Generation processes supported by appropriate practices and tools. This was achieved via the synthetisation of existing effective processes, practices and tools underpinned by the research to address identified gaps in theory and practice. The three main components of processes, practices and tools were thoroughly tested across this research in order to achieve the objective of generating a new Framework.

2.1.1 Philosophical Approaches

The orientation adopted for the study is one that centres on naturalistic and interpretivistic approaches, aiming to develop indicative findings that provide a more profound and granular understanding of Idea Generation processes and practices within multinational organizations.

Since this research study was designed to investigate perceptions, intentions and beliefs of participants in Idea Generation, a qualitative, quasi-ethnographic research approach was deemed necessary. This was perceived appropriate for the facilitation of sense-making in relation to the data. The approach aimed to generate understanding in relation to the subjective interpretation of employees' actions within the specific scenarios studied (Weber, 1978). As, Goldkuhl (2012) suggests, interpretivism means working with existing actions, acknowledging, understanding and using them to build new knowledge on a specific topic. In this study, the researcher has been immersed in organizational Front End Innovation practices in order to collect evidence and develop theory around them.

There were two main research issues to be considered when planning this study: (1) The approach to the research was exploratory, aiming to understand the phenomena within the selected organizations and (2) the researcher would be required to mitigate against bias on the basis of prior experience or opinion.

The research followed an inductive research approach, that is, it is based or "grounded" in the observations or data from which it is developed, rather than being driven by a priori theory or a formal hypothesis. It also provides a series of arguments based on the evidence collected in various phases of the study (Copi et al, 2007). Due to the exploratory and indicative nature of the project, the conclusions were founded on knowledge gained in the specific cases, and this provides a platform for further research in the future. Within the general principles of inductive analysis, the project adopted case-based reasoning for problem solving: this approach is based on everyday human reasoning within the sample company (Aamodt and Plaza, 1994). To achieve its aims, the inductive reasoning approach implies the use of a variety of data sources, including qualitative data, company reports, interviews, and observation.

The key rationales for choosing case-based reasoning is that the seven case studies chosen for this study are: (1) rich in data and information; and (2) contain an appropriate level of complexity.

2.1.2 Rationale for the Study

Undertaking a thorough literature review combined with the professional experience as practitioner creates a robust base for the field research. This research study employed a multi-method approach, combining different sources of data collection to compare and verify two issues that have arisen from the pilot study: (1) Unpacking FEI idea generation processes in large multinational organisations; and (2) how to enhance the quality of the ideas generated via their idea generation practices and tools. These issues arose as a result of the observation of the challenges organisations face when generating creative ideas through very systematic processes or very informal processes. The nature of the processes has an impact on the outcome of the idea generation session: structured processes tend to pursue few ideas of high quality while informal processes tend to seek a large quantity of ideas independently of their quality.

The primary research methods applied were qualitative in nature. The data was gathered via: observation, field notes, interviews and analysis of documents and materials (Marshall and Rossman, 1998). This study adopted a blended approach of reflective and systematic practices observed form other studies (Bolton, 2014), in order to help identify the key points in which teams experience uncertainty and complexity, therefore an opportunity to develop strategies and tools to address them.

The operational study (see Table 38) had three key phases: (i) a pilot study, (ii) a main study and (iii) a validation study. The pilot study was formed by one Case Study in Company A, the main study was comprised by four cases, all of them in Company A and the validation study was formed by two case studies, one in Company A and one in Company B. The objective from the pilot study was to evaluate strengths and weaknesses of the process, practices and tools in order that new and more robust/effective framework could be developed. Therefore, while the Pilot Study established the base for a Framework, it was in the Main Study (four cases) where the synthesized framework was developed, applied and refined. Therefore, the emphasis on the main study was put on expanding the number of real project scenarios focusing to explore and validate the benefits and limitations of the synthesized idea generation framework in terms of scalability, reliability and repeatability factors on particular themes (emerging factors impacting Idea Quality, effective methods and participant's attitudes). Finally, the Validation Study (two cases) was designed to facilitate the test of the Synthesised Idea Generation Framework. The results were validated in two different scenarios (Phase 3 – Validation Study) to determine benefits and challenges of using a new tool to improve idea quality. The results also helped to build a model that underpins the development of an adaptive set of new tools to be used in a variety of Idea Generation Scenarios for multidisciplinary teams.

PHASE 1	PHASE 2				PHASE 3	
PILOT STUDY	MAIN STUDY				VALIDATION STUDY	
Case Study 1	Case Study 2	Case Study 3	Case Study 4	Case Study 5	Case Study 6	Case Study 7
	Generating, developing and refining the Synthesized Idea Generation Framework				Testing the Synthesized Idea Generation Framework	
Company A						Company B

Table 38 Research operational study

2.1.3 The Idea Generation Framework

Bringing together current effective processes, practices and tools has contributed to development of a new idea generation framework. To build an efficient and effective new idea generation framework to improve idea quality in FEI is the objective of the case studies. It brings together current effective processes, practices and tools. To do so the Case Study methodology is split into three different phases in order to evaluate, develop and test the effectiveness of the framework. Each case study output becomes the input for the following one. The study is divided into pilot, main and validation study.

The purpose of the piloting, main and validation studies was to test, develop and retest the process, practices and tools in different scenarios in the sample organisations regarding different types of projects, complexity and range of tools in order to answer the research questions.

Pilot Study - THE FRAMEWORK

Pilot studies can shed light on best research processes and likely outcomes (Van Tejilingen and Hundley, 2001). This is why this project has chosen to start by piloting a short idea generation session in isolation to understand the current practices in the organization A. In this case, the pilot study represents a feasibility study, small-scale version prior the main research study (Polit et al, 2001). It involved pretesting a research tool, like a new data collection method or it can also be used to test an idea or hypothesis. The reason behind this choice is to identify design issues in idea generation scenarios that can help to address similar issues in the main study. The pilot study also aims to identify potential problems that emerge in practice (Tashakkori and Teddlie, 1998). In this case, the Pilot Study focused on an exploratory case study with Company A and was built upon non-participatory observation of an idea generation session.

At the end of the Pilot study the appropriateness of the Research Questions were validated. This helped the orientation purposes of this study. The key learnings also helped refine the generation of the Framework, since the pilot worked as an introduction of the sample organisation processes, practices and tools within Front End Idea Generation practices. Through this pilot study a base of knowledge around idea generation practices in Company A was generated in order to improve results the subsequent case studies (Tashakkori and Teddlie, 1998).

Main Study - THE FRAMEWORK

The main study was built upon the ideas that emerged from the pilot study in terms of appropriateness of methodologies, practices, processes, tools and research questions. The main study extended the concepts and tools, involving a significantly wider research programme, facilitating data gathering with an increased sample size, and examining the relevance of processes, practices and tools in multiple organisational and business settings in order to indicate the exploration of practices and research questions across the case studies. New factors might be also introduced by widening up the scope of the study.

During the idea generation workshops, non-participatory observation was conducted. It has been chosen as the most appropriate technique for reflexive learning (Lindlof and Taylor, 2002) to gather data to deepen the knowledge of the behaviours, perceptions and performance during Idea Generation activities, where the researcher can observe participants' frequency of actions without interacting with them. Before the research has been conducted, the researcher explained to the participants their interest in this project and the implications of being part of it, obtaining participants informed consent to use this data and for what purpose.

Observation of the workshop testing sessions was recorded as field notes of the phenomena being explored (Erlandson et al, 1993) involving an "active looking, improving memory, informal interviewing, writing detailed" (DeWalt and DeWalt, 2002, p.vii) method to systematically gather relevant data for the subsequent data analysis stage.

The other research method involved in this study was interviews. It is one of the most common methods for data collection in qualitative research as it helps reveal the interactions observed from the non-participatory observation and enables a deeper insight from decoding them. In this occasion, it seeks to obtain information about the interviewee's behaviours, beliefs and attitudes within the idea generation process during Front End Innovation Projects. It sought to understand the meaning of what the interviewee says (Kvale, 1996) and the meaning of those experiences (Schwandt, 2000) while reducing the subjectivity that qualitative research may imply in the researcher (Robson, 2011). The researcher bore in mind what the person is saying, considering it as objectively as possible to avoid personal interpretation.

As discussed in Chapter 1, blended approaches have demonstrated the benefits of bringing strengths from different methods. Therefore, in this study, structured interviews were conducted combining both quantitative and qualitative questions with a very accurate and thorough approach to allow the researcher a clear plan to follow to obtain detailed insights from the study. The questions for the interview were of two types: (1) quantitative based questions to facilitate the evaluation, and (2) blended quantitative and qualitative based questions underpinned by an open *Why* question to allow the informant to provide a qualitative answer that can be expanded and provide an in-depth response. The informant was asked about the key factors of the idea management process and if there are any missing issues, so the interviewee can provide further valuable data.

This offered a robust understanding of the factors impacting on Idea Quality in

Multidisciplinary teams in large corporations as well as providing insights on the differences between individuals and group behaviours.

There were 3 empirical interviews for the PhD main study. The interviewees were selected in relation to their expertise in NPD within the company. These involved some of the participants on the idea generation sessions from the sample organization. By interviewing participants from diverse areas of NPD the researcher aimed to gather substantial data that helped address identified weaknesses in Idea Generation and demonstrate improved idea generation practices.

At the end of the main study a series of different tools and approaches were tested and evaluated in different live innovation projects at Company A (these involved idea generation sessions with multidisciplinary teams). These multiple idea generation scenarios indicated preliminary emerging factors impacting on Idea Quality and success of methodology and tools used to be further explored and developed during the validation study.

Validation study - THE FRAMEWORK

The validation study comprises a Comparative Validation Model formed by two final case studies, one in each sample organization. The first validation study took place in Company A, which is the one where the Framework was developed and shaped. Once the Framework was tested there, the Framework was taken to Company B to validate the results in a different setting to determine its effectiveness. Consequently, the framework resulted from the Main Study, including a process, practices and tools, was developed and applied to two projects with Companies A and B. The analysis and evaluation from main study activities led to a cluster of best features in practices of previously used tools and practices to improve the quality of ideas generated in FEI.

The reason behind testing the New Framework was to validate successful practices from the Main Study and to determine their feasibility into different domains in order to validate the replication of the framework.

2.1.4 The Selection of Companies

New Product Development is becoming increasingly important so the selection of organisations to take part in this study was very important to determine implications in FEI. The two sample companies have been chosen due to their experience in NPD, their ongoing innovation practices, the proximity location from the researcher and their product range expansion. The main organization for this study, Company A, is in the broadcasting and media industry while Company B belongs to the telecommunication sector. These companies have been selected for this study because New Product Development is one of their main drivers of innovation. They have been chosen due to their abilities and capabilities to engage with four NPD related circumstances: (1) New markets, (2) existing markets, (3) incremental innovation and (4) radical innovation (Von Stamm, 2008). Essentially then, selection was made on the basis of 'instantiation of concept': the companies were known innovators, heavily engaged in NPD activities (in the course of their business), and known users of NPD tools. They were also understood to be seeking to develop the efficiency and effectiveness of NPD tools. With respect to Company A, the organisation can be perceived as an overall case, with the six cases undertaken within it classified as 'embedded cases' (Yin, 2003). Again, the unit of analysis in the cases is determined by instantiation of concept, and can be configured as a 'live and situated example of front-end NPD activity'. The case in Company B was also an embedded example of instantiation in an organisation that is deeply involved in ongoing NPD processes.

They are both multinational organisations with differing areas of activity that offered a wide range of situations and scenarios to test, evaluate and validate a series of tools and practices.

Profile	Company A	Company B
Area of activity	Broadcasting/Media	Telecommunications
Size of company	Large Enterprise	Large Enterprise
Turnover	£6.8 Billion	£ 9.12 billion
Number of Employees	23.000	62.000
Product range	One Brand with multiple product ranges.	Three Brands with multiple product ranges

Table 39 Comparative Table between the two sample organisations taking part in the study

Using a case study model, it involved the testing of a conceptual framework within telecoms companies via multiple idea generation scenarios. This determined how to improve idea generation within NPD teams. It specifically evaluates the skill sets and tools needed to improve idea generation effectiveness (more, faster and better) in NPD teams.

COMPANY A

Is a multinational telecommunications corporation. Formed in 1990 in the UK it has acquired other companies in Europe, over time becoming a key player in Europe for television, broadband and fixed line telephone services to both private consumers and corporate businesses.

Twenty years ago, this company had the monopoly of paid TV subscriptions but over time there has been an emergence of more competitors and new challenges, such as piracy, that have had an impact on their sales and revenue.

Company A driver for innovation lies in the fact that their customer behaviours around TV and phones have changed. This is the reason Company A put a leadership team in place to drive innovation within the organization. They were responsible for generating quality ideas that would feed into their innovation pipeline, identifying key trends in technology and consumer needs and coordinating the development of ideas.

While the innovation department was set up and spent six months holding around twenty brainstorming sessions, the outputs had not been successful. The previous creative consultancy helped Company A to put the necessary resources and infrastructure in place to generate key ideas that would feed into their idea pipeline. However, although they generated 98 ideas, the quality was still lacking and there was not a formal process to select and prioritize them.

This was the moment the team was called in to take action. The gatekeeper character (Hammersley and Atkinson, 1995) in this case, was represented by a key innovation manager with who the researcher arranged the initial negotiations for the research study as well as determining the best ways to approach the members of the organization to understand better their culture and current processes, easing the process of getting access to the organization (Hoffman, 1980; Cassell, 1988).

One of the struggles Company A was facing was to rely too much on external consultancies to provide insights, research reports and drive some idea generation sessions for New Product Development. The knowledge and information gathered belonged to the team that had asked for it but was not shared across departments. The impact of this behaviour was a lack of knowledge management within the organization and a lack of innovation culture across teams. Very often, when employees had a doubt about a topic, they did not know who could answer that question or if that is something an external research party had already helped them. This is the reason the senior level of the organization had decided they needed to boost their innovation pipeline but there was no department to do that nor specialized people.

This telecoms organization current challenge lied in improving the effectiveness of idea generation processes and the impact of idea pipelines for products, platforms, customer experience and business models. Consequently, the benefit they were looking to get from this study was to enhance their idea generation effectiveness through equipping teams with skills and tools, improve their ability to generate ideas with business impact and help teams to evaluate opportunities and ideas quicker and better

COMPANY B

Is a multinational communication and information technology corporation founded in the 1870s. It is spread across the world, with offices in more than 100 countries and has annual revenue above 12 billion Euros. Its main current focus is technology development and manufacturing.

In terms of challenges, this multinational is seeking to identify future design and manufacturing opportunities to create new products and services to leverage the communications market. The organization B takes part in this study at the validation stage. The benefit from this exploratory study on this organization is the improvement of its performance during idea generation practices and the better utilization of large amounts of internal data within the organization to trigger this activity. The reason behind this is to evaluate and validate results from the new idea generation tool across industries and organizations to determine the benefits and drawbacks on multiple scenarios.

2.2 Methodological Approach

This is an exploratory and systematic ethnographic study based on a small sample model that explored cultural phenomena (Geertz, 1973). Geertz (1973, p.10) suggests that ‘Doing ethnography is like trying to read (in the sense of "construct a reading of") a manuscript - foreign, faded, full of ellipses, incoherencies, suspicious emendations, and tendentious commentaries, but written not in conventional graphs of sound but in transient examples of shaped behaviour’. This definition implies that ethnography is based on the translation of behaviours, comments and statements into valuable data to understand deeply the lives of a cultural group (Philipsen, 1992). Ethnography has been the chosen method of research as this study aims to problematize “the ways in which individuals and groups constitute and interpret organisations and societies on a daily interactional basis” (Schwartzman, 1993 p.3). This study adopted an eighteen months Deep Ethnography approach, in which the researcher became part of the organisation, being able to immerse in the culture of the organisation to understand and analyse better the underlying practices.

As any other research methodology, ethnography has a series of strengths and weaknesses. Its best advantage is the fact that it enables a holistic approach (Ember and Ember, 2006) enabling the inclusion of the history of the phenomena, the analysis of situation and the environment in which it takes place. Nevertheless, it is very advantageous for an ethnographic study to start from a deep data collection in order to develop a theory (Glaser and Strauss, 1967). This study did not start with a hypothesis but it aimed to generate theory through the collection and analysis of data.

This deep ethnographic study aimed to address some of the limitations associated with ethnographic research. One of most acute problems in ethnographic research relates to data collection, typically ethnographic studies involve gaining access to ‘everyday life’ and private settings (Hammersley and Atkinson, 1995), however in this research study this limitation did not apply as the sample companies agreed to allow close access to data and practices within the organisations. Consequently, due to the sensitivity of data, the necessary ethical procedures were carried out in order to decrease the risks of sensitive data being leaked. The information about the participants has not been shared with anyone other than the researcher and the information collected from this research project was kept private. Nothing that the participant told the researcher was shared with anybody outside the research team, and nothing was attributed to her or him by name, as they remain anonymous. The knowledge derived from the research was shared as transcripts and agreed with the participants before it was made available for use in the research study. Participants were also asked to complete an informed consent form, and were offered the right to withdraw from the study at any moment. The data about this study has been stored as an encrypted file in a locked file and it has not being shared with or given to anyone, ensuring that employees are not placed in a compromising position.

A second limitation in ethnographic studies is the fuzziness of their limits, for instance, ethnography researchers become, voluntary or involuntary, participant observers in the situations explored (Hammersley and Atkinson, 1995). This raises the question of when ethnography ends and other qualitative enquiry method, for instance participant observation begin. However, in this study observation was conducted only during idea generation sessions included under the Deep Ethnography methodology across the seven case study projects.

Biased results in ethnographic studies refer to “the ways in which [the] researcher's involvement with a particular study influences, acts upon and informs such research" (Nightingale and Cromby, 1999). This is a key weakness of ethnographic studies as researchers cannot be completely unbiased; therefore, it was a challenge to be considered in this exploratory study. The researcher addressed this issue by setting clear criteria to validate results at all stages of the research study to avoid personal interpretation.

Finally, in ethnographic studies the researcher tends to rely on what people say they believe and do, however, in this case the observation aimed to ameliorate against this problem (Hammersley, 1993, p.11). The potential weakness was also addressed by the operationalisation of a validation study that was designed to test – and to confirm, refute or extend - the results gained in the main study.

2.2.1 Development of the Research Tools

The study involved a multi-theme literature review and it has been combined with knowledge and understanding gained in industry by the researcher as a practitioner. This resulted in a robust basis for the development of a ‘Case Study Methodology’. The pilot study highlighted a series of emerging issues underpinned by literature but triggered some scoping matters that needed further research. Finally, the validation study aimed to condense all the previous knowledge gained both from literature and practice and to develop two validation case studies in order to trial the potential benefits achieved that might be achieved by a new synthesized idea generation framework. The purpose of using the Case Studies was to help identify and address emergent gaps in knowledge and recognize agreements and disagreements between theory and practice. The scoping interviews constituted the introduction of a major research tool designed specifically for the study.

Extracting Theories from The Review of Literature

The literature review has followed Robson's (2011) principles of investigation by exploring gaps in knowledge around five core topics in order to identify patterns in data from different sources and develop suitable research methods: (1) the importance of ideas for business success; (2) Factors impacting in the dynamics of New Product Development; (3) Factors influencing Idea Generation practices; (4) The impact of uncertainty on decision-Making in FEI; and (5) Tools and practices in Idea Generation. The review of literature was driven by the study's aim to identify the key factors that influence front-end idea generation practices in multinational organisations.

The cross-trajectory literature review has explored the context of idea generation at different levels: new product development, front-end innovation and idea management within a design practice. This approach has enabled an understanding of existing and emerging trends in this field, culminating in a series of common elements, links and topics. The purpose of undertaking a multi-trajectory literature review is based on the intricacy of the emerging importance of generating high quality ideas.

Research has shown that many of the empirical studies, have not followed a common approach but created multiple processes that do not develop the knowledge in the field but generate intersections of knowledge. One of the objectives of the literature review was to focus on the different factors that influence New Product Development processes, Front End Innovation activities and Idea Generation practices and tools. By establishing such a systematic literature review it was possible to recognise these issues and focus this study. The literature review pursued an investigation of gaps in knowledge around the following themes:

4. Design Practices Issues

- Lack of common terminology in relation to Design Driven Innovation
- Lack of common processes and practices
- Shift in importance from ‘Design’ to ‘Ideas’
- Lack of understanding of idea generation tools and techniques

4. New Product Development Issues:
    - Lack of structured Front End Innovation processes
    - Over-reliance on formal processes impacts on a lack of innovative outcomes
    - Shift from ‘process’ to ‘quality of data’

4. Idea Generation Issues:
    - Struggle to generate high quality ideas
    - Importance of good idea management practices
    - Lack of common processes and practices
    - Unstructured and informal nature of processes
    - Lack of focus in idea generation techniques
    - Lack of bespoke and updated data in supporting tools
    - Lack of objective and agreed evaluation criteria
    - Lack of understanding of success factors and drivers for idea quality

4. Decision-making Issues:
    - Lack of reflective thinking in FEI practices
    - Lack of agreement in decision-making impacts on implementation of ideas
    - Undervalued role of the group facilitator to enable decision-making

By analysing the empirical evidence gathered from previous studies it was possible to establish a series of core issues within this field that have contributed to development of a Synthesized Idea Generation Framework (see Figure 20) that was explored in the case studies in order to guide the research. This framework, built upon issues mentioned above, developed a series of processes, practices and tools that help to answer the research questions by determining strengths and weaknesses of current methods and factors that impact on idea quality, and ultimately, how Idea Quality can be enhanced in FEI in multinational organisations.

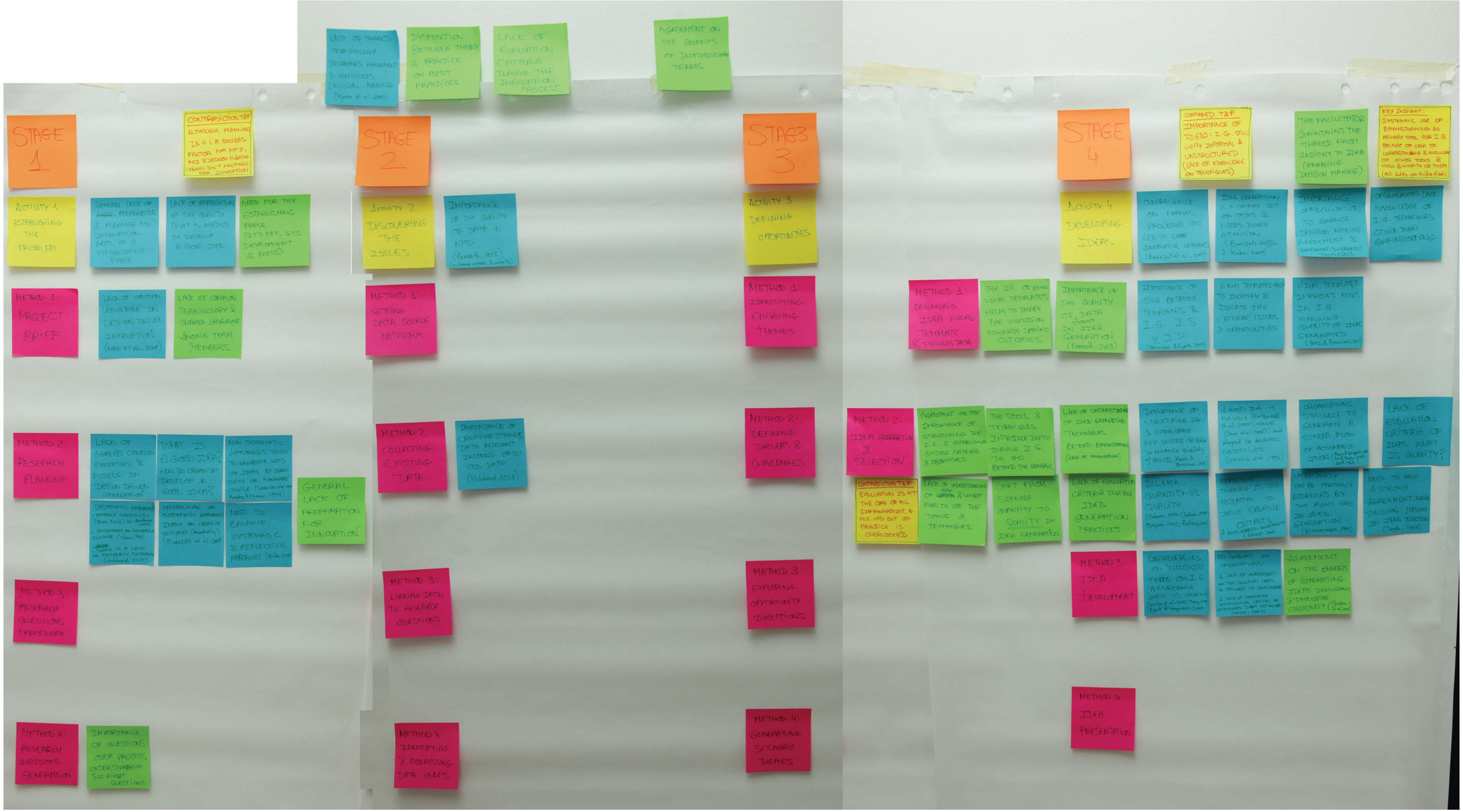


Figure 20, Preliminary Synthesised Idea Generation Framework linked to identified core issues in Literature Review

2.2.2 Implementation of the Study

This study was undertaken as a single phase in a UK MNCs industrial setting. The entire research study was carried out during an eighteen-month period, from Pilot Study to Validation Study results, followed by the analysis of the data and findings. As seen in previous chapters, the methodology follows an iterative approach in which the cycles of the individual case studies inform each other (Yin, 2003). The data streams from the observation and the interviews help support and inform the case studies' key learnings. Consequently, a series of changes and improvements are applied to the framework, helping to advance in this methodology proposed.

This exploratory study adopted Robson's (2011) approach to gathering evidence, one that combines both ethnographic observation (to understand the context) and empirical interviews (to understand in detail the 'why' of the challenges and issues identified). The ethnographic observation in the pilot study showed what people do, but it did not address the 'why'. Thus a series of empirical interviews was undertaken to ensure a good degree of triangulation in the methodology.

Observation

The observation sessions at Company A took place across a wide range of idea generation scenarios. However, the observation in Company B focused on the Idea Generation session for validation.

For this project, non-participatory observation was chosen as the most appropriate technique for reflexive learning (Lindlof and Taylor, 2002) in order to gather data to deepen knowledge on behaviours, beliefs, perceptions and performance during Idea Generation activities. Here the researcher could observe participants attitudes without interacting with them. Once the research had been conducted, the researcher typically explained to the participants their interest in this project and the implications of being part of it, consent was obtained from the participants to use this data (see Appendix 7) and an ethics code was followed (see Appendix 6).

Observation of the projects was recorded as field notes of the phenomena being explored (Erlandson et al, 1993) involving an "active looking, improving memory, informal interviewing, writing detailed" (DeWalt and DeWalt, 2002, p.vii) method to systematically gather relevant data for the subsequent data analysis stages.

Scoping Interviews

Interviews are one of the most common methods for data collection in qualitative research as they help to build understanding of the beliefs and behaviours previously observed and to generate deeper insight via decoding (Denzin and Lincoln, 2005). On this occasion, interviews sought to obtain information about the interviewee's behaviours and attitudes within the idea generation process during Front End Innovation Projects. Moreover, they aimed to investigate the meaning of what the interviewees had said (Kvale, 1996) and the meaning of those experiences (Schwandt, 2000) while reducing the subjectivity that qualitative research may imply for the researcher (Robson, 2011).

Structured interviews were conducted combining both quantitative (closed) and qualitative (open) questions with a very accurate and thorough approach to allow the researcher a clear plan to follow to obtain robust insights for the study. Most questions were split into a two-stage process: a first closed question to facilitate the evaluation and assessment of objectivity of responses combined with a second stage based on an open *Why* question to allow the informant to provide a qualitative answer that can be expanded and provide an in-depth response. The informant was asked about the key factors of the idea management process and if there were any issues that had not been addressed, so the interviewee could provide further valuable data. Figure 21 visualises the flow of questions around Idea Quality and Idea Generation practices to be explored.

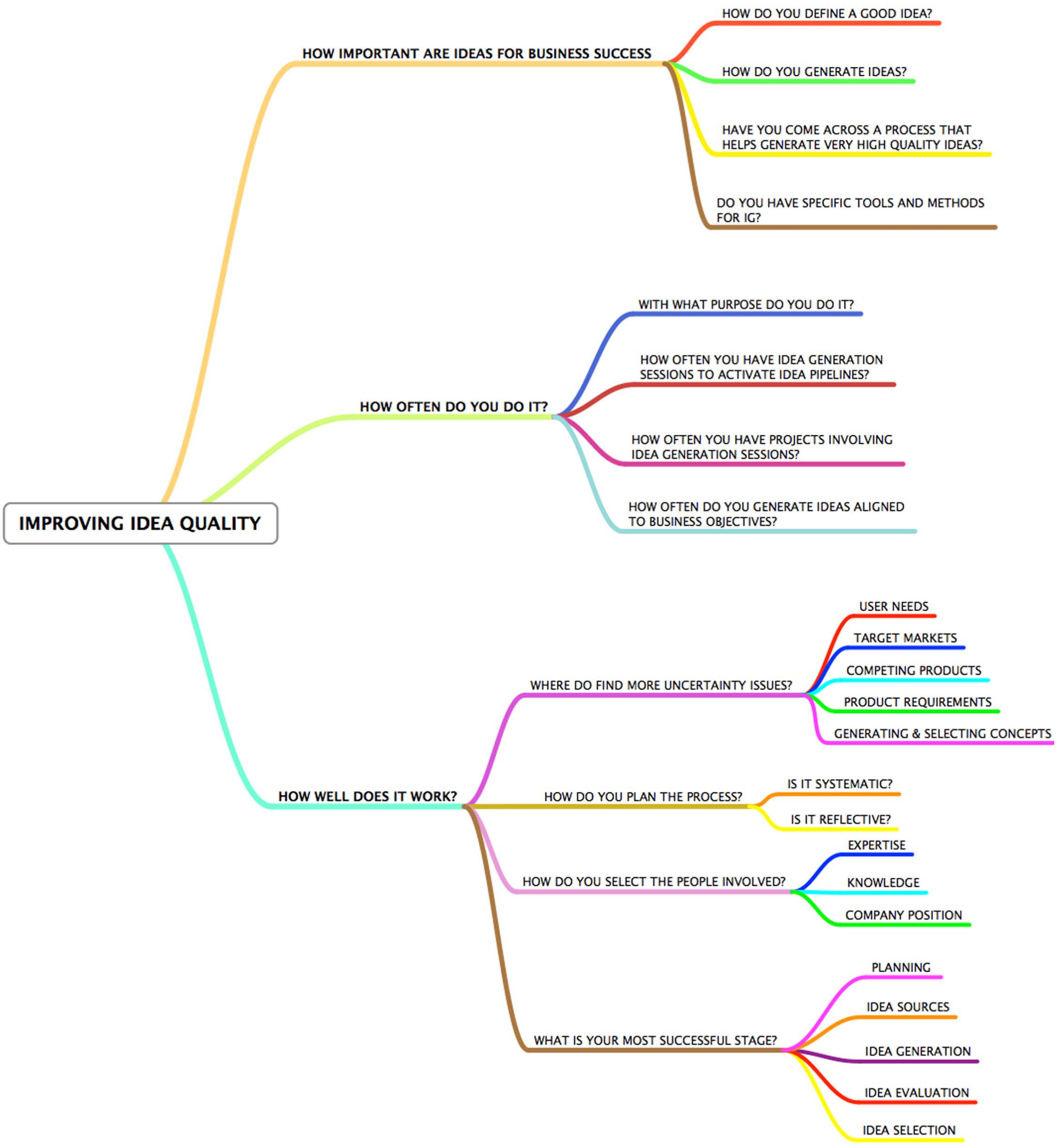


Figure 21 *Interviews about Idea Quality and Idea Generation Practices Mind Map*

The scoping interviews embedded an evaluation criteria involving four key metrics: (1) importance, (2) frequency, (3) performance, and (4) sources of uncertainty. The scoping interviews involved the Director of New Concept Development, in charge of the front-end innovation projects to get a significant insight from the process of those idea generation projects, and two concept development employees involved in these projects. This offered a robust understanding of the factors impacting on Idea Quality in Multidisciplinary teams in large corporations as well as providing insights with respect to the differences between individuals and group behaviours. This output was further tested on the large sample to determine the similarities and differences between organizations, participants and idea generation processes.

Preparing and Conducting Case Studies

The case study was the selected research strategy for the project for two reasons: (1) the exploratory nature of this study implied that the case study methodology offered the opportunity for a more in-depth investigation (Miles, 1979; Herbert, 1990: 19); and (2) the case study methodology enabled the exploration of the 'how' and 'why' of a current real life phenomena within a specific context (Yin, 2003). In this case Idea Generation Quality in the context of Front End Innovation Projects was explored through gathering the maximum information on opinions, session feedback, outcomes achieved, strengths, weaknesses and key learning points.

As with most case studies, there was a combination of methods and sources of information used alongside theory (Denzin, 1978): this has been highlighted in the previous sections. During this research study a series of tools and approaches were piloted and tested and a series of case studies were developed based on different innovation projects within Company A involving idea generation sessions with multidisciplinary teams. These multiple idea generation scenarios helped to identify the emerging factors impacting on Idea Quality.

By combining interviews, observation and case studies over a period of eighteen months, the aim of this research was to gather rich data that would provide a solid base for data analysis and decoding. It helped to build a robust framework to aid understanding of where and how to improve specific idea generation processes, practices and tools in front-end innovation activities. The final stage of the study tested the new synthesized idea generation framework with a larger sample of participants in order to validate the efficacy and value in a multiple organization setting.

Yin (2003) states that typically one case study does not typically present sufficient evidence; therefore this study has adopted a multi-case study approach (Yin, 2003) in order to generate a detailed understanding of IG practices and to avoid over-generalisation from a limited evidential (case) base. This study follows Yin's multi-case study model, which uses a range of different case studies in order to show the robustness of the model. The reason behind it is based on the fact that only one type of idea generation project would not be representative of the scope and would result in generalised outcomes. It was decided the study would include seven case studies (each one with a different idea generation objective) to observe the progression of issues. This decision was made because each case study builds upon the knowledge gained from the previous one. They all together represent and explore the potential scope of different idea generation type activities within FEI, seeking to help answer the research questions (see Figure 22).

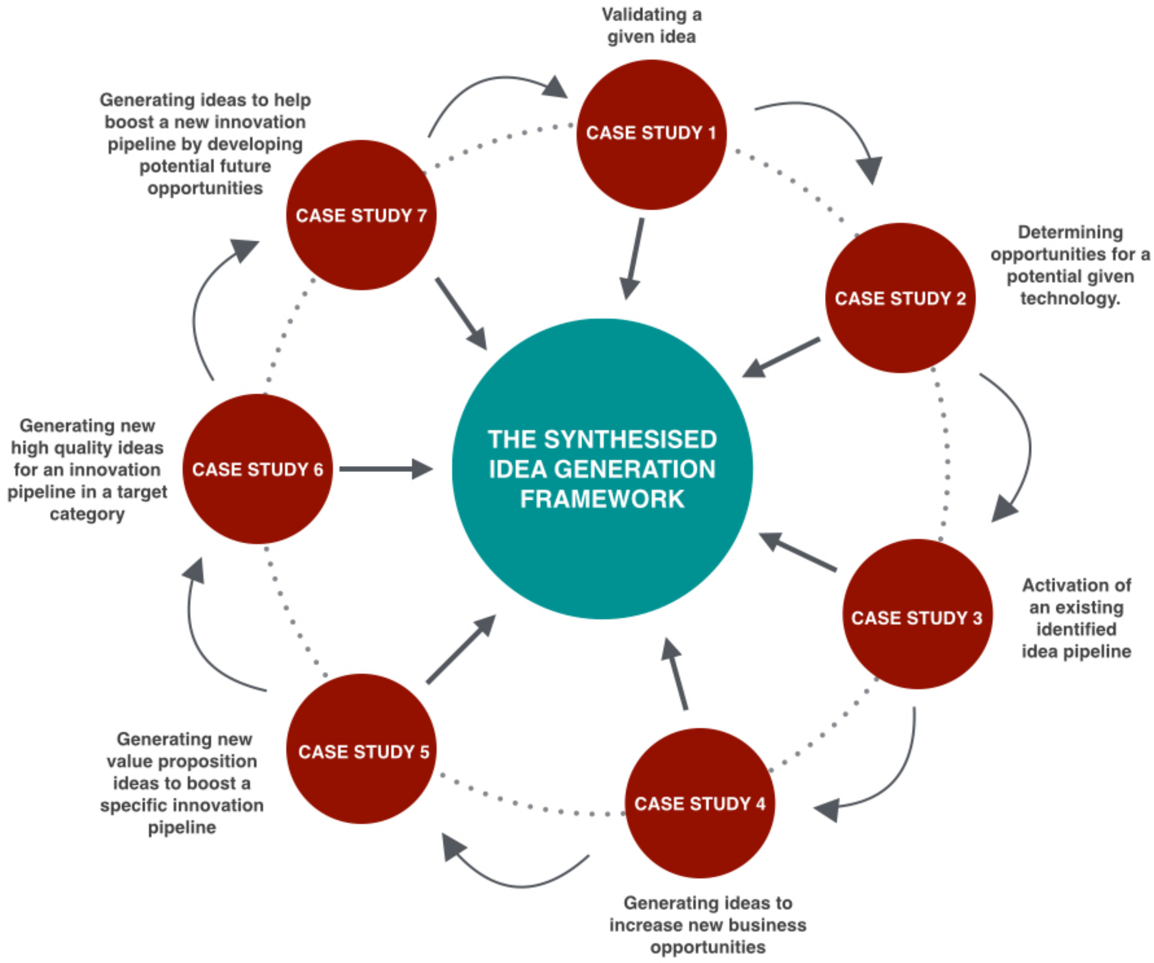


Figure 22 *Selection of the Case Studies*

2.3 Data Analysis

The objective of the data analysis stage is to summarise the resulting data by undertaking a thorough analysis of the sample data. The data analysis helps evaluate the performance and efficacy of the new idea generation framework under a series of parameters: project, people, knowledge, tools, stimulus, process and outcomes and how it impacts on idea quality within multidisciplinary teams. It helped to describe current practices in

Multinational Organisation’s Front End Innovation, specifically what they are doing to generate ideas.

There is not a unique way to evaluate and analyse ethnographic studies, however, this study adopted Richardson’s (2000) substantive contribution, which is based on enhancing the understanding of a phenomena and expressing a set criteria so it can help provide a credible understanding of the current idea generation scenarios in multinational organisations.

The analysis of data adopts a triangulation strategy that incorporates quantitative (closed) and qualitative (open) questions from the scoping interview tool and focuses on the following metrics: frequency, effectiveness and importance of issues. The study focused on determining the factors that impact on Idea Generation practices in multinational organisations via use of a Case Study approach. The metrics to determine the quality of ideas generated were: feasibility (Diehl and Stroebe, 1987), novelty (MacCrimmon and Wagner, 1994) and alignment to business objectives (Valacich et al, 1994). The parameters chosen to compare the Case Studies nature have been: the context of each of the projects, the issues and challenges that it represents, the type of project that comprises, the process that is followed and the outcomes achieved. All the case studies were evaluated against the metrics of importance, frequency and effectiveness of the different attributes that construct each of the projects using NVivo. For instance, the time allocated to the project, the people involved, the resources that have been put into place to develop it, the knowledge and understanding of the process, techniques, tools and stimulus used in different stages of the project.

This exploratory study adopted a ‘ladder up’ strategy in which the case studies are articulated to convey the progression of learning. Specifically, each of the case studies’ key learning points feed into the next case study to develop and strengthen the emergent framework through sequential creation and consolidation of learning. This strategy follows Yin’s (2003) chain of evidence theory, in which the key learning from a case study informs the following case. Learning builds from one case study to the next, ensuring synthesis and ensuring findings and learning points are not generalised. Figure 23 visualises how the emerging issues from one case study become the starting point for the next study. The objective of this kind of strategy is to improve the process, practises and tools of the SIGF so it enables an enhancement in the quality of outcomes in Front End Idea Generation.

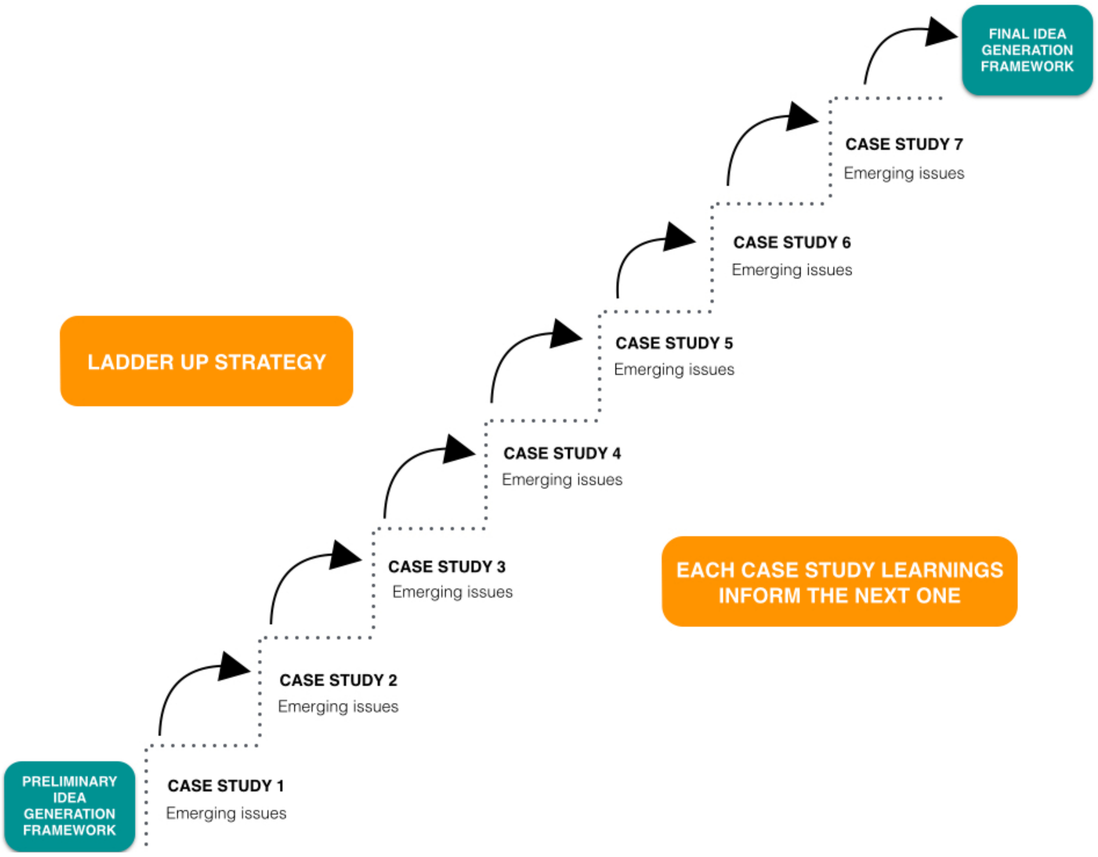


Figure 23 *Visualisation of the Case Study Ladder Up Strategy*

In order to analyse the findings from each Case Study large data maps were created to highlight the core issues to be further explored or addressed in the following Case Study (see Appendix 5). These Data Maps visualise the process, practices and tools used, what were the issues that came up in each stage and what was the impact on the Case Study. It also linked the findings to issues identified in literature in order to understand the relationship between theory and practice. These Data Maps helped to visualise the learning gained from the analysis of each of the Case Studies to be applied onto the next one, helping build upon the knowledge across the seven cases.

Due to the exploratory nature of this study, the chosen approach has been of inductive reasoning coming from the premises: observation, interviews and case studies. The gained knowledge from these premises has helped to generate a series of preliminary conclusionsfor a more precise future investigation (Herbert, 1990: 19). The analysis from interviews fed back into the ideas to build the tools and methods, testing the accuracy of the outcomes.

A wide range of approaches has been used to visualise (visual templates, stimulus data) and present (maps, tables, figures, diagrams) the data results from the study, and these will appear in the following chapters. In the main findings sections, a summary table (Table 67) has been used in order to provide focused and concise summaries of the resulting data.

2.4 Discussion and Conclusions

This chapter has summarized the methodological rationale and approach that this exploratory study has adopted. The methodology chosen has been ethnographic research to really understand the processes, practices and tools currently used in MNCs and being able to determine the influence of uncertainty and complexity in FEI projects as well as the factors that impact on idea quality in this same setting.

The emerging themes in literature, such as the impact on innovation practices of over-structured processes, which tend to lead to low creativity outcomes (Barczack et al, 2009), the dilemma between seeking quantity or quality in idea generation practices (Osborn, 1953; Majaro, 1992; Reitzig, 2011), and most importantly the lack of agreed models in design driven innovation (Osborn, 1963; Noller, Parnes and Blondi, 1976; Isaksen et al, 1992; Cross, 2000; Design Council, 2006; Brown, 2009; Baeck and Gremett, 2011). Through testing and developing the Idea Generation Framework, which follows the principles of effective practices in literature (see figure 20), this exploratory deep ethnographic study helped to address these issues in literature.

The purpose of the Framework in this exploratory study is to discuss the implications of a lack of common Design-Driven Innovation processes in FEI and the identified factors that influence Idea Generation practices from the literature. It informed in great detail the strengths and weaknesses of processes, practices and tools used in order to refine and elaborate a new Idea Generation Framework able to blend effective practices and enhance the quality of ideas generated in large multinational organisations. It aimed to create a robust framework that is based both in literature and professional practices.

The conclusions from this study refer to the identification of the constructs that are needed to develop a quality idea, which include planning, use of supportive bespoke tools, importance of the group facilitator, need for idea quality criteria, and understanding different idea generation and selection tools and techniques.

2.5 Limitations of the study – The Framework

There are three factors that can potentially impact on the results and findings of this study: replication, reliability and validity. Guba and Lincoln (1994) suggested the way to evaluate the validity of qualitative studies is by determining the: applicability of the findings and results to other scenarios and believability of finding, which Lecompte and Goets (1982) agree with by considering validity can be interpreted when the findings can be extrapolated and applied to a less specific context.

The concreteness of this study could be suggested as a limitation of the study in terms of replication, since it thoroughly analyses the performance within one organisation and could not represent the same approaches that another organisation. However, by developing a triangulation strategy to analyse the data gathered, the resulting findings can be transferable and applicable to similar contexts in multinational organisations. This exploratory study has proposed a series of indicative findings that have supported the identification of several factors impacting on idea generation practices in Front-End Innovation activities in large multinational organisations in the UK.

The thesis addresses the previously described issues and will further discuss these in the presentation of findings from case studies, interpretation and discussion and conclusions chapters below.

3 Case Study Methodology

The literature has helped synthesise the Idea Generation processes and has highlighted the core phases (see Chapter 3). This gathered knowledge helped to create an Idea Generation Framework that brings together effective practices from well-established previous models based around the common phases of establishing, discovering, defining and developing. The literature review has also shown a wide range of activities and tools depending on the type of project, purpose and complexity of the problem.

The purpose of the case studies is to test, develop and retest the idea generation process, activities and tools depending on the type of project, complexity and range of scoping tools in order to answer the research questions. All the Case Studies follow the same framework in order to be consistent and target specific aspects of interest for the research.

Case study Framework
Project Focus
Project team composition
Research Objectives of the Case Study Project
Pilot/Case Study Project Phases
Idea Generation Session Characteristics: a. Session Objectives b. Workshop Participants c. Idea Generation Techniques d. Session Activities e. Session Tools
Evaluation Criteria
Idea Generation Session Outcomes
Key Learnings
Preliminary Findings from the Case Study

3.1 Introduction

The following information will introduce and discuss the seven Case Studies carried out during this exploratory research study. This chapter comprises six sections that explore the core themes and issues around the methodology deployed for the data collection elaboration and development:

4.2.Context of the research
4.3.The Case Studies and the Idea Generation Framework
4.4.Summary of the Case Studies and the Idea Generation Framework

3.2 Context of the Research

This section presents the seven case studies for this research project. They are divided in three different stages: a pilot study formed by one case study, main study formed by four case studies and a validation study formed by two case studies.

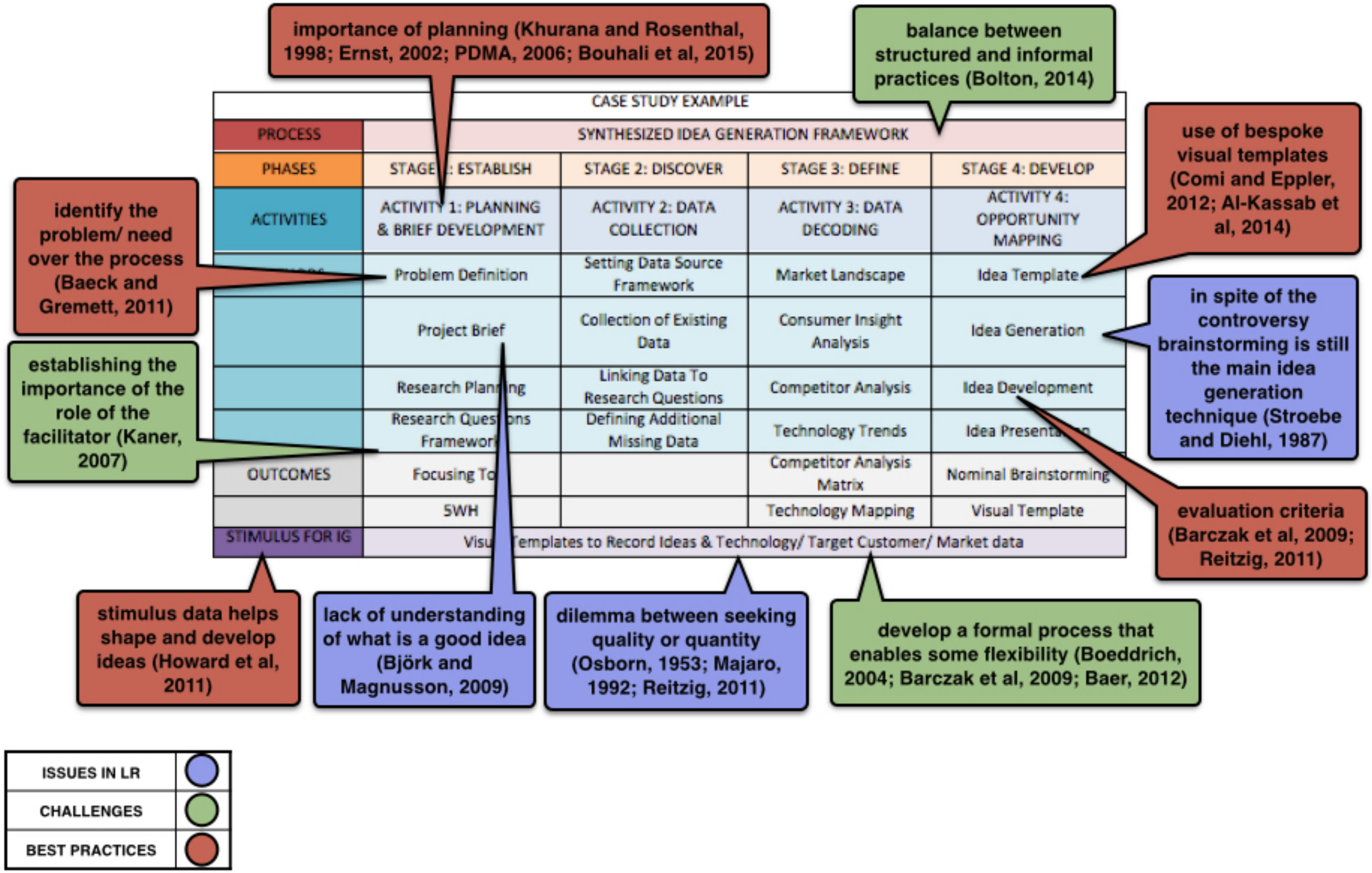
Adopting Yin's (2003) chain of evidence principles, each phase within the Idea Generation Framework (IGF) focused on building upon the findings gained from the previous case study, generating a thread of knowledge from Case Study 1 to Case Study 7. Therefore, the study follows a ladder up strategy, which is based on seven case studies to develop a progression of learnings to strengthen the Idea Generation Framework. This approach helps avoid generalised findings, which has been identified as a key weakness from previous studies.

All case studies are analysed under the same structure by describing the context and operational conditions in which the innovation project took place, the objectives, focus and outcomes form the project, the undertaken process, the idea generation session description and the results from the process and from the project.

Example of the Case Study

This research study is composed of 7 case studies within two different multinational organisations, six in Company A, over a period of eighteen months, and a validation study in Company B of three months. They all follow a Project Driven approach, which contributed to the variety of characteristics and capabilities of each project.

To evaluate the performance, effectiveness and frequency of activities, methods and tools all the case studies have being mapped against the same process (the Idea Generation Framework). It has evolved over time in order to address identified issues within the case studies articulation.



CASE STUDY EXAMPLE				
PROCESS	SYNTHESIZED IDEA GENERATION FRAMEWORK			
PHASES	STAGE : ESTABLISH	STAGE 2: DISCOVER	STAGE 3: DEFINE	STAGE 4: DEVELOP
ACTIVITIES	ACTIVITY 1: PLANNING & BRIEF DEVELOPMENT	ACTIVITY 2: DATA COLLECTION	ACTIVITY 3: DATA DECODING	ACTIVITY 4: OPPORTUNITY MAPPING
	Problem Definition	Setting Data Source Framework	Market Landscape	Idea Template
	Project Brief	Collection of Existing Data	Consumer Insight Analysis	Idea Generation
	Research Plan ing	Linking Data To Research Questions	Competitor Analysis	Idea Development
	Research Ques ons Framewor	Defining Additional Missing Data	Technology Trends	Idea Presenta
OUTCOMES	Focusing To		Competitor Analysis Matrix	Nominal Brainstorming
	5WH		Technology Mapping	Visual Template
STIMULUS FOR IG	Visu emplates to Record Ideas & Technology/ Target Customer/ Market data			

importance of planning (Khurana and Rosenthal, 1998; Ernst, 2002; PDMA, 2006; Bouhali et al, 2015)

balance between structured and informal practices (Bolton, 2014)

identify the problem/ need over the process (Baeck and Gremett, 2011)

use of bespoke visual templates (Comi and Eppler, 2012; Al-Kassab et al, 2014)

in spite of the controversy brainstorming is still the main idea generation technique (Stroebe and Diehl, 1987)

establishing the importance of the role of the facilitator (Kaner, 2007)

evaluation criteria (Barczak et al, 2009; Reitzig, 2011)

stimulus data helps shape and develop ideas (Howard et al, 2011)

lack of understanding of what is a good idea (Björk and Magnusson, 2009)

dilemma between seeking quality or quantity (Osborn, 1953; Majaro, 1992; Reitzig, 2011)

develop a formal process that enables some flexibility (Boeddrich, 2004; Barczak et al, 2009; Baer, 2012)

ISSUES IN LR	●
CHALLENGES	●
BEST PRACTICES	●

Figure 24 Example of the Idea Generation Framework applied to Case Studies

What it is important for this research project is to determine the different outcomes and effectiveness of the synthesised process. Each Case Study will show the different methods and tools applied during the project (Figure 24) and will be followed by a more thorough explanation of each phase with its visualization. This will help to understand the effectiveness of the Idea Generation Framework in terms of its processes, practices and tools.

The purpose of this exploratory study was to develop and test an idea generation framework in relation to a range of different types of innovation projects: (1) validating the potential of a given idea; (2) identify the potential of a given technology; (3) activation of an existing identified idea pipeline; (4) generating ideas to increase new business opportunities; (5) generating new value proposition ideas to boost a specific innovation pipeline; and (6) generating high quality ideas for an innovation pipeline. To test, develop and refine the phases, activities and tools of the Framework a model was developed (Figure 25) in order to answer the research questions. The Case Studies were all compared against the same parameters: (1) purpose of the case study, (2) type of project, (3) practices, (4) scoping tools used and (5) key learnings. The reason behind these parameters was to differentiate the complexity of the problems, the range of tools and practices in order to identify common issues. This model helped to demonstrate there is a consistency in phases but the practices and tools can grow depending on the complexity of the problem.

	PILOT STUDY **Case Study 1** **Company A**	**MAIN STUDY** **Case Study 2** **Company A**	**MAIN STUDY** **Case Study 3** **Company A**	**MAIN STUDY** **Case Study 4** **Company A**	**MAIN STUDY** **Case Study 5** **Company A**	**TEST STUDY** **Case Study 6** **Company A**	**VALIDATION STUDY** **Case Study 7** **Company B**
Purpose							
Type of Project							
Practises							
Scoping Tools used							
Key Learnings							

Figure 25, Case Studies Review Framework

3.3 The Case Studies and the New Idea Generation Framework

The seven case studies will test in practice the emerging issues from Literature Review to determine the relevance, frequency and effectiveness of current processes, practices and tools. The objective of the case studies is to demonstrate how idea quality can be improved in FEI practices through the use of the Idea Generation Framework compared to previous practices in the sample multinational organisations.

3.3.1 The Pilot Study- Case Study 1

1. Context:

The background of this study is based on the interest of Company A to accelerate their Innovation Pipeline by increasing the number of quality ideas to develop new products and services. After discussions with a Senior Manager in the Innovation Department, with Company A, it was decided that Project X would be a good representative Pilot Project for this exploratory study. Through Project X we could observe the way participants behaved in idea generation activities, their current challenges, the nature of teams involved and the organizational factors that were currently impacting on the Front End Innovation Outcomes.

As seen in the literature, many organisations are still undertaking very informal idea generation practices in which the focus is made on the quantity of the ideas rather than on its quality (Osborn, 1963). In the sample organisation, prior to the intervention of Project X, the team had used a range of supportive tools such as visual templates and stimulus data in order to trigger the idea generation. However, the templates were too broad and general (see Figure 23), only including title of the idea, summary, visualization and platform associated, which did not help to support the generation of quality ideas because it did not promote a thorough development and understanding of the ideas. The literature has suggested how the use of a suitable template (Al-Kassab et al, 2014) has a significant impact on achieving focused results, which is supported by Comi and Eppler (2012) who build on this by adding how bespoke templates can help facilitate the emergence of patterns, the analysis and review of ideas (Star and Griesemer, 1989). However, after reviewing Company A's approach, unstructured idea generation methods appeared to encourage idea repetition, lack of feasibility and lack of novelty of ideas. The existing template (see Figure 26) allowed a very broad range of Idea Generation but it did not facilitate Idea combination, evaluation and selection in order to determine which ideas to move forward.

Give it a headline: ______________________________

Your idea in a nutshell ...

Visualise it ...

Future Opportunity Platform:

Figure 26 Visual Template Prior Intervention

The Pilot Project was focused on idea development stage. Specifically, it was based on an in-house workshop to develop *Idea X*, which was the result of a previous idea generation session leading to an interest to further explore its possibilities in terms of target market, definition of features, develop of a product/service opportunity and its foreseen level of success.

2. Objective of the case study:

The objective of the pilot study was to understand *the type and range of issues explored, the tools and methods typically used* in Company A's idea generation activities in order to help develop and test a new Idea Generation Framework.

3. Pilot Project Focus:

The focus of the pilot project lied in determining if *Idea X* could act as a 'hook product and service' (a product that attracts customers) to increase customers base of Company A by offering a very specific product. To achieve this objective, the idea needed to be further explored, the idea needed to be targeted at a suitable customer segment in order to determine its market potential and its ability to fulfil business objectives for a specific type of media content.

4. Project team composition:

Two people formed the team: A project manager, the director of the new innovation department, and the external researcher that helped plan and design the idea development session. The project manager had the responsibility of feeding the idea pipeline of the organization and had decided the Idea X could have potential to increase the organization revenue, although a formal selection process to select ideas has not been carried out. She had taken the opportunity to acknowledge the need for improvements in the idea instead of judging it and rejecting it (Ulrich and Eppinger, 2000). However, this idea had not been evaluated and selected during the idea generation session, instead, it resulted from a managers' gut feel (Murphy and Kumar, 1997) afterwards.

The researcher came from a different background and offered a different point of view to the project manager, so the multidisciplinary team principle for successful NPD projects (Barczak, 2009) was at the core of this Pilot Project, both at organizational and session participants level.

5. Research Objectives of the Pilot Project

The objective of the Pilot Project was to understand the tools and practices Company A typically used with a potential idea *to create a product proposition* that would resonate in the market and potentially increase revenue.

6. Pilot Project Phases

This pilot project had two main phases instead of four because the idea had been previously conceived, therefore, data gathering and data decoding were missing from this project. Therefore, the pilot study focused on the key phase of the FEI, idea management, determining how the Framework could enhance this core stages in order to improve Idea

Quality. The phases were as follows: (1) planning and brief development and (2) idea generation session. In both phases the focus was put on their process, practices and tools used to drive outcomes. The first step focused on building a clear and focused project brief in order to identify the key aims and objectives of the session. To do this, a series of meetings with the project manager were carried out in order to understand the previous processes undertaken as well as identifying the problem definition, in order to establish how the Pilot Study process would work. The second step centred on the idea development session that was focussed on identifying a viable business opportunity.

7. Idea Generation Session Characteristics

The Idea Generation session was at the core of the pilot study and was carried out around the development of an idea previously generated. The session aimed to determine if the approaches of the Framework were appropriate and gain knowledge about Company A Idea Generation practices, challenges and attitudes of participants.

Session Objectives

There were four objectives that the idea generation session focused on: (1) Generation of the target segment; (2) Development of ideas; (3) Identification of the Opportunity Spaces for the Idea; and (4) Evaluation of the ideas generated. The nature of the session was structured with a systematic process to take participants through.

Workshop Participants

Sixteen employees of different seniority, function and expertise (multidisciplinary team) formed the group, which is considered a success factor in NPD and Front End Idea Generation Practices. The facilitation was carried out by someone external from the organisation, who was only concerned about guiding critical thinking among participants and facilitating agreement and decision-making.

Idea Generation Techniques

The Idea Generation technique chosen was nominal brainstorming, to enhance iterative thinking, and 5WH to clarify all aspects around the given idea in order to identify weaknesses and incoherencies. Both techniques were supported by a series of bespoke Visual Templates to record and share participants' thoughts.

Type of Team	Multidisciplinary
Number of Participants	16 (4 teams of 4 people)
Facilitation	External from organization
Timing	120 minutes session
Type of process	Structured
Idea Generation Techniques	Nominal Brainstorming & 5WH
Idea Generation Tools	Visual templates to record ideas

Table 40 Idea Generation session characteristics- Pilot Study

Each of these techniques was split into a series of tools that ended with a group review to evaluate their work. This helped to allow sharing during group discussion to enhance the performance of participants.

Session Activities

These activities (Figure 27) were chosen to determine if there was a target segment for the idea, secondly, an idea development activity to determine its readiness, the third activity focused on identifying the market opportunity and the last one centred on the evaluation of the ideas, processes, criteria and practices. This highlighted that the multinational organisation faced a challenge when using Idea Generation tools because they lack an understanding and experience of using them due to their tendency to hold informal and unstructured Idea Generation Practices.

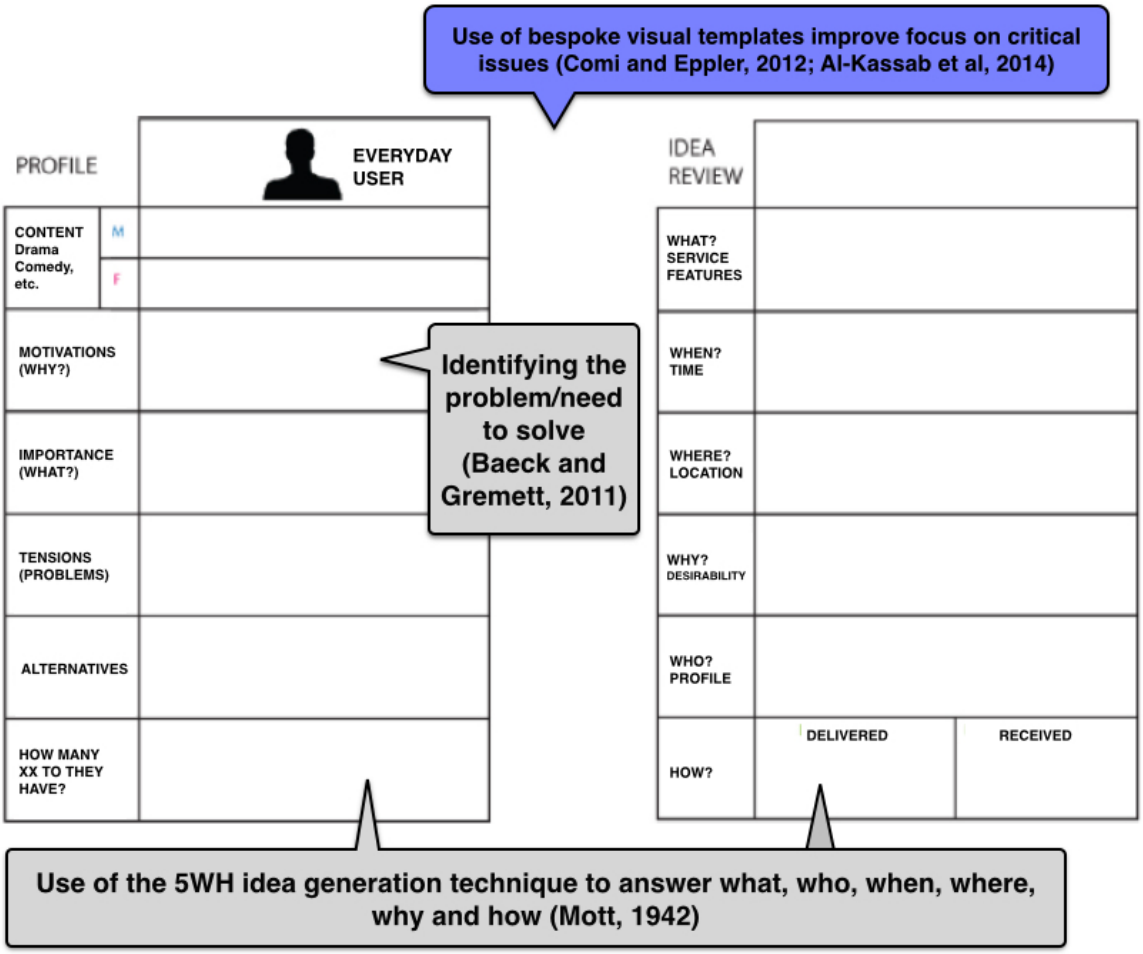
ACTIVITY 1: GENERATION OF USER PROFILES
ACTIVITY 2: IDEA DEVELOPMENT
ACTIVITY 3: OPPORTUNITY SPACES FOR THE IDEA
ACTIVITY 4: IDEA EVALUATION

Figure 27 Idea Development Workshop Activities

Session Tools

The visual templates used for this session were semi-structured (see Figure 28) and aimed at determining if there was a customer profile for the idea being developed. The big size of the templates, helped teams to work collaboratively while each of them could display their ideas in the different areas by post-it notes. The reason behind this choice is that shy and introvert participants did not have to stand up and speak out loud, which is a behaviour that tends to happen when there is a lack of creative confidence due to the fear of being judged (Kelley and Kelley, 2012). This helped to encourage iterative thinking in which individuals generate ideas individually, then shared and develop them collectively (Gumble, 2003), advocated by many authors such as Stroebe and Diehl (1994), that combined reflective thinking (Doyle, 2007) to allow participants to reflect on their knowledge and experiences individually during the session.

The visual template tools aimed to guide the critical thinking of participants towards a more focused understanding of the possibilities of the idea being developed. They aimed to identify the problem or need by the target customer as well as to fully understand the impact of selecting ideas based on managers' choice (Desouza et al., 2009) instead of critically evaluating ideas in order to align them to a set criteria.



Use of bespoke visual templates improve focus on critical issues (Comi and Eppler, 2012; Al-Kassab et al, 2014)

Identifying the problem/need to solve (Baeck and Gremett, 2011)

Use of the 5WH idea generation technique to answer what, who, when, where, why and how (Mott, 1942)

Figure 28 Template example

8. Evaluation Criteria

In the pilot study the evaluation criteria to determine the potential of the given idea was focused on four key parameters: (1) Demand (Girotra *et al.*, 2010), which reflects market size for the product versus cost to develop it; (2) Feasibility (Diehl and Stroebe, 1987) considering the ability to supply and deliver the idea; (3) Novelty (Dean et al, 2006) in the form of market readiness; and (4) Attractiveness (Girotra *et al*., 2010), in terms of the desirability of the product/service generated.

9. Idea Generation Session Outcomes

The idea generation session clarified the product/service idea developed was not a hook concept for the organization. This was because they had underestimated the importance of customer profiles in determining market segmentation opportunities. The consequence of this was that the idea being developed did not appeal in a significant way to 3 out of the 4 target profiles and therefore did not meet the required demand criteria established prior to the workshop. The participants evaluated the ideas against an evaluation criteria in order to determine its relevancy across the 4 customer profiles. Participants provided feedback claiming how the use of customer profiling had helped to gain a deeper understanding of the motivations and tensions behind the potential subscribers in order to identify or not the market opportunity.

Through the process of structuring participants, within the Idea Generation process, to identify potential unique features that would appeal to the specified target customers, it became clear that without a clear customer profile there was no point in developing an idea that had nobody's needs to satisfy. In fact, the idea generation session highlighted not only that the demand was poor, but also the ability to supply/deliver, the market was not ready.

However, what did emerge was that *Idea X* was considered not to be strong enough to be a stand-alone product or service but an interesting complimentary service/ feature for another product or service.

The outcomes of the sessions were very successful, not because the idea was a great one, but because the process made participants realise the key problems they needed to fix were that they did not have an established idea generation process, therefore they kept reinventing the wheel and nor did they have an established idea process criteria. By understanding these problems, the Pilot Study highlighted how Company A could stimulate performance and effectiveness of Front End Innovation processes.

10. Key Learnings

The pilot project helped to determine the appropriateness of the research questions and highlighted a lack of: (1) understanding of idea quality, (2) idea evaluation criteria, (3) what is needed to develop a good idea and (4) understanding of the effort that innovation projects require.

This pilot study specifically identified seven key learnings to be applied to the subsequent case studies in order to improve performance and address identified weaknesses in the proposed processes, activities and tools. The key Pilot study learnings were: (1) The importance of using the target customer profile as mechanism for determining a potential ideas relevancy, novelty (Dean et al, 2006), need and feasibility (Diehl and Stroebe, 1987); (2) That the use of defined success criteria enable more rapid and effective evaluation and selection of better aligned ideas (ideas that had the potential to fulfil the agreed impact criteria) during idea generation session; (3) That participants considered the tools useful in helping them better understand the usage scenario of a potential service idea,; (4) That the visual templates enabled the participants to record more effectively the customer needs and evaluate which ideas addressed identified needs and impact criteria; (5) The repetition of activities within the idea generation sessions decreased participant engagement during the second part of the session; (6) Duration of activities in one location impacts on participant motivation; and (7) that allowing time to share views during group discussion in order to clarify issues enhanced participants' reflection thinking and had a positive impact on their input.

Preliminary Findings from the Pilot Study

The Pilot Study identified two common mistakes frequently made in innovation processes: (1) that ideas are often selected to be further developed without prior evaluation based only on a manager's gut feeling (Murphy and Kumar, 1997) and (2) in terms of the use of Idea Generation tools and practices, the Pilot Study has shown a lack of knowledge and understanding of idea generation techniques besides Group Brainstorming. However, in the Pilot Study Nominal Iterative Brainstorming was undertaken to address group-brainstorming deficiencies and has shown it helps participants to discern if an idea is worth moving forward.

Preparation for innovation has been widely encouraged over the years (Martino 1972) in order to deploy resources efficiently in Innovation practices. What was observed in this

Pilot Study was that the latent need for ideas to feed into the pipeline was driving a desperate behaviour within the organization that sought to accelerate the innovation pipeline avoiding the correct preparation and resources for innovation.

Although in Company A the New Product Development is very structured (Booz, Allen and Hamilton, 1982; Cooper, 1990), the idea generation practices tend to be very informal and unstructured, unless they were part of a major project, which suggests a lack of appreciation of the importance of idea generation within FEI.

In terms of the Framework, the Pilot Study has highlighted that the Framework needs to address the identified issues that impact on the idea generation session. Phases cannot be held in isolation, as they need to be combined with each other in order to maintain a thread from the problem definition to the idea validation.

In summary, the Pilot Study preliminary findings (Table 41) showed the importance of properly deploying background planning, the need for quality of information and resources for the Idea Generation Session to achieve high quality objectives that meet the organization strategy. The Main study will focus on the quality of processes, practices and tools as well as the quality of data to drive successful outputs to build upon the Framework.

	PILOT STUDY Case Study 1 Company A
Purpose	The objective of the Pilot Project was to understand the type and range of issues explored, the tools and methods typically used in Company A's idea generation activities. In order to help develop and test an idea generation framework.
Type of Project	The project focussed validating the potential of a **given idea**. The main emphasis was on determining the potential of identified ideas to create new product propositions that would resonate in the market and increase revenue.
Practises	Project brief, nominal brainstorming.
Scoping Tools used	The innovation framework, innovation templates and idea quality criteria helped address key issues in the idea generation session such as the poor definition of ideas, lack of understanding of the potential of an idea and the lack of appreciation of structured idea generation practices by utilising bespoke visual templates and promoting guided critical thinking by the group facilitator. The reason behind it was to address the poor idea definition that had preceded failed idea generation practices in Company A.
Key Learnings	This Case Study highlighted the need for ideas to feed the pipeline had an impact on erratic behaviour within the organisation, rushing to innovate but avoiding preparation and allocation of resources.

Table 41 Pilot Study Review Framework

3.3.2 Main Study- Case Study 2

1. Context:

It is very common that companies look for new technologies to develop new products. This becomes the starting point of case study 2, rather than solving a current or future problem. When this happens, organizations typically undertake a business opportunity research project to determine its potential business and market potential. This study focussed on a video technology service that Company A was potentially interested in but there was no clear idea on how to integrate this technology in current products/services and or what would enable a breakthrough innovation that could potentially bring together the technology and relevant content from the organization.

2. Objective of the case study:

The objective of this case study focused on determining how *the use of (a) the innovation framework, (b) innovation templates; and (c) a set idea quality criteria would impact* on: (1) identifying and addressing project issues that needed to be tackled, (2) facilitating idea generation; (3) improving idea quality; and (4) idea selection.

3. Main Study Case Study 2 Focus:

This case study was focused on establishing the potential of a given technology, defining current market landscape and social trends and behaviours across target segments. The key objective of the project was to identify how Company A's content could be supercharge by technology X service.

4. Project team composition:

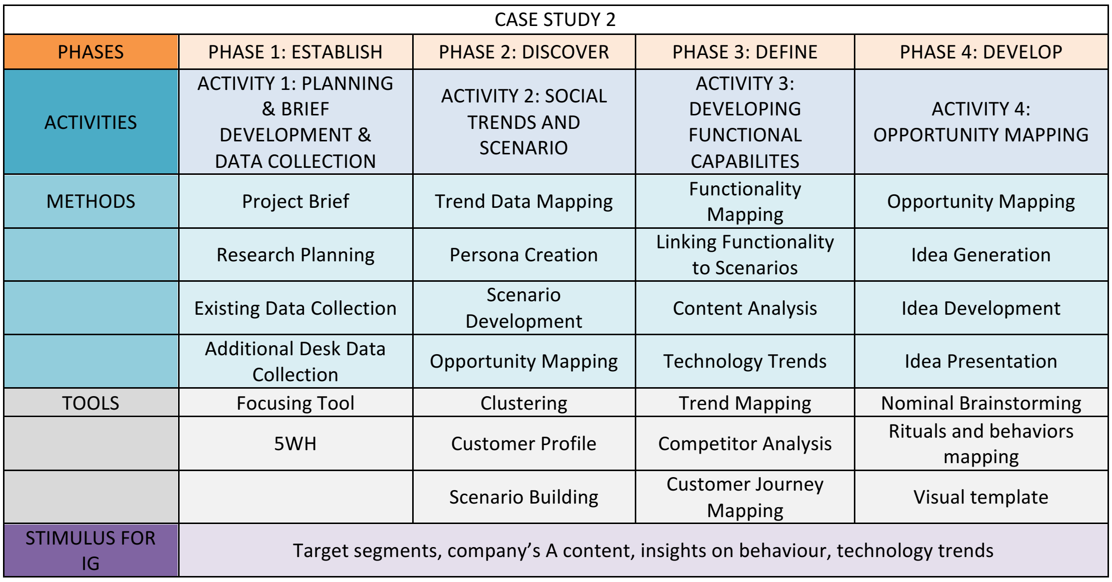
Four people formed the multidisciplinary team. There were two project leaders that were working on the project from beginning to end and two supportive team members. The range of expertise in the team ranged from junior roles to senior ones, all of them from different backgrounds offering a wide range of skills and knowledge to the project.

5. Research Objectives of the Main Study Case Study 2 project

The Pilot study highlighted that informal idea generation practices typically failed to generate relevant ideas that could be feed into the innovation pipeline. The Pilot Study established that a contributing factor to this problem related to the fast pace of the team activities, which typically led to a lack of preparation and allocation of resources needed to generate high quality ideas (see Success Metrics page 79).

This helped to focus the research objectives of Case Study 2: (1) to define performance related issues of the frameworks' a set of practices and activities were implemented and (2) developing bespoke visual template (guiding) to help facilitating organised thinking of ideas.

6. Main Study Case Study 2 Project Phases



CASE STUDY 2				
PHASES	PHASE 1: ESTABLISH	PHASE 2: DISCOVER	PHASE 3: DEFINE	PHASE 4: DEVELOP
ACTIVITIES	ACTIVITY 1: PLANNING & BRIEF DEVELOPMENT & DATA COLLECTION	ACTIVITY 2: SOCIAL TRENDS AND SCENARIO	ACTIVITY 3: DEVELOPING FUNCTIONAL CAPABILITES	ACTIVITY 4: OPPORTUNITY MAPPING
METHODS	Project Brief	Trend Data Mapping	Functionality Mapping	Opportunity Mapping
	Research Planning	Persona Creation	Linking Functionality to Scenarios	Idea Generation
	Existing Data Collection	Scenario Development	Content Analysis	Idea Development
	Additional Desk Data Collection	Opportunity Mapping	Technology Trends	Idea Presentation
TOOLS	Focusing Tool	Clustering	Trend Mapping	Nominal Brainstorming
	5WH	Customer Profile	Competitor Analysis	Rituals and behaviors mapping
		Scenario Building	Customer Journey Mapping	Visual template
STIMULUS FOR IG	Target segments, company's A content, insights on behaviour, technology trends			

Figure 29, Case Study 2 Project Phases

The project was split into the four key stages: establishing the focus of the project, discovering issues, defining insights and developing new ideas. However, there was a misbalance among activities. For instance, the Data Collection activity had a lot of weight while Planning and Brief Development were condensed into the research planning and brief definition. At this point of the study the process was very clear but the activities were still taking shape.

Activity 1: Planning, Brief Development & Data Collection:

In Case Study 2 Planning and Brief Development Activity focused on establishing the problem to be tackled and creating the project brief and a research planning to determine the scope, objectives, activities, methodology, research planning and desired outcomes of the project. To do this the 5WH tool was used to help to determine the information and categories the project was targeted to. The research planning method used the Focusing Tool (Bolton, 2014) that establishes the Focus (problem, need or objective) of the project by explaining the context of the project, the goals to be achieved and the issues and challenges that the project represents.

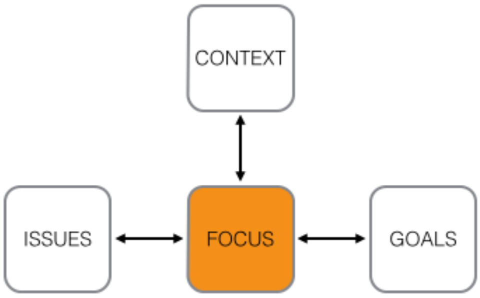


Figure 30 The Focusing Tool (Bolton, 2014)

Once the focus of the project was clear, in Case Study 2, a series of issues were established to drive information collection (see figure 31). There was a thorough existing desk data collection within the organization as well as an additional Desk Research data collection from online sources in order to collect the information needed for the study.

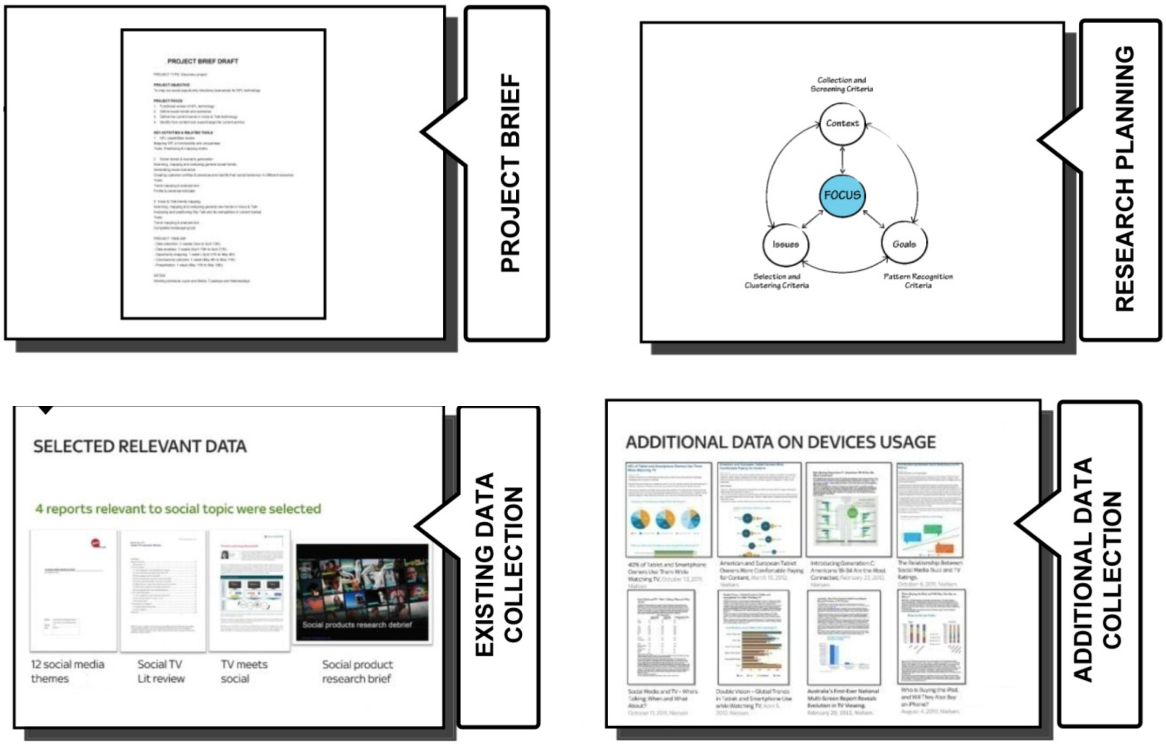


Figure 31 Planning and Brief Development Activity

Activity 2: Social Trends and Scenario Development

Once all the raw data was gathered, there was a need to make sense of their meaning for the project and undertake a deep analysis of the emerging issues. The first step focused on determining current Social Trends in the field in order to generate a series of customer profiles to personalize the target segment. To do this, a Trend Data Mapping tool was used to highlight the key issues in the data gathered. Secondly, by identifying three personas for the project, their characteristics were developed in order to have a clear idea of the target segments. Once we had the data mapped, the target customers, a scenario-building (Suri and Marsh, 2000) tool was carried out to identify key business opportunities (see Figure 32).

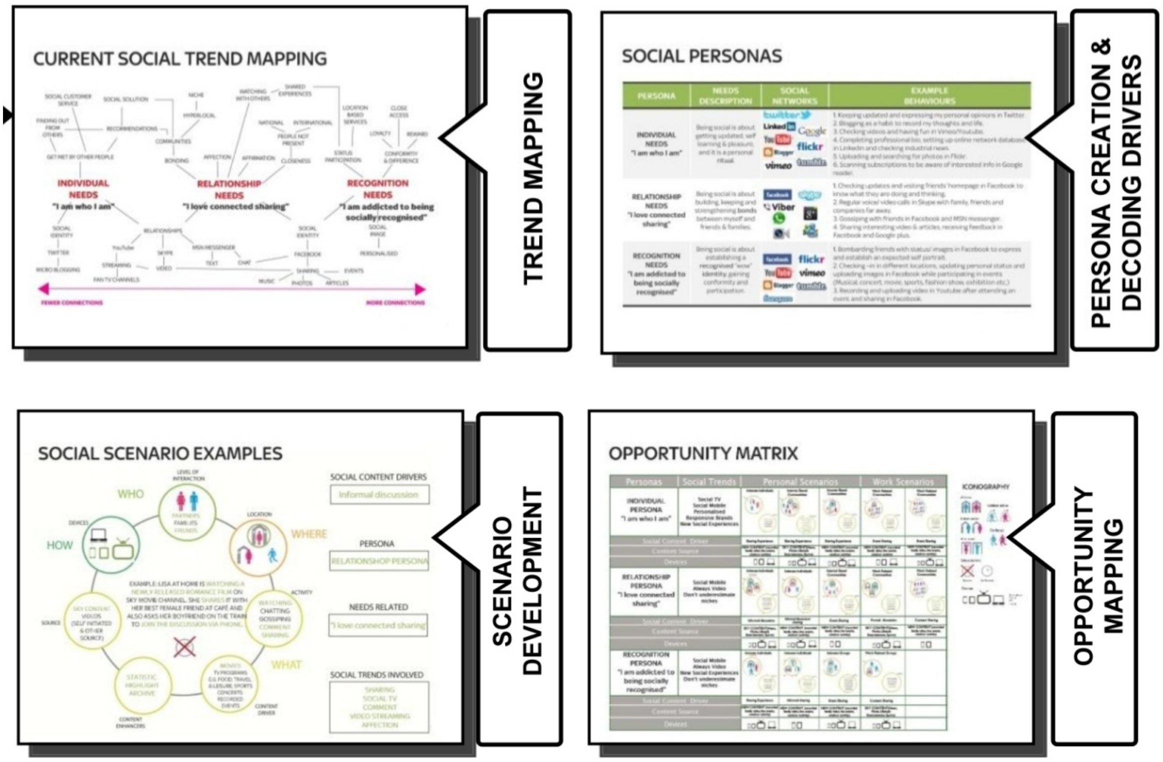
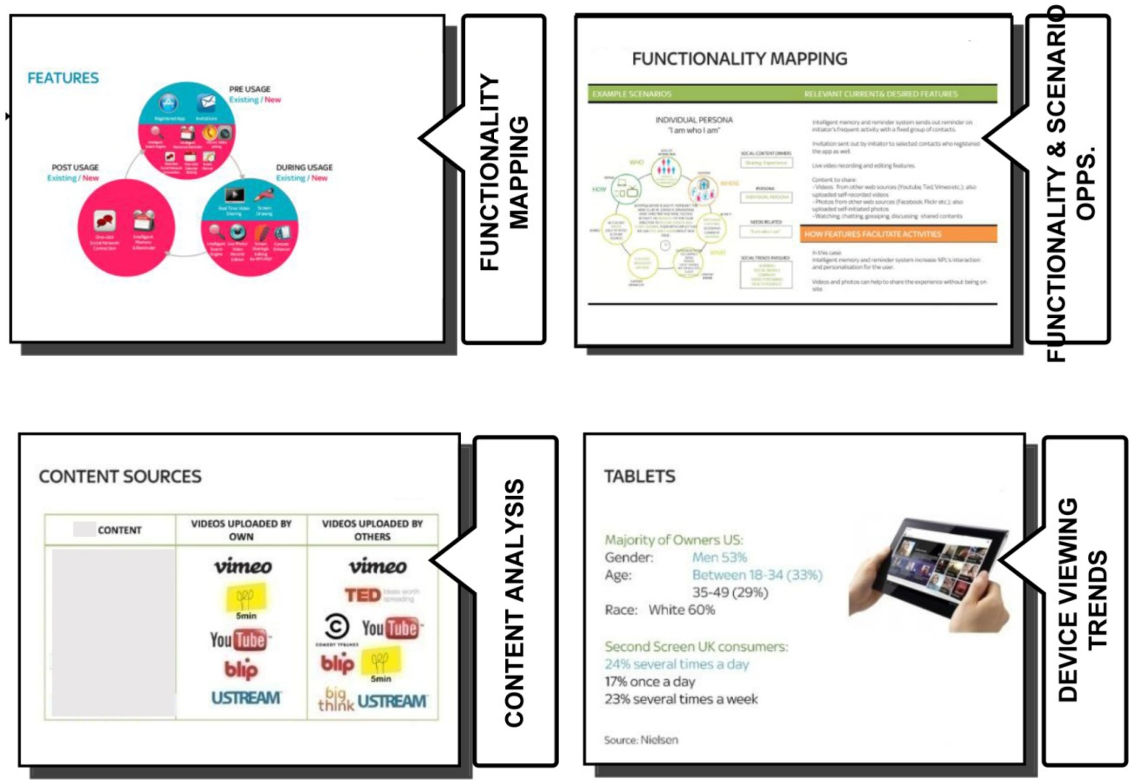


Figure 32, Social Trends and Scenario Development Activity

Activity 3: Developing Functional Capabilities:

The third stage is focused on a technology mapping tool to visualize the current functionality of Technology X and generating potential functions that can be relevant for Company A. This became the trigger to blend the functionality with the previous opportunity scenarios. Finally, the last step in this activity relates to decode device-viewing trends via desk research and analyse video content form competitors or potential partners via a content analysis tool (see Figure 33).



Majority of Owners US:
Gender: Men 53%
Age: Between 18-34 (33%)
35-49 (29%)
Race: White 60%

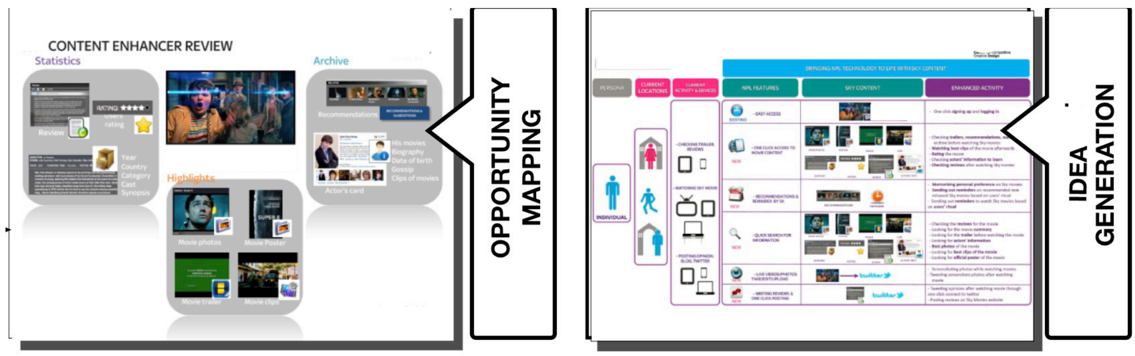
Second Screen UK consumers:
24% several times a day
17% once a day
23% several times a week

Source: Nielsen

Figure 33 Developing Functional Capabilities Activity

Activity 4: Opportunity Mapping:

The opportunity mapping activity focused on generating a series of ideas around scenarios in which the Technology X could provide a competitive advantage to Company A in the video sector. The idea generation session, using a nominal brainstorming tool, focused on developing a series of opportunity mapping scenarios that combined the insights and trends from the previous stages and as an outcome developed four key concept presentations aligned to four content areas of Company A (see Figure 34).



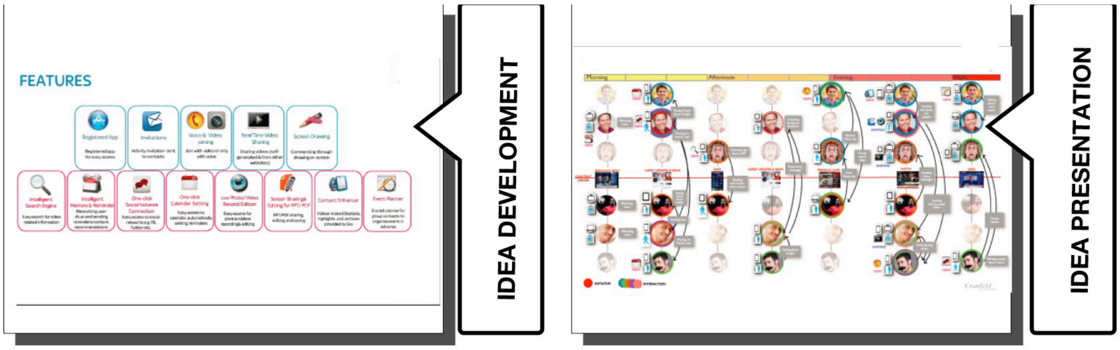


Figure 34 Opportunity Mapping Activity

7. Idea Generation Session Characteristics

Session Objectives

Workshop Participants

The idea generation session had three participants who belonged to the core team. The session focused on utilizing the key insights from the research and applying them to generate a series of potential opportunity scenarios that enhanced a current activity for the target customer.

Idea Generation Techniques

The IG technique used was a nominal brainstorming to maximise iterative and critical thinking and to draw attention to the reflective time in IG session in order to enable effective idea evaluation practices.

Session Activities

The idea generation session followed a similar path as Case Study 1. Each participant generated a series of ideas linking type of persona, locations where Technology X could be used, devices associated with the activities, Technology X features, Company A type of content and how this impacted on improving the activity experience.

Once participants had worked individually for some time, they put their ideas together and shared the results, combining them, analysing drawbacks and working on combining ideas to make them stronger.

The session lasted for three hours enabling the generation of an in-depth immersion into the topics, the evaluation of as many combinations as possible and allowing some time for reflection among stages in the session and have enough time to evaluate the idea scenarios.

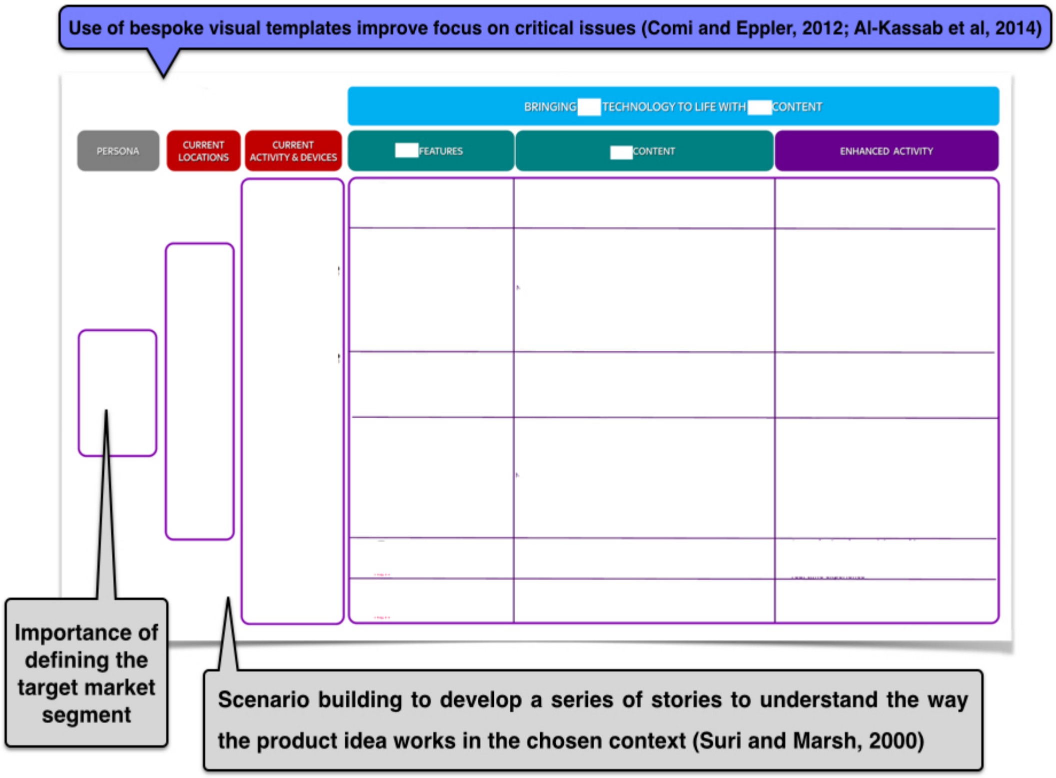
Type of Team	Multidisciplinary
Number of Participants	3
Facilitation	External from organization
Timing	3 hours
Type of process	Systematic Reflection approach
Idea Generation Techniques	Nominal Brainstorming (iterative process)
Idea Generation Tools	Visual Templates and Stimulus data (Target segments, company A content, insights on behaviour, video and voice trends)

Table 42 Idea generation session characteristics

Session Tools

The main tool was formed by a series of bespoke visual templates to generate and develop ideas and stimulus data, outcome from the analysis of the data collection and analysis, representing a series of insight triggers for Idea Generation. Additionally, there was a set of information to inspire the idea generation session: three identified target segments with different social needs and behaviours, diverse scenarios in which people use video services, current and potential functions in Technology X and competitors and video services landscape. The stimulus worked like puzzle pieces to create a wide range of possibilities around the two key areas: (1) Company A content and (2) Technology X potential functionality.

The visual template used during the Idea Generation session focused on mapping and integrating all the data gathered previously in order to maximize the opportunities and ideas generated. In this case, the template used (Figure 35) combined information regarding the type of customer, type of device, places the service would be used, current and potential technology features and content from the organisation that could be integrated into the experience. The purpose of this was to generate a very complex and refined picture of the customer experience when using the video service technology. The use of this template facilitated an organized thinking of ideas as it visually highlighted all the issues that needed to be taken into account when coming up with ideas and opportunities for the given technology. This bespoke visual template aimed to demonstrate the value of bespoke supportive tools to address core issues of projects. For instance, in this case study the visual template facilitated the integration of the scenario building idea generation technique to enable idea generation and development that would satisfy those scenarios.



Use of bespoke visual templates improve focus on critical issues (Comi and Eppler, 2012; Al-Kassab et al, 2014)

Importance of defining the target market segment

Scenario building to develop a series of stories to understand the way the product idea works in the chosen context (Suri and Marsh, 2000)

Figure 35 Case Study 2 Template example

8. Evaluation Criteria

Due to the exploratory nature of Case Study 2 within Main Study, the evaluation criteria chosen to establish the potential of the given technology focused on: (1) market potential, (2) product uniqueness, and (3) intuition (Hart *et al*., 2003).

9. Idea Generation Session Outcomes

The idea generation session generated sixteen opportunity scenarios. Two of them were further developed into an articulated scenario on the customer journey and the integration of the ideas into the daily life of the target segments by considering their interactions, behaviours, and rituals when using this given technology. These scenarios visually showed the potential opportunities for the organization when investing in this technology with different customer profiles and types of content. However, no clear opportunities were identified for Company A to invest in this technology and therefore, the project was put on hold.

10. Key Learnings

Although the idea generation session worked very well, it would have been helpful to gather a wider range of participants to collectively evaluate and enhance the opportunity scenarios. Moreover, a key team player should have been someone from Technology to engage on the feasibility of ideas in terms of the functionality of Technology X. However, in this project the sample company did not want to engage with other teams due to the confidentiality of the Technology X.

In this project the idea generation session was not planned and designed to follow the traditional structure, so a key learning was that the Idea generation sessions need more expert participants in order to get better quality input (feasible, novel and aligned to business objectives). The second challenge that turned into a key learning was that the idea generation session was not properly planned and the information gathered from the previous stages did not represent an effective input to trigger the generation of ideas. The proper utilisation of decoded data and consumer insights, the stimulus data, is crucial for idea generation, since it enables participants to work with real and objective data beyond their own assumptions in the topic explored.

There were two key learning's from Case Study 2. The first one relates to the fact that there needs to be a proper allocation of resources, such as time to facilitate a thorough project. Currently organisations have a lack of appreciation of the effort and resources needed to generate quality ideas that can nurture their innovation pipeline. Secondly, the project has proved that if there is no clear business opportunity for the organization it is better to put the project on hold, which is what subsequently happened with this project, so the organization can explore more relevant projects with clearer business opportunities.

Table 43 visualises how Case Study 2 informed the development of the framework by identifying purpose, type of project, practices, tools and key learning's.

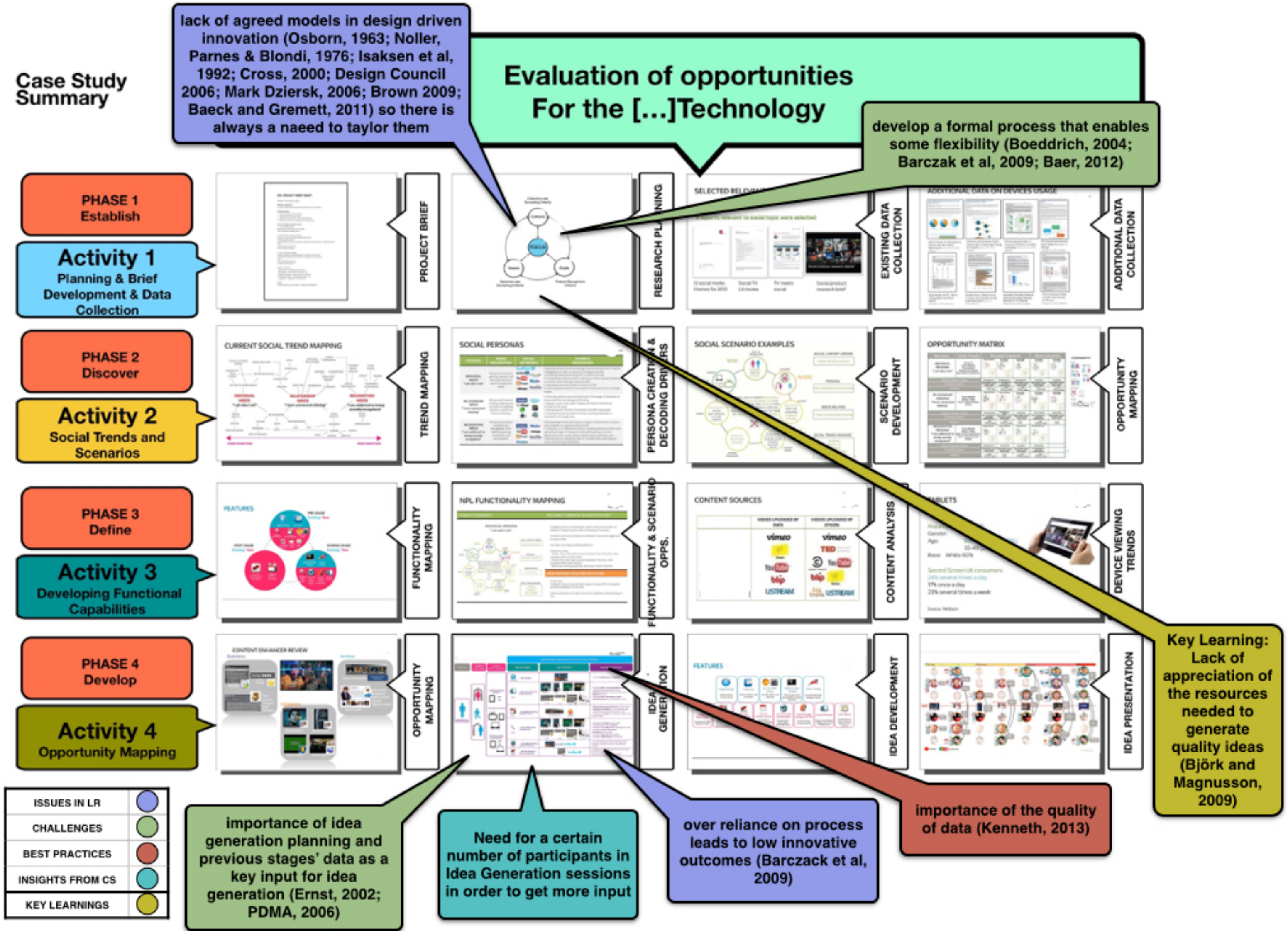
	MAIN STUDY Case Study 2 Company A
Purpose	The research objectives of case study 2 focussed on determining how the use of (a) innovation framework; (b) innovation templates; and (c) idea quality criteria would impact on: 1) identifying and addressing project issues that needed to be tackled; (2) facilitating idea generation; and (3) improving idea quality; and (4) idea selection
Type of Project	The project focussed on identification of a potential **given technology**. The key area of concern of the project was to understand the market landscape, to define the current social trends and behaviours across target segments to identify market opportunities.
Practises	Project Brief, focussing tool, 5WH and desk research, nominal brainstorming.

Scoping Tools used	The innovation framework, innovation templates and idea quality criteria helped facilitate an organized thinking of ideas as it visually highlighted key issues to be taken into account. For instance, the relevancy of ideas to key target segments and their behavioural insights and the alignment of new ideas to the business strategy in order to help evaluate their potential and quality for Company A.
Key Learnings	This Case Study highlighted the lack of appreciation of effort and resources needed to generate quality ideas and the need for innovation templates to make the connection between insights and idea generation in order to seek quality ideas.

Table 43 Main Study Study Case Study 2 Review Framework

OVERVIEW OF THE PROCESS, PRACTICES AND TOOLS

Figure 36 visualises Case Study 2 and it highlights where the core issues of the study took place. Specifically it draws attention to issues in: (1) Literature Review, such as a lack of agreed processes in Design Driven Innovation and the overreliance of process that lead to low quality outcomes; (2) Challenges, such as idea generation planning and establishing a formal process that enables flexibility; (3) Effective Practices, such as the importance of the quality of data; (4) Insights from Case Studies; and (5) Key Learnings, in this case the lack of appreciation of what is needed to develop quality ideas.



Case Study Summary

Evaluation of opportunities
For the [...]Technology

PHASE 1
Establish

Activity 1
Planning & Brief Development & Data Collection

PHASE 2
Discover

Activity 2
Social Trends and Scenarios

PHASE 3
Define

Activity 3
Developing Functional Capabilities

PHASE 4
Develop

Activity 4
Opportunity Mapping

lack of agreed models in design driven innovation (Osborn, 1963; Noller, Parnes & Blondi, 1976; Isaksen et al, 1992; Cross, 2000; Design Council 2006; Mark Dziersk, 2006; Brown 2009; Baeck and Gremett, 2011) so there is always a naeed to taylor them

develop a formal process that enables some flexibility (Boeddrich, 2004; Barczak et al, 2009; Baer, 2012)

Key Learning: Lack of appreciation of the resources needed to generate quality ideas (Björk and Magnusson, 2009)

importance of idea generation planning and previous stages' data as a key input for idea generation (Ernst, 2002; PDMA, 2006)

Need for a certain number of participants in Idea Generation sessions in order to get more input

over reliance on process leads to low innovative outcomes (Barczack et al, 2009)

importance of the quality of data (Kenneth, 2013)

ISSUES IN LR	●
CHALLENGES	●
BEST PRACTICES	●
INSIGHTS FROM CS	●
KEY LEARNINGS	●

Figure 36, Case Study 2 Summary

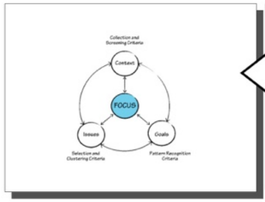
Case Study Summary

Evaluation of opportunities
For the […]Technology

PHASE 1
Establish

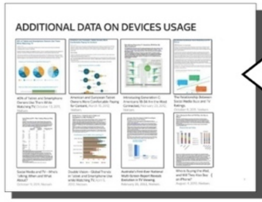
Activity 1
Planning & Brief Development & Data Collection

DATA ANALYSIS
4-5 days
1 day reflection
3-4 meetings
Collaborative process



RESEARCH PLANNING

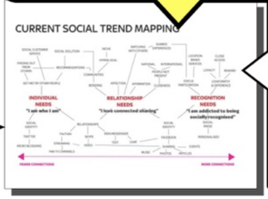
SCENARIO CREATION
3-4 days
1 day reflection
2-3 meetings
Collaborative process



ADDITIONAL DATA COLLECTION

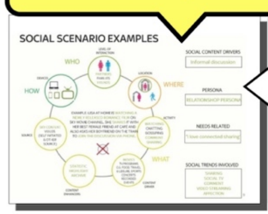
PHASE 2
Discover

Activity 2
Social Trends and Scenarios

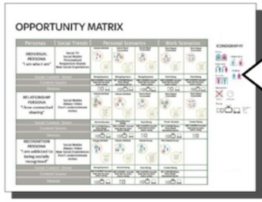


TREND MAPPING

PERSONA CREATION & DECODING DRIVERS



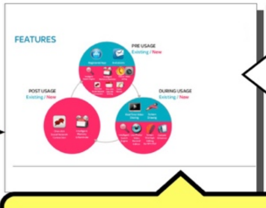
SCENARIO DEVELOPMENT



OPPORTUNITY MAPPING

PHASE 3
Define

Activity 3
Developing Functional Capabilities



FUNCTIONALITY MAPPING

IDEA GENERATION
3-4 days
1 day reflection
2-3 meetings
Collaborative process

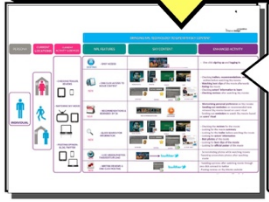
IDEA DEVELOPMENT
2-3 days
1 day reflection
1-2 meetings
Collaborative process

IDEA PRESENTATION
2-3 days
1-2 review meetings
Collaborative process

PHASE 4
Develop

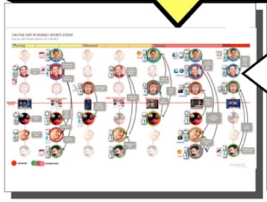
Activity 4
Opportunity Mapping

DATA ANALYSIS
4-5 days
1 day reflection
3-4 meetings
Collaborative process



IDEA GENERATION

IDEA DEVELOPMENT



IDEA PRESENTATION

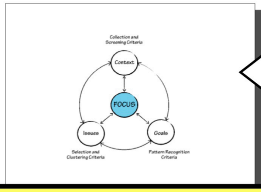
Case Study Summary

Evaluation of opportunities
For the […]Technology

PHASE 1
Establish

Activity 1
Planning & Brief Development & Data Collection

PROJECT BRIEF



RESEARCH PLANNING

SELECTED RELEVANT DATA

4 reports relevant to social topic were selected

12 social media themes for 2012

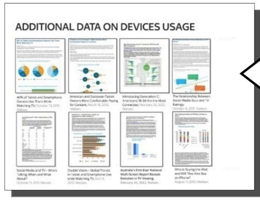
Social TV Lit review

TV meets social

Social product research brief

Social products research debrief

EXISTING DATA COLLECTION



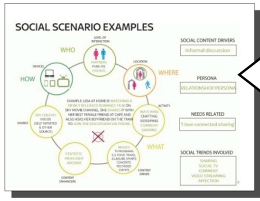
ADDITIONAL DATA ON DEVICES USAGE

ADDITIONAL DATA COLLECTION

PHASE 2
Discover

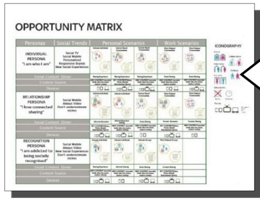
Activity 2
Social Trends and Scenarios

VALUE
From phase 1 deliverable, work has been used to
•Drive understanding of social and communication needs
•Help develop Company A app
•Will be used for upcoming pipeline of ideas for […] department and communications



SOCIAL SCENARIO EXAMPLES

SCENARIO DEVELOPMENT



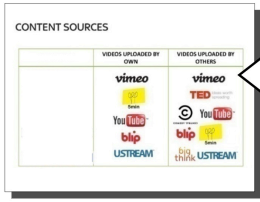
OPPORTUNITY MATRIX

OPPORTUNITY MAPPING

PHASE 3
Define

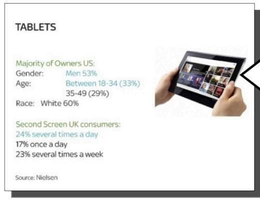
Activity 3
Developing Functional Capabilities

VALUE
From phase 2 deliverable, work has be used to
•Inform direction of […] technology functional features
•Will be used for upcoming functionality development of Company A and […] ideas



CONTENT SOURCES

CONTENT ANALYSIS



TABLETS

Majority of Owners US:
Gender: Men 53%
Age: Between 18-34 (33%)
35-49 (29%)
Race: White 60%

Second Screen UK consumers:
24% several times a day
17% once a day
23% several times a week

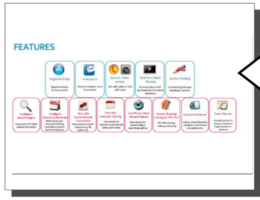
Source: Nielsen

DEVICE VIEWING TRENDS

PHASE 4
Develop

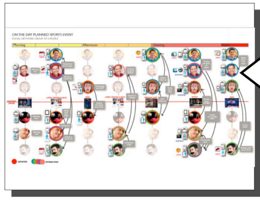
Activity 4
Opportunity Mapping

VALUE
Opportunity mapping in phase 3 integrates Company A content into customers' social rituals and behaviours.
From phase 3 deliverable, work will be used to
•Lead further product development of […] technology or other similar technology
•Help to evaluate consumer based technology under social category



FEATURES

IDEA DEVELOPMENT



ON THE DAY PLANNED SPORTS EVENT

IDEA PRESENTATION

3.3.3 Main Study- Case Study 3

1. Context:

Company A had not ever developed a product or service targeted to children between 5 and 11 years old. However, there was an interest in defining the market size for this type of product idea, the potential market space for Company A and the benefits Company A could achieve.

This project was very focused on generating and developing a high-quality product/service idea that could be developed.

2. Objective of the case study:

The objective of this Case Study was to determine *how to use the new Idea Framework*, the *innovation templates, the idea quality criteria* (as in previous case studies). This case study also explores the new factor of the impact of internal and external stimulus data and the idea generation technique, specifically exploring their impact on: (1) identifying and addressing project issues that needed to be tackled; (2) facilitating idea generation; (3) improving idea quality and (4) idea selection.

3. Main Study Case Study 3 project Focus:

The project focused on: (1) gaining an immersive insight on in-home kids needs & desires for education & entertainment and (2) generating insight driven business opportunities for the targeted household segment. In terms of the Framework, this case study looked at identifying its suitability to generate insight driven ideas.

4. Project team composition:

Three people formed the core team, a project leader and two other employees from New Product Development function. One of the key points from this project was that the project leader had been one of the participants from the pilot study and therefore, through learning by experience (Kolb, 1975) was able to run the project following the same project process.

5. Research Objectives of the Main Study Case Study 3 project:

Case Study 2 highlighted a lack of appreciation of effort and resources needed to generate quality ideas and the need for bespoke innovation templates to make the connection between insights and idea generation in order to seek quality ideas. It also demonstrated the benefits of using Nominal Brainstorming technique by deploying critical thinking and informed opinions to evaluate ideas. Therefore, Case Study 3 built upon these findings and focused on improving allocation of resources in order to improve the general framework performance as well as generating bespoke visual templates to focus on the objectives of the idea generation session and using Nominal Brainstorming principles.

6. Main Study Case Study 3 Project phases:

CASE STUDY 3				
PHASES	PHASE 1: ESTABLISH	PHASE 2: DISCOVER	PHASE 3: DEFINE	PHASE 4: DEVELOP
ACTIVITIES	ACTIVITY 1: PLANNING & BRIEF DEVELOPMENT	ACTIVITY 2: CONSUMER INSIGHT DEVELOPMENT	ACTIVITY 3: MARKET CONTEXT	ACTIVITY 4: OPPORTUNITY MAPPING
METHODS	Project Brief	Existing Data Collection	Ethnographic Data Decoding	Idea Template
	Research Planning	Additional Desk Data Collection	Defining Need & Behaviours drivers	Idea Generation
		Existing data decoding	Lessons from Competitors	Idea Development
		Rapid Ethnography Data Collection	Industry Analysis	Idea Presentation
		Competitors Landscape	Market Context Opportunities	
TOOLS	Focusing Tool	Customer Profile	Competitor Analysis Matrix	Group Brainstorming
	5WH			Visual Template
STIMULUS FOR IG	Insights from in-home visits, competitor analysis and Visual Templates to record ideas			

Figure 37 Case Study 3 Project Phases

This project was split into the four core phases: establish, discover, define and develop. However, the activities were still not totally shaped. Activity 1 and Activity 4 stayed the same as in the standard Framework, however, the project leader slightly altered Activities 2 and 3 by going back and forth from data collection to data decoding and vice versa. This issue highlighted the currently lack of understanding in large organizations of the purpose of the different activities and how they link to each other in the innovation process.

Activity 1: Planning and Brief Development:

This first step in this activity was to determine the problem to solve and to elaborate a project brief that summarized the key issues to be tackled in the project (see Figure 38). Following the same methodology as previous case study projects, the team focused on defining the context, issues, goals and focus of the project so that all the team members were clear on the common objective of the project and could also relate the outcomes of the activities in relationship to target the ultimate objective.

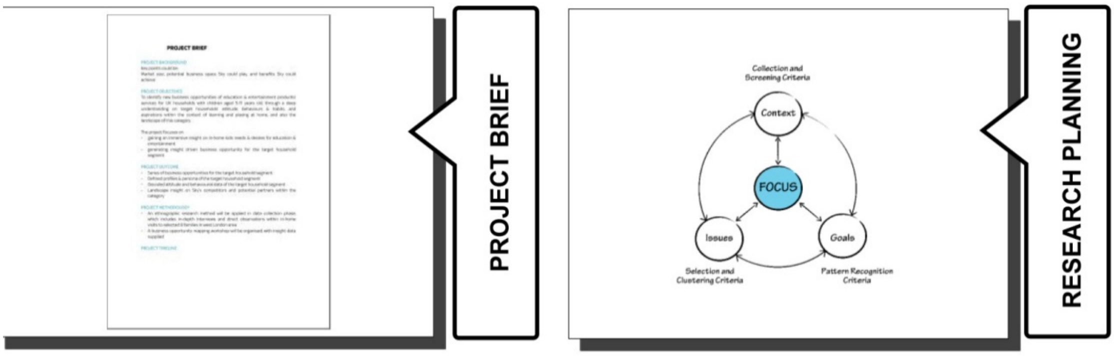
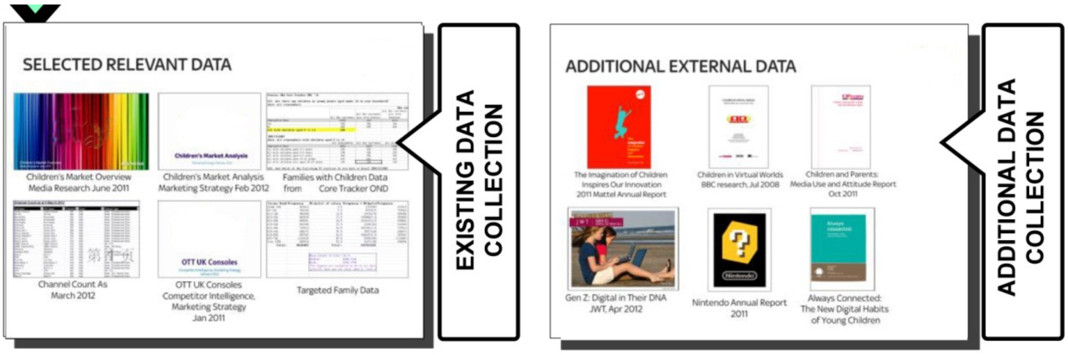
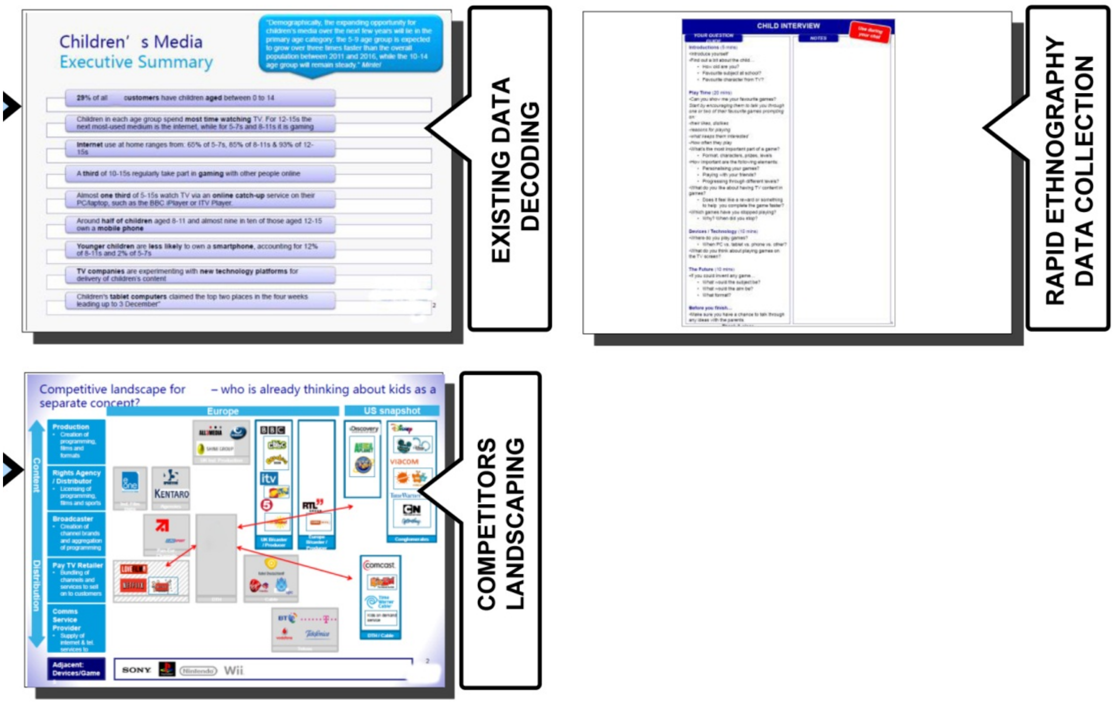


Figure 38, Planning and Brief Development Activities

Activity 2: Consumer Insight Development:

This activity focused on gathering data via desk research (from both inside and outside of the organization), from in-house reports about the market and from the analysis of ethnographic consumers in-home visits (selected form an in-house consumer panel). The reason behind this research method was to gather more data about the target consumers' lifestyle beyond the desk research (see Figure 39). The integration of ethnographic user research into a project where there was little knowledge about the consumer was of great benefit to identify key behavioural insights. The outcomes from this activity were a series of drivers of customers' needs.





Children's Media
Executive Summary

"Demographically, the expanding opportunity for children's media over the next few years will lie in the primary age category: the 5-9 age group is expected to grow over three times faster than the overall population between 2011 and 2016, while the 10-14 age group will remain steady." *Mintel*

- **29%** of all **customers** have children **aged** between 0 to 14
- Children in each age group spend **most time watching** TV. For 12-15s the next most-used medium is the internet, while for 5-7s and 8-11s it is gaming
- **Internet** use at home ranges from: 65% of 5-7s, 85% of 8-11s & 93% of 12-15s
- A **third** of 10-15s regularly take part in **gaming** with other people online
- Almost **one third** of 5-15s watch TV via an **online catch-up** service on their PC/laptop, such as the BBC iPlayer or ITV Player.
- Around **half of children** aged 8-11 and almost nine in ten of those aged 12-15 own a **mobile phone**
- **Younger children** are **less likely** to own a **smartphone**, accounting for 12% of 8-11s and 2% of 5-7s
- **TV companies** are experimenting with **new technology platforms** for delivery of children's content
- Children's **tablet computers** claimed the top two places in the four weeks leading up to 3 December"

CHILD INTERVIEW

Use during your chat

YOUR QUESTION GUIDE	NOTES
Introductions (5 mins) •Introduce yourself •Find out a bit about the child… • How old are you? • Favourite subject at school? • Favourite character from TV? **Play Time** (20 mins) •Can you show me your favourite games? *Start by encouraging them to talk you through one or two of their favourite games prompting on:* •their likes, dislikes •reasons for playing •what keeps them interested •How often they play •What's the most important part of a game? • Format, characters, prizes, levels •How important are the following elements: • Personalising your games? • Playing with your friends? • Progressing through different levels? •What do you like about having TV content in games? • Does it feel like a reward or something to help you complete the game faster? •Which games have you stopped playing? • Why? When did you stop? **Devices / Technology** (10 mins) •Where do you play games? • When PC vs. tablet vs. phone vs. other? •What do you think about playing games on the TV screen? **The Future** (10 mins) •If you could invent any game… • What would the subject be? • What would the aim be? • What format? **Before you finish…** •Make sure you have a chance to talk through any ideas with the parents	

Competitive landscape for – who is already thinking about kids as a separate concept?

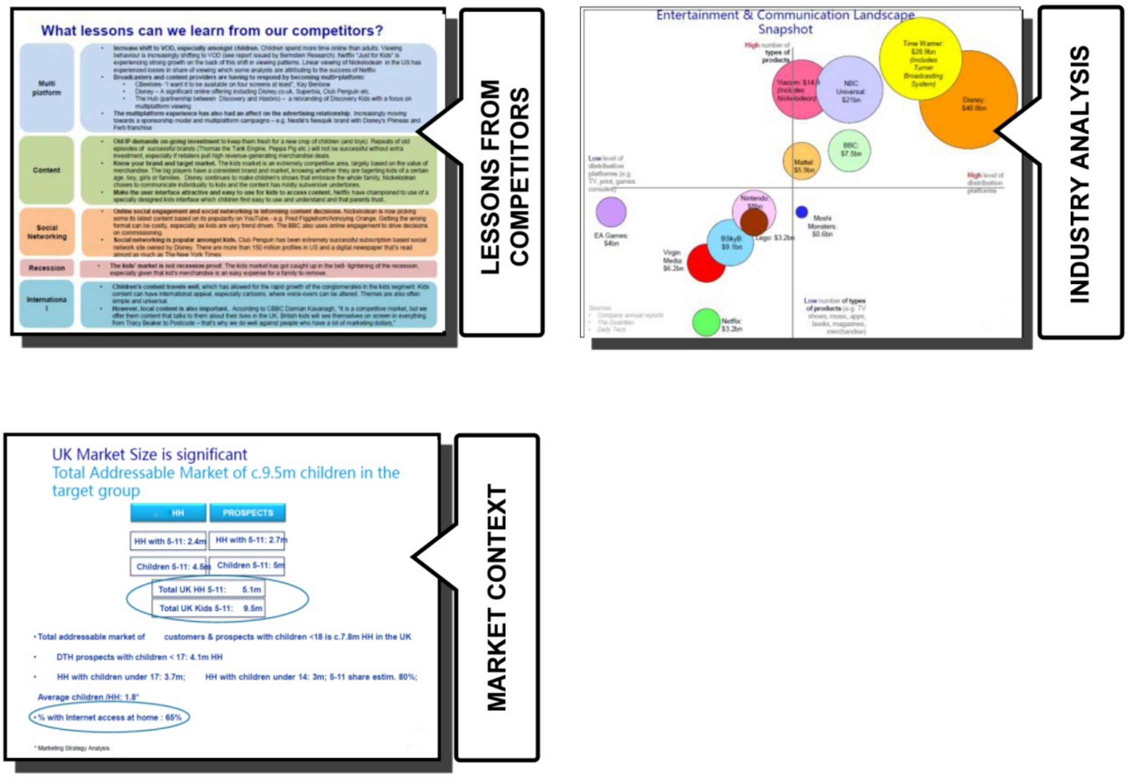
- **Production**
  - Creation of programming, films and formats
- **Rights Agency / Distributor**
  - Licensing of programming, films and sports
- **Broadcaster**
  - Creation of channel brands and aggregation of programming
- **Pay TV Retailer**
  - Bundling of channels and services to sell on to customers
- **Comms Service Provider**
  - Supply of internet & tel. services to
- **Adjacent: Devices/Game**

Figure 39 Consumer Insight Development Activities

Activity 3: Market Context:

The third activity focused on a thorough analysis and evaluation of the market context in which data gathered from the desk research was analysed and decoded to visualize the market landscape (see Figure 40). The team were especially interested in understanding the competitor landscape to identify gaps that were not currently being targeted and could represent a market opportunity for Company A.

Kids Opportunity:
Customer Insight



What lessons can we learn from our competitors?

Multi platform	• **Increase shift to VOD, especially amongst children.** Children spend more time online than adults. Viewing behaviour is increasingly shifting to VOD (see report issued by Bernstein Research). Netflix "Just for Kids" is experiencing strong growth on the back of this shift in viewing patterns. Linear viewing of Nickelodean in the US has experienced losses in share of viewing which some analysts are attributing to the success of Netflix
	• **Broadcasters and content providers are having to respond by becoming multi-platform:**
	  • CBeebies- "I want it to be available on four screens at least", Kay Benbow
	  • Disney – A significant online offering including Disney.co.uk, Superbia, Club Penguin etc.
	  • The Hub (partnership between Discovery and Hasbro) – a rebranding of Discovery Kids with a focus on multiplatform viewing
	• **The multiplatform experience has also had an affect on the advertising relationship.** Increasingly moving towards a sponsorship model and multiplatform campaigns – e.g. Nestlé's Nesquik brand with Disney's Phineas and Ferb franchise

Content	• **Old IP demands on-going investment** to keep them fresh for a new crop of children (and toys). Repeats of old episodes of successful brands (Thomas the Tank Engine, Peppa Pig etc.) will not be successful without extra investment, especially if retailers pull high revenue-generating merchandise deals. • **Know your brand and target market.** The kids market is an extremely competitive area, largely based on the value of merchandise. The big players have a consistent brand and market, knowing whether they are tagerting kids of a certain age, boy, girls or families. Disney continues to make children's shows that embrace the whole family, Nickelodean choses to communicate individually to kids and the content has mildly subversive undertones. • **Make the user interface attractive and easy to use for kids to access content.** Netflix have championed to use of a specially designed kids interface which children find easy to use and understand and that parents trust.
Social Networking	• **Online social engagement and social networking is informing content decisions.** Nickelodean is now picking some its latest content based on its popularity on YouTube - e.g. Fred Figglehorn/Annoying Orange. Getting the wrong format can be costly, especially as kids are very trend driven. The BBC also uses online engagement to drive decisions on commissioning. • **Social networking is popular amongst kids.** Club Penguin has been extremely successful subscription based social network site owned by Disney. There are more than 150 million profiles in US and a digital newspaper that's read almost as much as The New York Times.
Recession	• **The kids' market is not recession proof.** The kids market has got caught up in the belt- tightening of the recession, especially given that kid's merchandise is an easy expense for a family to remove.
Internationa l	• **Children's content travels well**, which has allowed for the rapid growth of the conglomerates in the kids segment. Kids content can have international appeal, especially cartoons, where voice-overs can be altered. Themes are also often simple and universal. • **However, local content is also important.** According to CBBC Damian Kavanagh, "It is a competitive market, but we offer them content that talks to them about their lives in the UK. British kids will see themselves on screen in everything from Tracy Beaker to Postcode – that's why we do well against people who have a lot of marketing dollars."

LESSONS FROM COMPETITORS

UK Market Size is significant
Total Addressable Market of c.9.5m children in the target group

HH	PROSPECTS
HH with 5-11: 2.4m	HH with 5-11: 2.7m
Children 5-11: 4.5m	Children 5-11: 5m

Total UK HH 5-11: 5.1m
Total UK Kids 5-11: 9.5m

- Total addressable market of customers & prospects with children <18 is c.7.8m HH in the UK
- DTH prospects with children < 17: 4.1m HH
- HH with children under 17: 3.7m; HH with children under 14: 3m; 5-11 share estim. 80%;

Average children /HH: 1.8*

- % with Internet access at home : 65%

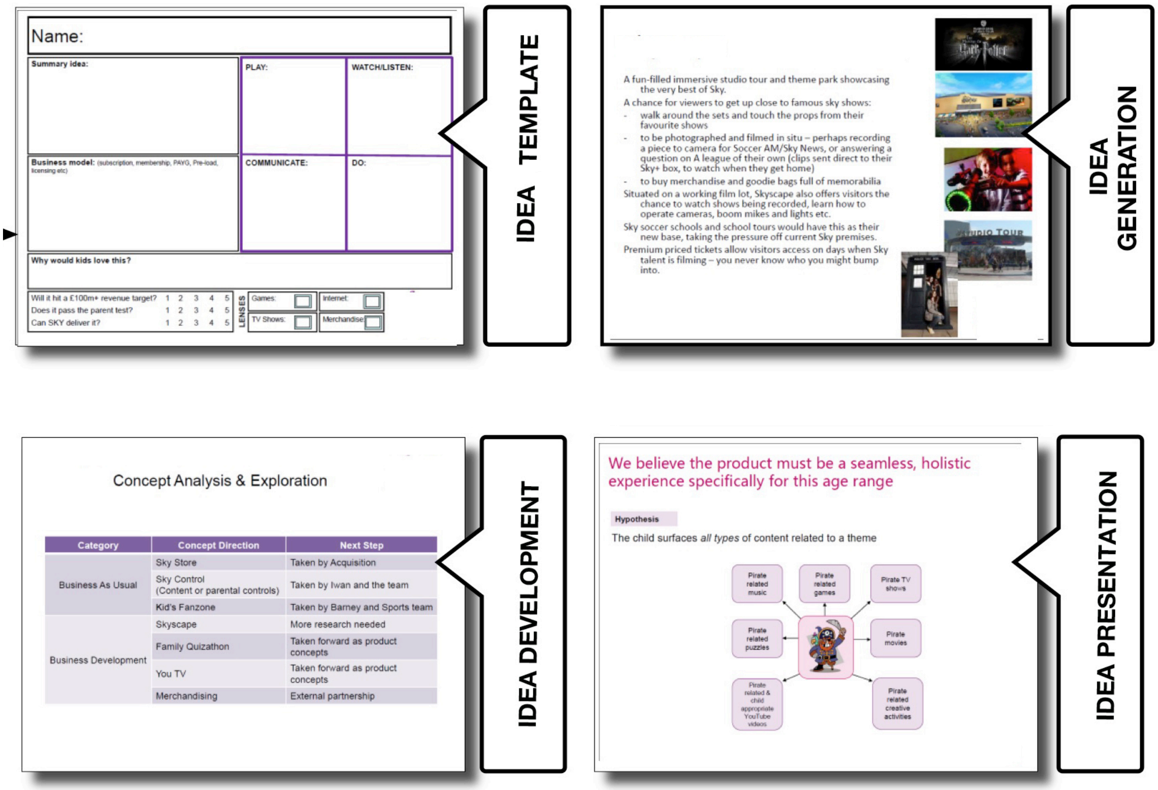
* Marketing Strategy Analysis

MARKET CONTEXT

Figure 40, Market Context Activity

Activity 4: Opportunity Mapping:

The last activity, the Opportunity Mapping, focused on the Idea Generation stage. The first method was the planning of the idea generation session, including the design of a visual template (see Figure 41) that would help build ideas around the key issues on the matter. The second method, the Idea Generation, was split into two sessions (with two different teams) followed by a day of reflection before the evaluation meeting. The purpose of this method was to test the impact of reflective thinking on the evaluation of ideas. However, due to the fast pace of multinational organizations where employees are always managing various matters at the same time, the result did not differ positively as the momentum was lost and people did not put more thought on the ideas during the reflective time. Therefore, in comparison with the previous methods, the reflective thinking time allowed in the Idea Generation session seemed enough to thoroughly evaluate the ideas generated. The method used in the session after the reflection time was Idea Exploration and Development, which focused on identifying the weaknesses in the selected ideas and develop solutions to strengthen them. The outcomes from this phase were a series of product ideas to lead the development of kids' entertainment and communication prototype product and service.



Name:

Summary idea:

PLAY:

WATCH/LISTEN:

Business model: (subscription, membership, PAYG, Pre-load, licensing etc)

COMMUNICATE:

DO:

Why would kids love this?

Will it hit a £100m+ revenue target?	1	2	3	4	5
Does it pass the parent test?	1	2	3	4	5
Can SKY deliver it?	1	2	3	4	5

LENSES

Games: ☐
Internet: ☐
TV Shows: ☐
Merchandise: ☐

A fun-filled immersive studio tour and theme park showcasing the very best of Sky.

A chance for viewers to get up close to famous sky shows:

- walk around the sets and touch the props from their favourite shows
- to be photographed and filmed in situ – perhaps recording a piece to camera for Soccer AM/Sky News, or answering a question on A league of their own (clips sent direct to their Sky+ box, to watch when they get home)
- to buy merchandise and goodie bags full of memorabilia

Situated on a working film lot, Skyscape also offers visitors the chance to watch shows being recorded, learn how to operate cameras, boom mikes and lights etc.

Sky soccer schools and school tours would have this as their new base, taking the pressure off current Sky premises.

Premium priced tickets allow visitors access on days when Sky talent is filming – you never know who you might bump into.

Concept Analysis & Exploration

Category	Concept Direction	Next Step
Business As Usual	Sky Store	Taken by Acquisition
	Sky Control (Content or parental controls)	Taken by Iwan and the team
	Kid's Fanzone	Taken by Barney and Sports team
Business Development	Skyscape	More research needed
	Family Quizathon	Taken forward as product concepts
	You TV	Taken forward as product concepts
	Merchandising	External partnership

We believe the product must be a seamless, holistic experience specifically for this age range

Hypothesis

The child surfaces *all types* of content related to a theme

Figure 41 Opportunity Mapping Activity

7. Idea Generation Session Characteristics

Session Objectives

To generate insight driven ideas for a very specific target market segment. The session was very focused on the quality of the ideas, since the organization was seeking a quality idea that represented a clear business opportunity.

Workshop Participants

The Idea Generation session was comprised of a multidisciplinary team of six participants coming from different departments within the organisation.

Idea Generation Techniques

This session was split into two phases to allow reflective thinking before evaluating the ideas and to test what was the impact of the reflective thinking approach on the decision-making process. The idea generation technique used was group brainstorming, in order to determine the impact on idea quality of this "controversial" technique when other constructs of effective practices are applied, such as bespoke visual templates, quality of data in NPD and multidisciplinary teams.

Session Activities

The Idea Generation session was broken down into a series of activities: two short idea generation sessions (due to organization time constraint to gather a larger group for a single idea generation session), followed by a day of reflection before the evaluation and selection of ideas. In this project, there was a special interest in reflect upon the ideas before evaluating them to make sure the ideas chosen were the best ones to pursue.

The idea generation session was based on a Group Brainstorming method in which participants were given a series of visual templates to record their ideas and were presented with the key insights gathered from the preliminary research (from target customers and competitors). They then started generating ideas in teams of 2 people and sharing them at the end of the session.

There were two ideas that went into a more thorough Idea Development stage, which lasted 3 days, a meeting to develop the ideas followed by two days to reflect on them.

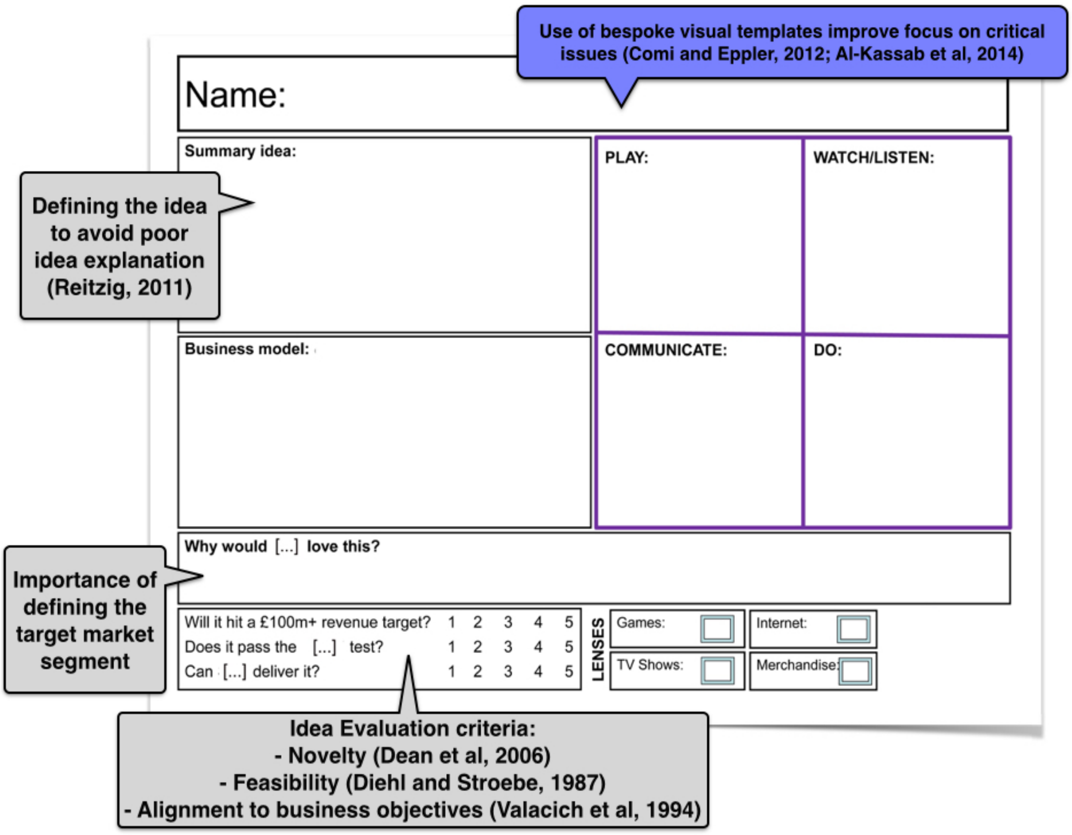
Type of Team	Multidisciplinary
Number of Participants	6 participants each session
Facilitation	Internal from organization
Timing	2 sessions of 60 minutes
Type of process	Formal process
Idea Generation Techniques	Group Brainstorming
Idea Generation Tools	Ad hoc Visual Templates and Stimulus data (Insights from in-home visits and competitor analysis)

Table 44 Idea Generation Session Characteristics

Session Tools

For this project, a bespoke visual template was created that focused on the sensorial elements of the new product/service, since it was targeted to children. There was also a special interest in determining the business model the idea would engage with to clarify the business opportunity. This specific visual template was designed as an exploratory idea template, whose ideas would be further developed in the next stage.

The visual template aimed to determine the market segment that the idea was targeted at, in order to avoid a lack of clarity like in Case Study 1. The Idea Evaluation Criteria played a key role in this template, because the alignment to business objectives was core to this project as the idea was meant to be able to develop a 3 to 5 year idea roadmap. The aim of the Visual Template was to help visualise the complexity of the factors attributed to this project, as a way to isolate the critical issues and focus the objectives of the session.



Use of bespoke visual templates improve focus on critical issues (Comi and Eppler, 2012; Al-Kassab et al, 2014)

Defining the idea to avoid poor idea explanation (Reitzig, 2011)

Importance of defining the target market segment

Idea Evaluation criteria:
- Novelty (Dean et al, 2006)
- Feasibility (Diehl and Stroebe, 1987)
- Alignment to business objectives (Valacich et al, 1994)

Figure 42 Template example

8. Evaluation criteria

In Case Study 3, the evaluation criteria focused on three key parameters to determine the potential to activate the existing idea pipeline: (1) Novelty (Dean et al, 2006); (2) Feasibility (Diehl and Stroebe, 1987); and (3) Alignment to business objectives (Valacich et al., 1994). These criteria were introduced in the visual innovation template in order to guide thinking towards the scope of the project.

9. Idea Generation Session Outcomes

The outcomes from the idea generation session were a series of exploratory ideas from which two were selected to be further developed by the New Product Development team and tested with real consumers.

The project had four different outcomes. The first related to a series of business opportunities for the target segment. These scenarios have helped visualize the potential interests that Company A had to penetrate in a specific target market. The second outcome from the project focused on the thorough and defined customer profiles that drove the target segment. The third outcome has been a thorough insight on the competitor landscape and potential partners within this specific category unveiling key market opportunities for the organization. Finally, the fourth outcome has been the quality of decoding of the attitude and behavioural data of the target segment highlighting patterns of behaviour and latent needs that Company A could address with a new product proposition.

10. Key Learnings

There were four key learnings from the Idea Generation session: (1) An overview at the beginning of the session was considered very useful; (2) A contextualization to the session was thought to be very helpful; (3) Working with a multidisciplinary team was highly rated by the Idea Generation participants; (4) The visual template was considered very helpful in helping to frame ideas by the 83% of participants.

In Case Study 3 there were five key learnings that came up from the implementation of the Idea Generation Framework: (1) The project focused on business opportunities rather than product development per se, which expanded the possibilities to achieve the objective of the project; (2) looking into different business models and analysing which is best for the business gave a significant insight into what Company A should use; (3) Assessing what content should be relevant during the first stages of the Innovation Process improved the quality of the ideas generated; (4) Developing visual prototypes of the options and how the experience could look helped to develop the feasibility of ideas; (5) Many project leaders of innovation projects do not appreciate the value or purpose of the different methods and activities of the innovation process and they jump from one to the other randomly, misunderstanding the way one activity output is the next activity input.

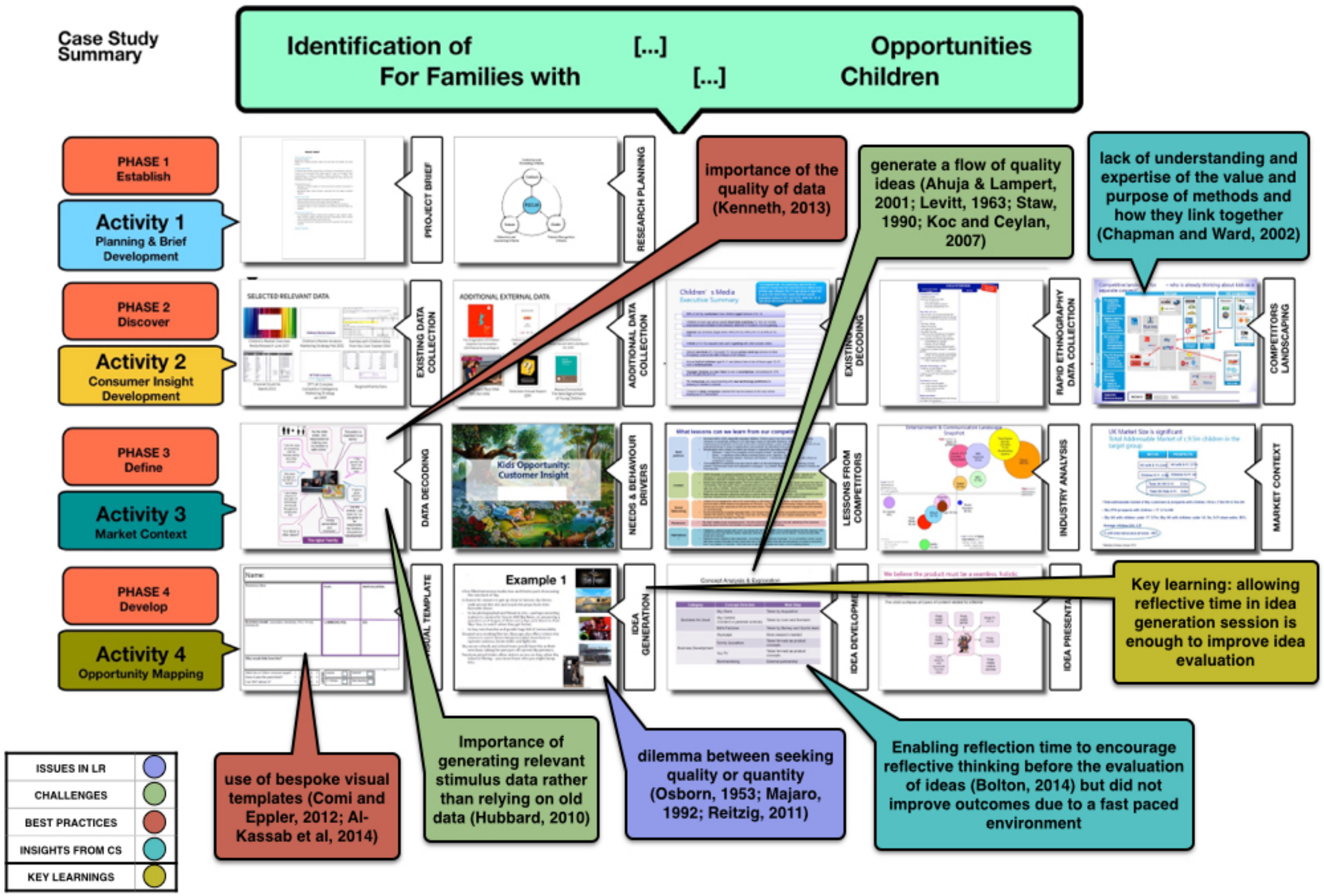
Table 45 shows how the learning’s from Case Study 2 informed Case Study 3 and what were the core issues that were extrapolated from this third study in order to develop the Framework further. Case Study 3 has demonstrated the Framework has the potential to drive insight driven ideas but has also shown there is a lack of appreciation of the value and purpose of the activities.

	MAIN STUDY Case Study 3 Company A
Purpose	The research objectives built upon case study 2 and added an additional factor (d). The objectives focussed upon determining how the use of (a) innovation framework; (b) innovation templates; (c) idea quality criteria (d) internal and external stimulus data; and (e) idea generation techniques would impact on: 1) identifying and addressing project issues that needed to be tackled; (2) facilitating idea generation; and (3) improving idea quality; and (4) idea selection
Type of Project	The project focussed on the activation of an **existing identified idea pipeline** The project concentrated on identifying market opportunities and the generation of insight driven ideas for an existing idea pipeline
Practises	Project brief, focussing tool, internal and external data gathering, data analysis, group brainstorming.
Scoping Tools used	The innovation framework, innovation templates and idea quality criteria allowed the teams to organise and structure information and issues more effectively. The complexity of the project required the template to increase the number of issues around idea evaluation criteria in order to control the scope during the IG session. On the other hand, the stimulus data helped to highlight key issues for the project in order to generate ideas that aligned with current challenges. This helped to connect the insights gained during data collection and analysis with idea generation.
Key Learnings	This Case Study made clear a lack of appreciation of the value and purpose of the different activities. There was a lack of understanding of the connection of the practices and methods (input-output) in order to link together to pursue quality of ideas.

Table 45 Main Study Case Study 3 Review Framework

OVERVIEW OF THE PROCESS, PRACTICES AND TOOLS

Figure 43 visualises Case Study 2 and it highlights where the core issues of the study took place. Specifically it draws attention to issues in: (1) Literature Review, such as the dilemma between seeking quality or quantity; (2) Challenges, such the difficulty to generate quality ideas as well as generating relevant and focused stimulus data; (3) Effective Practices, such as the benefits of using bespoke visual templates and quality data; (4) Insights such as the benefits of reflective thinking and how participants of this study were not able to understand the relation between activities and methods; and (5) Key Learnings, in this case how allowing reflection time in IG helped to evaluate outcomes.



Identification of [...] Opportunities For Families with [...] Children

importance of the quality of data (Kenneth, 2013)

generate a flow of quality ideas (Ahuja & Lampert, 2001; Levitt, 1963; Staw, 1990; Koc and Ceylan, 2007)

lack of understanding and expertise of the value and purpose of methods and how they link together (Chapman and Ward, 2002)

Key learning: allowing reflective time in idea generation session is enough to improve idea evaluation

use of bespoke visual templates (Comi and Eppler, 2012; Al-Kassab et al, 2014)

Importance of generating relevant stimulus data rather than relying on old data (Hubbard, 2010)

dilemma between seeking quality or quantity (Osborn, 1953; Majaro, 1992; Reitzig, 2011)

Enabling reflection time to encourage reflective thinking before the evaluation of ideas (Bolton, 2014) but did not improve outcomes due to a fast paced environment

ISSUES IN LR	●
CHALLENGES	●
BEST PRACTICES	●
INSIGHTS FROM CS	●
KEY LEARNINGS	●

Figure 43, Case Study 3 Summary

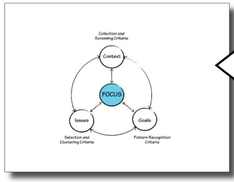
Case Study Summary

Identification of [...] Opportunities For Families with [...] Children

PHASE 1
Establish

Activity 1
Planning & Brief Development

PROJECT BRIEF



RESEARCH PLANNING

PHASE 2
Discover

Activity 2
Consumer Insight Development

PROJECT PLANNING
1 day 8 x in-home visits
1 day reflection
3 meetings
Collaborative process

ADDITIONAL EXTERNAL DATA

The Imagination of Children Inspires Our Innovation 2011 Mattel Annual Report

Children in Virtual Worlds BBC research, Jul 2008

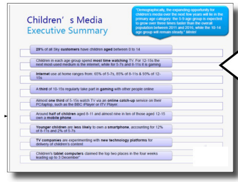
Children and Parents: Media Use and Attitude Report Oct 2011

Gen Z: Digital in Their DNA JWT, Apr 2012

Nintendo Annual Report 2011

Always Connected: The New Digital Habits of Young Children

ADDITIONAL DATA COLLECTION

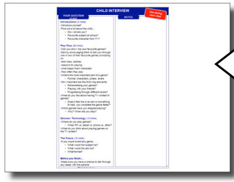


Children' s Media
Executive Summary

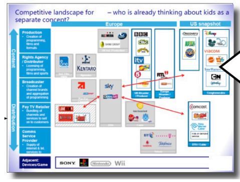
"Demographically, the expanding opportunity for children's media over the next few years will lie in the primary age category: the 5-9 age group is expected to grow over three times faster than the overall population between 2011 and 2016, while the 10-14 age group will remain steady." *Mintel*

- **29%** of all Sky **customers** have children **aged** between 0 to 14
- Children in each age group spend **most time watching** TV. For 12-15s the next most-used medium is the internet, while for 5-7s and 8-11s it is gaming
- **Internet** use at home ranges from: 65% of 5-7s, 85% of 8-11s & 93% of 12-15s
- **A third** of 10-15s regularly take part in **gaming** with other people online
- Almost **one third** of 5-15s watch TV via an **online catch-up** service on their PC/laptop, such as the BBC iPlayer or ITV Player.
- Around **half of children** aged 8-11 and almost nine in ten of those aged 12-15 own a **mobile phone**
- **Younger children** are **less likely** to own a **smartphone**, accounting for 12% of 8-11s and 2% of 5-7s
- **TV companies** are experimenting with **new technology platforms** for delivery of children's content
- Children's **tablet computers** claimed the top two places in the four weeks leading up to 3 December"

EXISTING DATA DECODING



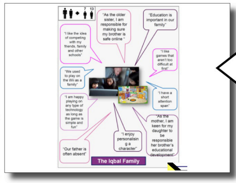
RAPID ETHNOGRAPHY DATA COLLECTION



COMPETITORS LANDSCAPING

PHASE 3
Define

Activity 3
Market Context



DATA DECODING

IDEA GENERATION
2 days
1 day reflection
4 meetings
Collaborative process

IDEA DEVELOPMENT
3 days
2 day reflection
2 meetings

IDEA PRESENTATION
7 days
2 review meetings
Collaborative process

PHASE 4
Develop

Activity 4
Opportunity Mapping

DATA ANALYSIS
5 days
3 day reflection
3 meetings
Collaborative process

A fun-filled immersive studio tour and theme park showcasing the very best of Sky.

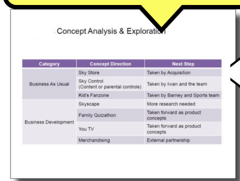
A chance for viewers to get up close to famous sky shows:
- walk around the sets and touch the props from their favourite shows
- to be photographed and filmed in situ – perhaps recording a piece to camera for Soccer AM/Sky News, or answering a question on A league of their own (clips sent direct to their Sky+ box, to watch when they get home)
- to buy merchandise and goodie bags full of memorabilia

Situated on a working film lot, Skyscape also offers visitors the chance to watch shows being recorded, learn how to operate cameras, boom mikes and lights etc.

Sky soccer schools and school tours would have this as their new base, taking the pressure off current Sky premises.

Premium priced tickets allow visitors access on days when Sky talent is filming – you never know who you might bump into.

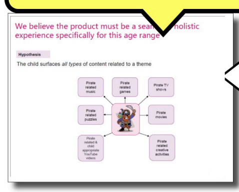
IDEA GENERATION



Concept Analysis & Exploration

Category	Concept Direction	Next Step
Business As Usual	Sky Store	Taken by Acquisition
	Sky Control (Content or parental controls)	Taken by Iwan and the team
	Kid's Fanzone	Taken by Barney and Sports team
Business Development	Skyscape	More research needed
	Family Quizathon	Taken forward as product concepts
	You TV	Taken forward as product concepts
	Merchandising	External partnership

IDEA DEVELOPMENT



We believe the product must be a sea[...]holistic experience specifically for this age range

Hypothesis

The child surfaces *all types* of content related to a theme

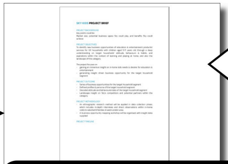
IDEA PRESENTATION

Case Study Summary

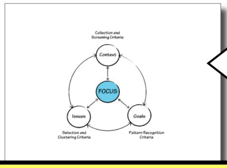
Identification of [...] Opportunities For Families with [...] Children

PHASE 1
Establish

Activity 1
Planning & Brief Development



PROJECT BRIEF

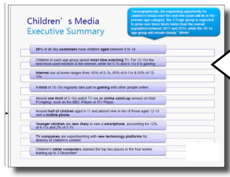


RESEARCH PLANNING

PHASE 2
Discover

Activity 2
Consumer Insight Development

VALUE
From phase 1 deliverable, work was used to
- Drive understanding on target consumers needs and consumption behaviour in media and general lifestages
- Define drivers of target consumers needs & behaviours
- Used for product/ service innovation project

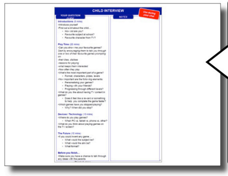


Children' s Media
Executive Summary

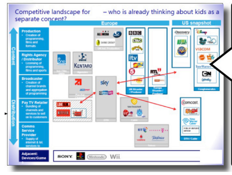
"Demographically, the expanding opportunity for children's media over the next few years will lie in the primary age category: the 5-9 age group is expected to grow over three times faster than the overall population between 2011 and 2016, while the 10-14 age group will remain steady." *Mintel*

- **29%** of all Sky **customers** have children **aged** between 0 to 14
- Children in each age group spend **most time watching** TV. For 12-15s the next most-used medium is the internet, while for 5-7s and 8-11s it is gaming
- **Internet** use at home ranges from: 65% of 5-7s, 85% of 8-11s & 93% of 12-15s
- A **third** of 10-15s regularly take part in **gaming** with other people online
- Almost **one third** of 5-15s watch TV via an **online catch-up** service on their PC/laptop, such as the BBC iPlayer or ITV Player.
- Around **half of children** aged 8-11 and almost nine in ten of those aged 12-15 own a **mobile phone**
- **Younger children** are **less likely** to own a **smartphone**, accounting for 12% of 8-11s and 2% of 5-7s
- **TV companies** are experimenting with **new technology platforms** for delivery of children's content
- Children's **tablet computers** claimed the top two places in the four weeks leading up to 3 December"

EXISTING DATA DECODING



RAPID ETHNOGRAPHY DATA COLLECTION



COMPETITORS LANDSCAPING

PHASE 3
Define

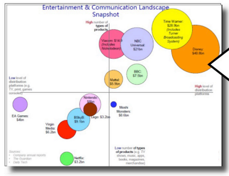
Activity 3
Market Context

VALUE
From phase 2 deliverable, work was used to
- Drive overall understanding on kids entertainment & communication market and competitor landscape
- Identify trends and gaps in current kids entertainment & communication market
- Clear positioning space & role Company A could play

What lessons can we learn from our competitors?

Multi platform	**Increase shift to VOD, especially amongst children.** Children spend more time online than adults. Viewing behaviour is increasingly shifting to VOD (see report issued by Bernstein Research). Netflix "Just for Kids" is experiencing strong growth on the back of this shift in viewing patterns. Linear viewing of Nickelodean in the US has experienced losses in share of viewing which some analysts are attributing to the success of Netflix **Broadcasters and content providers are having to respond by becoming multi-platform:** CBeebies- "I want it to be available on four screens at least", Kay Benbow Disney – A significant online offering including Disney.co.uk, Superbia, Club Penguin etc. The Hub (partnership between Discovery and Hasbro) – a rebranding of Discovery Kids with a focus on multiplatform viewing **The multiplatform experience has also had an affect on the advertising relationship.** Increasingly moving towards a sponsorship model and multiplatform campaigns – e.g. Nestlé's Nesquik brand with Disney's Phineas and Ferb franchise
Content	**Old IP demands on-going investment** to keep them fresh for a new crop of children (and toys). Repeats of old episodes of successful brands (Thomas the Tank Engine, Peppa Pig etc.) will not be successful without extra investment, especially if retailers pull high revenue-generating merchandise deals. **Know your brand and target market.** The kids market is an extremely competitive area, largely based on the value of merchandise. The big players have a consistent brand and market, knowing whether they are tagerting kids of a certain age, boy, girls or families. Disney continues to make children's shows that embrace the whole family, Nickelodean choses to communicate individually to kids and the content has mildly subversive undertones. **Make the user interface attractive and easy to use for kids to access content.** Netflix have championed to use of a specially designed kids interface which children find easy to use and understand and that parents trust.
Social Networking	**Online social engagement and social networking is informing content decisions.** Nickelodean is now picking some its latest content based on its popularity on YouTube.- e.g. Fred Figglehorn/Annoying Orange. Getting the wrong format can be costly, especially as kids are very trend driven. The BBC also uses online engagement to drive decisions on commissioning. **Social networking is popular amongst kids.** Club Penguin has been extremely successful subscription based social network site owned by Disney. There are more than 150 million profiles in US and a digital newspaper that's read almost as much as The New York Times.
Recession	**The kids' market is not recession proof.** The kids market has got caught up in the belt- tightening of the recession, especially given that kid's merchandise is an easy expense for a family to remove.
Internationa l	**Children's content travels well**, which has allowed for the rapid growth of the conglomerates in the kids segment. Kids content can have international appeal, especially cartoons, where voice-overs can be altered. Themes are also often simple and universal. **However, local content is also important.** According to CBBC Damian Kavanagh, "It is a competitive market, but we offer them content that talks to them about their lives in the UK. British kids will see themselves on screen in everything from Tracy Beaker to Postcode – that's why we do well against people who have a lot of marketing dollars,"

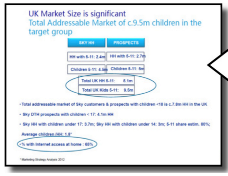
LESSONS FROM COMPETITORS



Entertainment & Communication Landscape Snapshot

Sources:
- Company annual reports
- The Guardian
- Daily Tech

INDUSTRY ANALYSIS



UK Market Size is significant
Total Addressable Market of c.9.5m children in the target group

SKY HH	PROSPECTS
HH with 5-11: 2.4m	HH with 5-11: 2.7m
Children 5-11: 4.5m	Children 5-11: 5m

Total UK HH 5-11: 5.1m
Total UK Kids 5-11: 9.5m

- Total addressable market of Sky customers & prospects with children <18 is c.7.8m HH in the UK
- Sky DTH prospects with children < 17: 4.1m HH
- Sky HH with children under 17: 3.7m; Sky HH with children under 14: 3m; 5-11 share estim. 80%; Average children /HH: 1.8*
- % with Internet access at home : 65%

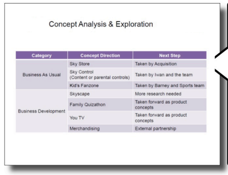
* Marketing Strategy Analysis 2012

MARKET CONTEXT

PHASE 4
Develop

Activity 4
Opportunity Mapping

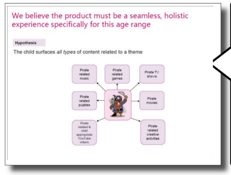
VALUE
From phase 3 deliverable, work will be used to:
- Lead the development and refinement of a kids entertainment and communication prototype product and/or service



Concept Analysis & Exploration

Category	Concept Direction	Next Step
Business As Usual	Sky Store	Taken by Acquisition
	Sky Control (Content or parental controls)	Taken by Iwan and the team
	Kid's Fanzone	Taken by Barney and Sports team
Business Development	Skyscape	More research needed
	Family Quizathon	Taken forward as product concepts
	You TV	Taken forward as product concepts
	Merchandising	External partnership

IDEA DEVELOPMENT



We believe the product must be a seamless, holistic experience specifically for this age range

Hypothesis

The child surfaces *all types* of content related to a theme

IDEA PRESENTATION

3.3.4 Main Study- Case Study 4

1. Context:

This project aimed to create and develop a 3 to 5 year product roadmap for a range of third parties B2B initiatives of the sample company.

One of the key points of this project was that in Company A, as in many other multinational organisations, individuals/teams needed to take ownership and run the entire project themselves. In this case, the project leader undertook a very formal and structured approach to the project in order to help drive quality data onto the idea generation session.

2. Objective of the case study:

The objective of this Case Study was to determine the impact of: (a) the innovation framework, (b) bespoke innovation visual templates; (c) an idea quality criteria; (d) internal and external research collection and analysis; (e) specific analytical and mapping tools; (f) field work; and (g) idea generation techniques to help improve - (1) the definition of key the issues to be tackled; (2) improving idea quality and (3) idea selection.

3. Main Study Case Study 4 Project Focus:

This project aimed to develop and implement a repeatable NPD process to: (1) support the objectives of Company A Business Department; (2) deliver product value to partners and establish early engagement and feedback and (3) join up B2B initiatives across Company A.

4. Project team composition:

Three people with different functions, expertise and levels of experience formed the core team of this project. The project leader’s expertise lied in strategy. However, a key point of this study was to understand and evaluate what impact having a deeper understanding of the Framework would have on project performance (the project leader had been one of the participants in the idea generation session of the pilot study), versus participants who were unfamiliar with the structure. As with Case Study 3, this individual followed the same process we had been using and was able to successfully carry out all the tasks on her own by following the structure of the Framework and becoming a committed project leader.

5. Research objectives of the Main Study Case Study 4 project:

The learnings from Case Study 3 indicated a lack of appreciation by the participants of the value and purpose of the different activities (data collection, data analysis and opportunity mapping) in FEI and a lack of connection of the practices and methods (input-output) and their link together to pursue quality of ideas.

The research objectives of Case Study 4 focused on establishing a clear process, set of practices and success criteria, all underpinned by group facilitation to guide critical thinking and focusing the scope of the project.

6. Main Study Case Study 4 Project Phases

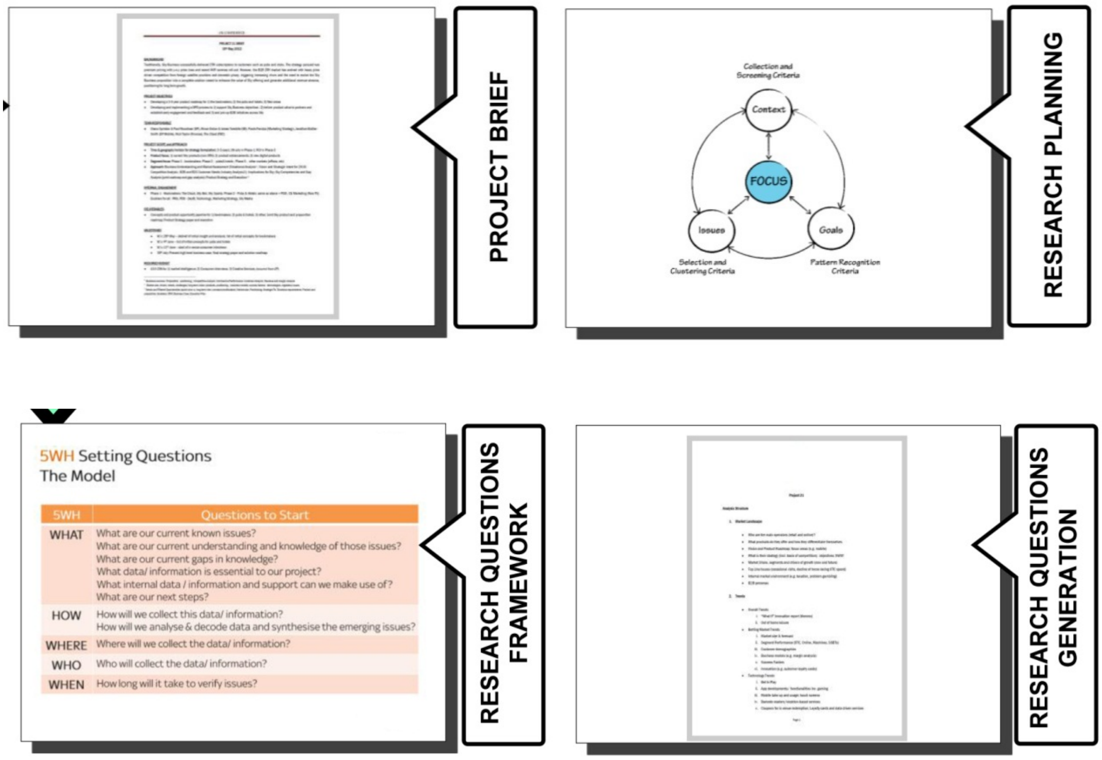
CASE STUDY 4				
PHASES	PHASE 1: ESTABLISH	PHASE 2: DISCOVER	PHASE 3: DEFINE	PHASE 4: DEVELOP
ACTIVITIES	ACTIVITY 1: PLANNING & BRIEF DEVELOPMENT	ACTIVITY 2: DATA COLLECTION	ACTIVITY 3: DATA DECODING	ACTIVITY 4: OPPORTUNITY MAPPING
METHODS	Project Brief	Setting Data Source Framework	Market Landscape	Field research
	Research Planning	Collection of Existing Data	Consumer Insight Analysis	Idea Generation
	Research Questions Framework	Linking Data To Research Questions	Competitor Analysis	Idea Testing and Development
	Research Questions Generation	Defining Additional Missing Data	Technology Trends	Idea Presentation
TOOLS	Focusing Tool		Competitor Analysis Matrix	Visual Template
	5WH		Technology Mapping	Nominal Brainstorming
STIMULUS FOR IG	Visual Templates for idea recording and visual templates from ethnography location visits			

Figure 44 Case Study 4 Project Phases

In this Project the Framework solved the issues from Case Study 3 where the activities were slightly modified, disrupting the alignment among activities to pursue the objective of the project. The activities in Case Study 4 were split into: planning and brief development, data collection, data decoding and opportunity mapping. From this project on, the Stages and Activities of the Framework would be static and only the methods and tools changed.

Activity 1: Planning and Brief Development:

The first phase of the case study focused on establishing the definition of the problem and developing the project brief accordingly, which included the scope, approach, timings, team members, activities, research methodology and budget. Once the brief was clear, the team carried out the same method as in the other case studies, determining the focus, goals, issues and context of this specific project. This method highlighted some issues that were added to the Research Questions Framework, in which the team used the 5WH tool to map the general questions that this project brought up. Finally, the last method of this activity was the Research Questions generation in which the team established all the relevant questions of the project that needed to be answered in order to achieve the objectives.



5WH Setting Questions
The Model

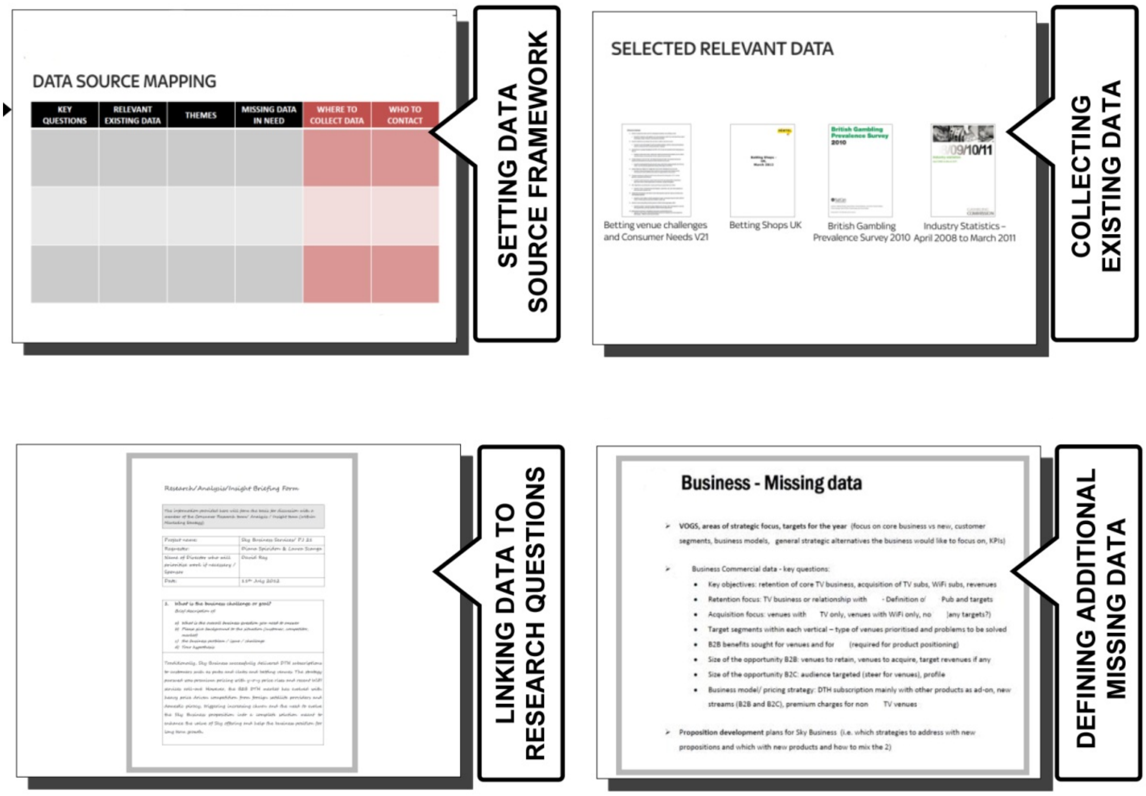
5WH	Questions to Start
WHAT	What are our current known issues? What are our current understanding and knowledge of those issues? What are our current gaps in knowledge? What data/ information is essential to our project? What internal data / information and support can we make use of? What are our next steps?
HOW	How will we collect this data/ information? How will we analyse & decode data and synthesise the emerging issues?
WHERE	Where will we collect the data/ information?
WHO	Who will collect the data/ information?
WHEN	How long will it take to verify issues?

Figure 45 Planning and Brief Development Activity

Activity 2: Data Collection:

Once the questions were established and the team of eight members was split into four teams of two people. Each team was assigned to one of the four core themes identified.

In order to answer the research questions, a data source framework was created to help identify where the information could be found. Each team started gathering data that belonged to their theme. The information was sought both internally and externally from the corporation (see Figure 46). Once all the data was gathered, teams came together again and started linking the data back to the research questions, establishing a set of valuable new information for achieving the objectives of the project. However, some questions were not answered so the team defined the additional missing data that needed to be collected and acted accordingly.



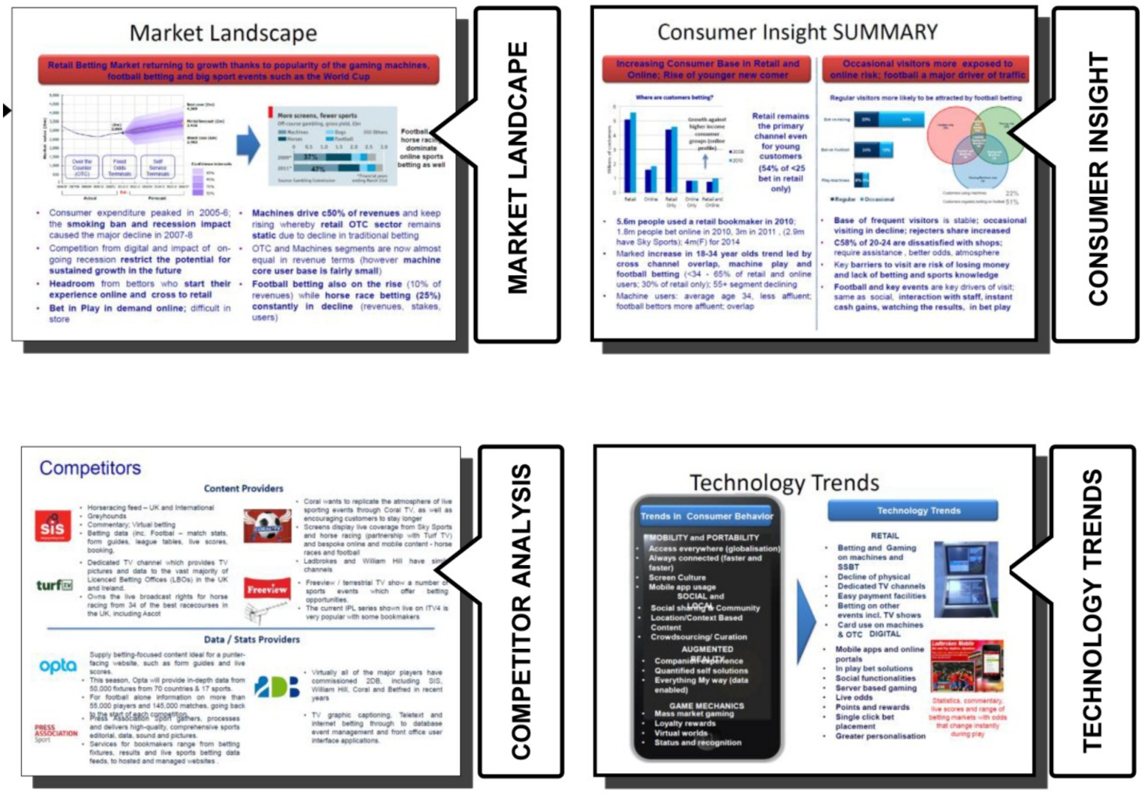
Business - Missing data

- **VOGS, areas of strategic focus, targets for the year** (focus on core business vs new, customer segments, business models, general strategic alternatives the business would like to focus on, KPIs)
- Business Commercial data - key questions:
  - Key objectives: retention of core TV business, acquisition of TV subs, WiFi subs, revenues
  - Retention focus: TV business or relationship with - Definition of Pub and targets
  - Acquisition focus: venues with TV only, venues with WiFi only, no (any targets?)
  - Target segments within each vertical – type of venues prioritised and problems to be solved
  - B2B benefits sought for venues and for (required for product positioning)
  - Size of the opportunity B2B: venues to retain, venues to acquire, target revenues if any
  - Size of the opportunity B2C: audience targeted (steer for venues), profile
  - Business model/ pricing strategy: DTH subscription mainly with other products as ad-on, new streams (B2B and B2C), premium charges for non TV venues
- **Proposition development** plans for Sky Business (i.e. which strategies to address with new propositions and which with new products and how to mix the 2)

Figure 46 Data Collection Activity

Activity 3: Data Decoding:

The third activity, Data Decoding, triggered the analysis and decoding of the previously gathered information. It was split and summarized into four key areas: market landscape, consumer insights, competitor analysis and technology trends (see Figure 47). These four categories had been chosen during the Activity 1, Planning and Brief Development. This holistic understanding of the factors involved in the project became the base for the opportunity mapping stage.



Market Landscape

Retail Betting Market returning to growth thanks to popularity of the gaming machines, football betting and big sport events such as the World Cup

More screens, fewer sports

Football, horse racing dominate online sports betting as well

- Consumer expenditure peaked in 2005-6; the **smoking ban and recession impact** caused the major decline in 2007-8
- Competition from digital and impact of on-going recession **restrict the potential for sustained growth in the future**
- **Headroom** from bettors who **start their experience online and cross to retail**
- **Bet in Play in demand online;** difficult in store
- **Machines drive c50% of revenues** and keep rising whereby **retail OTC sector** remains **static** due to decline in traditional betting
- OTC and Machines segments are now almost equal in revenue terms (however **machine core user base is fairly small**)
- **Football betting also on the rise** (10% of revenues) while **horse race betting (25%) constantly in decline** (revenues, stakes, users)

Consumer Insight SUMMARY

Increasing Consumer Base in Retail and Online; Rise of younger new comer

Where are customers betting?

Retail remains the primary channel even for young customers (54% of <25 bet in retail only)

- **5.6m people used a retail bookmaker in 2010;** 1.8m people bet online in 2010, 3m in 2011 , (2.9m have Sky Sports); 4m(F) for 2014
- Marked **increase in 18-34 year olds trend led by cross channel overlap, machine play and football betting** (<34 - 65% of retail and online users; 30% of retail only); **55+ segment declining**
- Machine users: average age 34, less affluent; football bettors more affluent; overlap

Occasional visitors more exposed to online risk; football a major driver of traffic

Regular visitors more likely to be attracted by football betting

- **Base of frequent visitors is stable; occasional visiting in decline; rejecters share increased**
- **C58% of 20-24 are dissatisfied with shops;** require assistance , better odds, atmosphere
- Key **barriers to visit are risk of losing money and lack of betting and sports knowledge**
- **Football and key events** are key drivers of visit; **same as social, interaction with staff, instant cash gains, watching the results, in bet play**

Competitors

Content Providers

- Horseracing feed – UK and International
- Greyhounds
- Commentary; Virtual betting
- Betting data (inc. Footbal – match stats, form guides, league tables, live scores, booking.
- Dedicated TV channel which provides TV pictures and data to the vast majority of Licenced Betting Offices (LBOs) in the UK and Ireland.
- Owns the live broadcast rights for horse racing from 34 of the best racecourses in the UK, including Ascot
- Coral wants to replicate the atmosphere of live sporting events through Coral TV, as well as encouraging customers to stay longer
- Screens display live coverage from Sky Sports and horse racing (partnership with Turf TV) and bespoke online and mobile content - horse races and football
- Ladbrokes and William Hill have similar channels
- Freeview / terrestrial TV show a number of sports events which offer betting opportunities.
- The current IPL series shown live on ITV4 is very popular with some bookmakers

Data / Stats Providers

Supply betting-focused content ideal for a punter-facing website, such as form guides and live scores.
- This season, Opta will provide in-depth data from 50,000 fixtures from 70 countries & 17 sports.
- For football alone information on more than 55,000 players and 145,000 matches, going back to the start of each competition.
- Press Association Sport gathers, processes and delivers high-quality, comprehensive sports editorial, data, sound and pictures.
- Services for bookmakers range from betting fixtures, results and live sports betting data feeds, to hosted and managed websites .
- Virtually all of the major players have commissioned 2DB, including SIS, William Hill, Coral and Betfred in recent years
- TV graphic captioning, Teletext and internet betting through to database event management and front office user interface applications.

Technology Trends

Trends in Consumer Behavior

MOBILITY and PORTABILITY
- Access everywhere (globalisation)
- Always connected (faster and faster)
- Screen Culture
- Mobile app usage

SOCIAL and LOCAL
- Social sharing & Community
- Location/Context Based Content
- Crowdsourcing/ Curation

AUGMENTED REALITY
- Companion experience
- Quantified self solutions
- Everything My way (data enabled)

GAME MECHANICS
- Mass market gaming
- Loyalty rewards
- Virtual worlds
- Status and recognition

Technology Trends

RETAIL
- Betting and Gaming on machines and SSBT
- Decline of physical
- Dedicated TV channels
- Easy payment facilities
- Betting on other events incl. TV shows
- Card use on machines & OTC

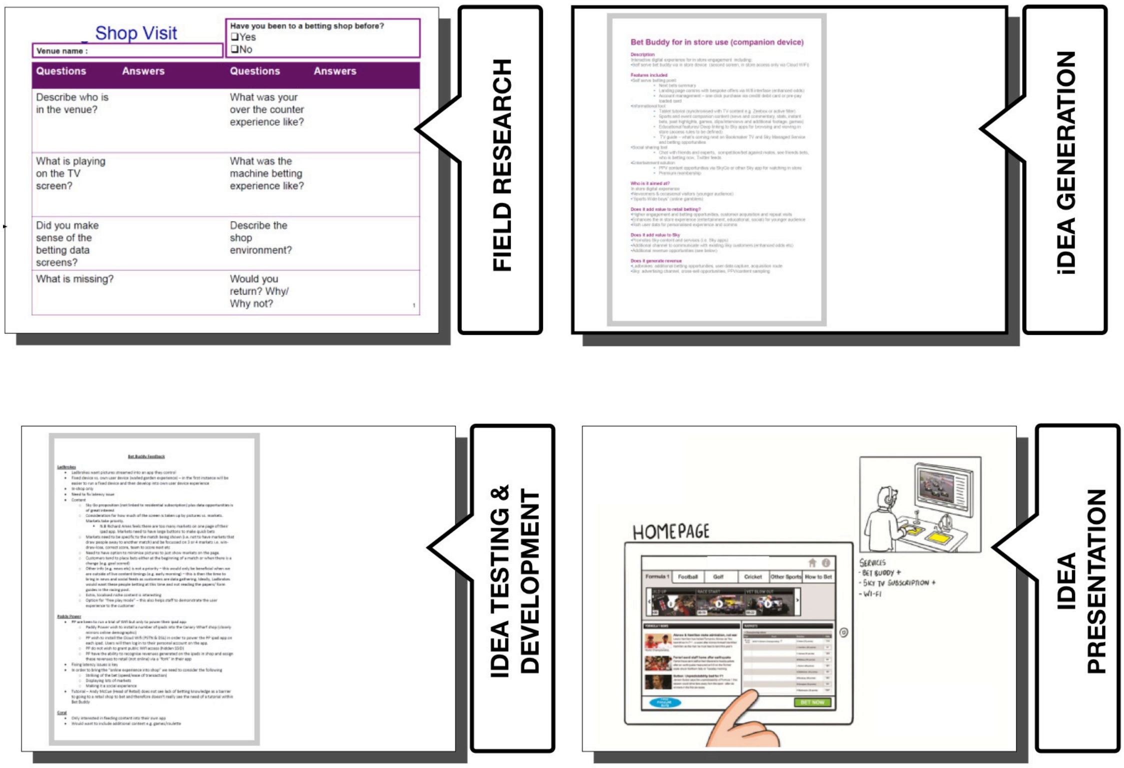
DIGITAL
- Mobile apps and online portals
- In play bet solutions
- Social functionalities
- Server based gaming
- Live odds
- Points and rewards
- Single click bet placement
- Greater personalisation

Statistics, commentary, live scores and range of betting markets with odds that change instantly during play

Figure 47, Data Decoding Activity

Activity 4: Opportunity Mapping:

The fourth activity, the Opportunity Mapping, focused on the generation of ideas for future product opportunities. The main focus of this activity was the Generation of Ideas that were novel, feasible, relevant to consumers and aligned to business strategy. Before holding the idea generation session, the project leader organized a field research activity to visit some of the locations and businesses they were going to generate ideas for. The objective of this method was for participants to feel the experience in those places and understand the ways things worked there, however, this specific method would be usually carried out during the Data Collection stage, where it could have created additional input for the entire team. Participants were all given a visual template in which they recorded the information from each location. They had eight questions to answer (number of people in the place, description of the place environment). Once completed, they came back to Company A, they immersed themselves in the Idea Generation Session. At the end of the session, the participants and a third partner of Company A validated the ideas. They consensually selected an idea that represented the clearest business opportunity. The next step was to test the idea by interviewing the partner's customers. Their feedback was used to develop the idea further. The outcome from this Case Study was a well-developed Idea that represented a competitive market opportunity for Company A (see Figure 48).



Shop Visit

Venue name :

Have you been to a betting shop before?
☐Yes
☐No

Questions	Answers	Questions	Answers
Describe who is in the venue?		What was your over the counter experience like?	
What is playing on the TV screen?		What was the machine betting experience like?	
Did you make sense of the betting data screens?		Describe the shop environment?	
What is missing?		Would you return? Why/ Why not?	

Bet Buddy for in store use (companion device)

Figure 48 Opportunity Mapping Activity

7. Idea Generation Session Characteristics

Session Objectives

The objective of this session was to generate a series of quality ideas to activate a 3-5 year roadmap of a certain department within Company A.

Workshop Participants

There were ten participants in the idea generation session. They belonged to very diverse departments within the organization: marketing, strategy, finance and new product development.

Idea Generation Techniques

The idea generation session followed a nominal brainstorming methodology, as it had consistently shown the benefits of iterative idea generation on idea quality in previous case studies. This idea generation technique was combined with a series of bespoke visual templates for recording of ideas and location visits.

This time the participants of the session were a multidisciplinary team of ten people. An employee in the organisation carried out the facilitation of the session in order to explore if someone who was not the researcher of the project could develop how the Framework and the Idea Generation Session ran with a non-expert facilitator.

Type of Team	Multidisciplinary
Number of Participants	10 participants
Facilitation	Internal from organization
Timing	Half a day
Type of process	Experiential
Idea Generation Techniques	Nominal Brainstorming
Idea Generation Tools	Visual Templates for idea recording and visual templates from ethnography location visits

Table 46 Idea Generation Session Characteristics

Session Activities

As stated previously, prior to starting the idea generation session, a preliminary activity was undertaken involving visiting the partners' facilities to understand the experience customers typically receive. This provided a rich insight that was key to trigger the idea generation session.

The activity generated a comprehensive overview of the four key areas previously analysed by the project leader: competitor landscape and competitor analysis, consumer insights and technology trends. Ideas were then generated individually, based on their own experience, and then pulled together in order to combined and or developed. At the end of the session ideas were shared with the whole group with ones that fulfilled the selection criteria being selected for further development.

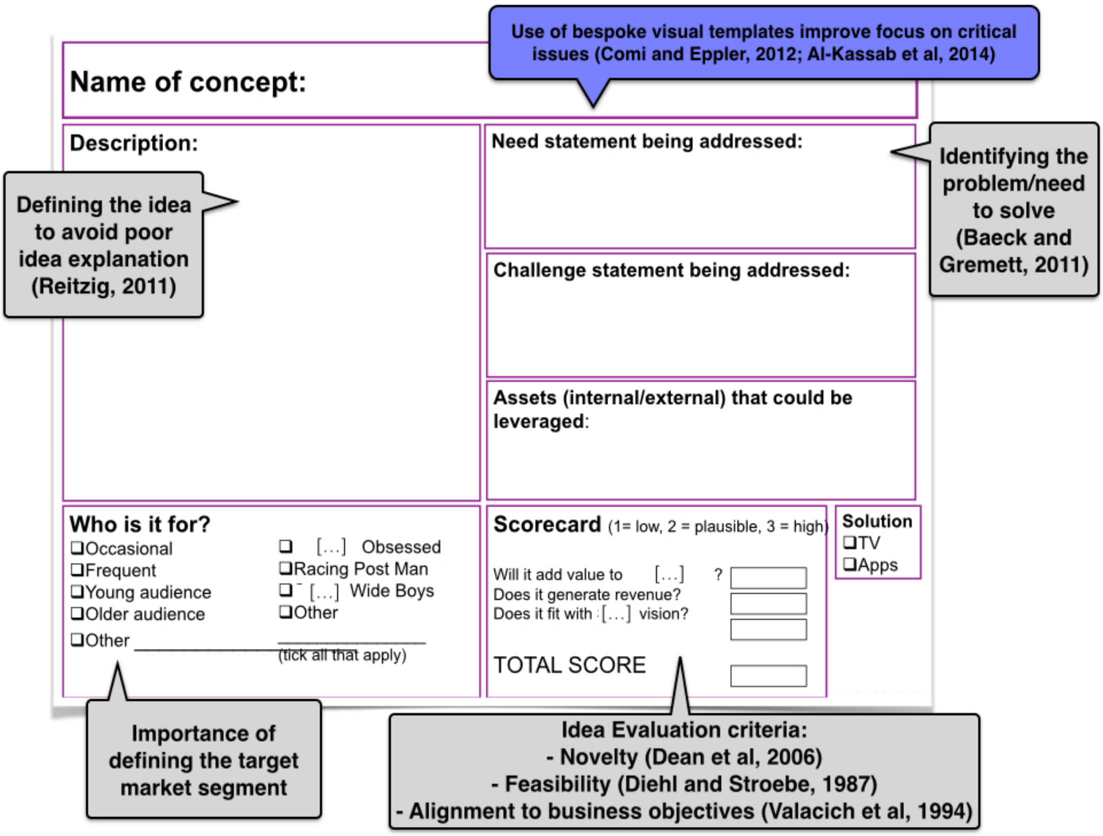
The selected ideas were taken to a Company A's partner to get their input, in the form of a concept testing, to determine the winning idea to move forward.

Session Tools

The visual template for this project was designed to answer some of the key questions of the project in order to determine how the idea could target them. It had two key areas that were most relevant. This template focused specifically on the target segment so a checklist was designed to make participants clear those were the potential customers they were ideating for.

There was a section in the template that aimed at targeting the assets that could be leveraged through the idea both internally and externally, promoting precise thinking on the market and business opportunity of the idea. This section aimed to enable participants to generate ideas that would be aligned with the company's business objectives.

The purpose of the bespoke visual template (see Figure 49) was to help rigorously define the ideas in order to strengthen them, avoiding out of scope. It also pointed out the problem being solved so participants focused on the need. Thirdly, the idea evaluation criteria were embedded into the visual template in order to critically evaluate each idea. Finally, the visual template also enabled the segmentation the idea was targeted to in order to visualise who would be the idea relevant to.



Use of bespoke visual templates improve focus on critical issues (Comi and Eppler, 2012; Al-Kassab et al, 2014)

Name of concept:

Description:

Defining the idea to avoid poor idea explanation (Reitzig, 2011)

Need statement being addressed:

Identifying the problem/need to solve (Baeck and Gremett, 2011)

Challenge statement being addressed:

Assets (internal/external) that could be leveraged:

Who is it for?

☐Occasional
☐Frequent
☐Young audience
☐Older audience
☐Other ____________________
☐ [...] Obsessed
☐Racing Post Man
☐ [...] Wide Boys
☐Other
____
(tick all that apply)

Scorecard (1= low, 2 = plausible, 3 = high)

Will it add value to [...] ? ☐
Does it generate revenue? ☐
Does it fit with [...] vision? ☐

TOTAL SCORE ☐

Solution

☐TV
☐Apps

Importance of defining the target market segment

Idea Evaluation criteria:
- Novelty (Dean et al, 2006)
- Feasibility (Diehl and Stroebe, 1987)
- Alignment to business objectives (Valacich et al, 1994)

Figure 49: Template example

8. Evaluation criteria

The Idea Evaluation criteria in Case Study 4, within the Main Study, followed the same format as in Case Study 3: (1) Novelty (Dean et al, 2006); (2) Feasibility (Diehl and

Stroebe, 1987); and (3) Alignment to business objectives (Valacich et al., 1994). In this occasion, the evaluation criteria sought to identify the potential of ideas to drive new business opportunities.

9. Idea Generation Session Outcomes

The outcomes from the session were a series of product opportunity ideas to feed into the pipeline for third parties and new potential businesses. There was also a new product and proposition roadmap as well as a product strategy in that area of the business.

10. Key Learnings

There were three key learnings from the idea generation session. The first, that participants considered the market overview at the beginning of the session very helpful. The second, that the location visits helped to understand the context of the project in a deeper way and resulted in more concrete ideas. The third key learning was that the structure and activities of the idea generation session were conceived very different from previous projects, which increased the motivation levels of participants.

There were five key learning's derived from the process used in Case Study 4: (1) When generating ideas teams should take into account the target market and the need for that idea. If there is not a clear opportunity the idea will be destined to fail; (2) There is a needs for clear success criteria for workshops/ ideas; (3) The process can be used as a repeatable procedure due to the excellent linkage among methods helping create a coherent process; (4) Multidisciplinary teams improve idea generation sessions by offering a different perspectives on issues that help build more comprehensive ideas; and (5) A committed project leader has a positive impact on keeping actions on track, on time and enhances the performance of the entire team.

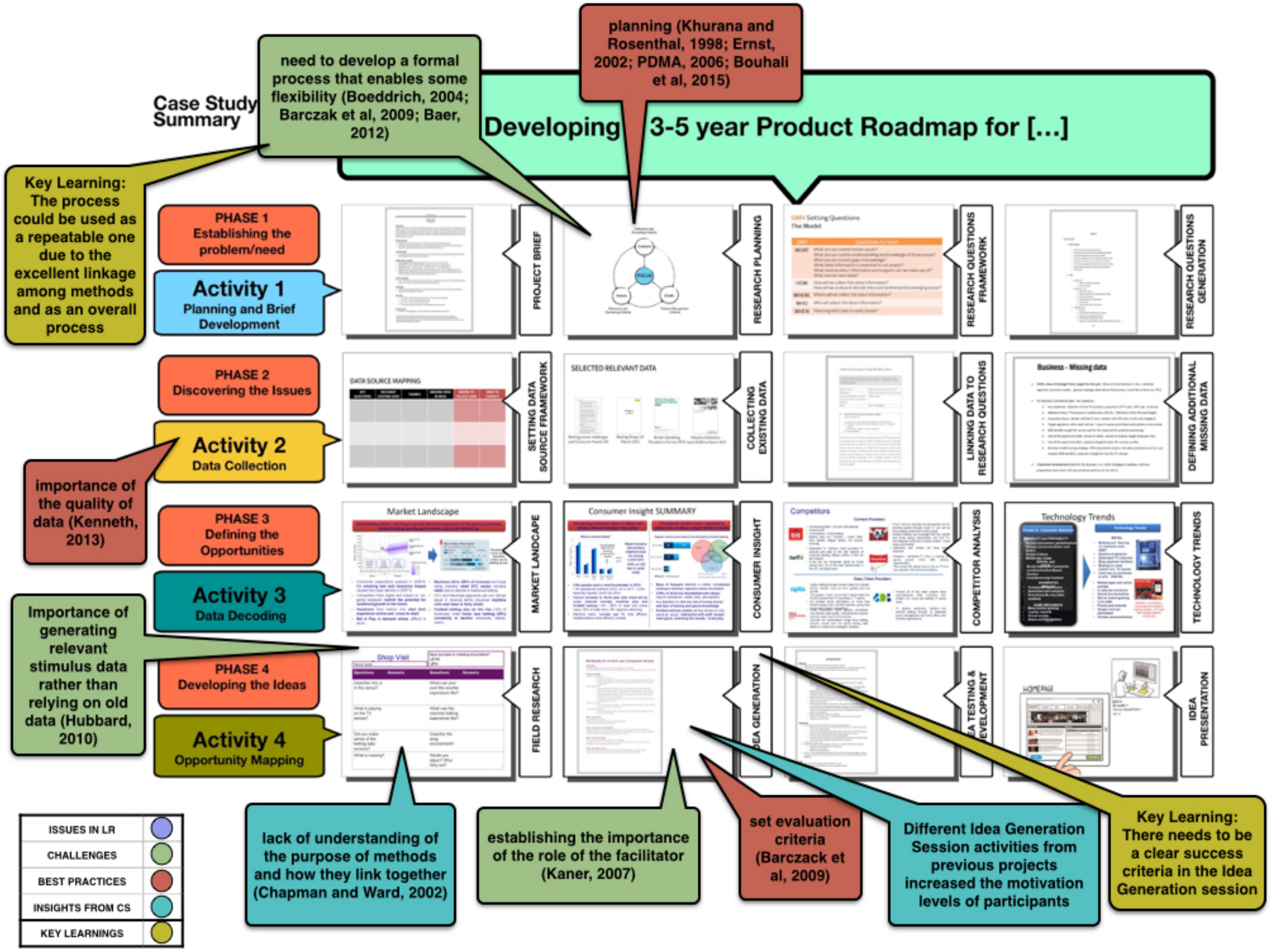
Case study 4 highlighted the need to establish clear evaluation criteria in workshops to drive critical thinking of ideas in that direction. It also showed project participants were still not clear about the value and purpose of activities and methods used, suggesting there was still a need to refine the Framework.

	MAIN STUDY Case Study 4 Company A
Purpose	The research objectives of case study 4 focussed on increasing the complexity of issues and activities focussed upon. The objectives focussed upon determining how the use of (a) innovation framework; (b) innovation templates; (c) idea quality criteria (d) internal and external research collection and analysis; (e) use of specific analytical and mapping tools; (f) field work and (g) use of idea generation techniques would impact on: (1) defining the issues that needed to be addressed; (2) facilitating idea generation; and (3) improving idea quality; and (4) idea selection.
Type of Project	The project focussed on the **generation of ideas to increase new business opportunities**. The main emphasis was on creating and developing a 3 to 5 year product roadmap to increase new business opportunities with a range of third parties.
Practises	Project brief, 5WH, Research Questions Framework, internal and external research collection and analysis, market landscape, consumer, competitor and technology trends mapping. Fieldwork visits, nominal brainstorming
Scoping Tools used	The innovation framework, innovation templates and idea quality criteria helped to promote precise thinking on three issues: (1) the market, (2) target segment and (3) business opportunity of the idea. The quality of data helped to create meaningful stimulus data and determine key issues for IG by turning a large quantity of data into a series of insights, trends and target segments. However, this project suggested the relevancy and importance of the role of the facilitator to guide critical thinking, manage the scope and focus of the IG session through the scoping tools.
Key Learnings	This Case Study showed the benefits of clear success criteria to trigger focused ideas and proper facilitation to generate quality ideas by guiding critical thinking and defining the scope of the project.

Table 47 Main Study Case Study 4 Review Framework

OVERALL VIEW OF PROCESS, PRACTICES AND TOOLS

Figure 50 visualises Case Study 4's core issues and at which point they took place. In terms of challenges, this case study highlighted the need for a formal process not overly systematic that enables some flexibility and the inability to understand the importance of the role of the facilitator. Secondly, it also draws attention to key emergent insights, specifically the lack of understanding of the purpose of activities, how they link together and how the use of different activities in the idea generation session increased the motivation in the Idea Generation session. Finally, it also shows two key learnings from the study: (1) the need for idea evaluation criteria to evaluate all ideas against and (2) the repeatability of the process in a wide range of challenges in FEI projects.



Case Study Summary

Developing 3-5 year Product Roadmap for [...]

need to develop a formal process that enables some flexibility (Boeddrich, 2004; Barczak et al, 2009; Baer, 2012)

planning (Khurana and Rosenthal, 1998; Ernst, 2002; PDMA, 2006; Bouhali et al, 2015)

Key Learning: The process could be used as a repeatable one due to the excellent linkage among methods and as an overall process

PHASE 1 Establishing the problem/need

Activity 1 Planning and Brief Development

PHASE 2 Discovering the Issues

Activity 2 Data Collection

importance of the quality of data (Kenneth, 2013)

PHASE 3 Defining the Opportunities

Activity 3 Data Decoding

Importance of generating relevant stimulus data rather than relying on old data (Hubbard, 2010)

PHASE 4 Developing the Ideas

Activity 4 Opportunity Mapping

lack of understanding of the purpose of methods and how they link together (Chapman and Ward, 2002)

establishing the importance of the role of the facilitator (Kaner, 2007)

set evaluation criteria (Barczack et al, 2009)

Different Idea Generation Session activities from previous projects increased the motivation levels of participants

Key Learning: There needs to be a clear success criteria in the Idea Generation session

ISSUES IN LR	●
CHALLENGES	●
BEST PRACTICES	●
INSIGHTS FROM CS	●
KEY LEARNINGS	●

Figure 50, Case Study 4 Summary

Case Study Summary

Developing a 3-5 year Product Roadmap for the [...]

PHASE 1
Establishing the problem/need

Activity 1
Planning and Brief Development

PHASE 2
Discovering the Issues

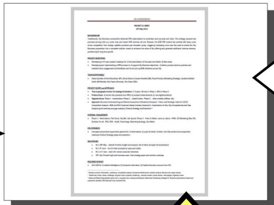
Activity 2
Data Collection

PHASE 3
Defining the Opportunities

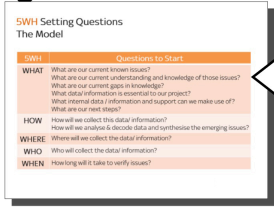
Activity 3
Data Decoding

PHASE 4
Developing the Ideas

Activity 4
Opportunity Mapping

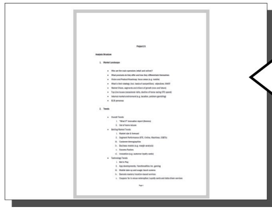

PROJECT BRIEF

DATA COLLECTION
10- 15 days, reflection at the same time
5- 6meetings
Collaborative process

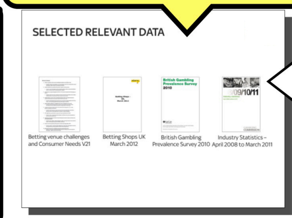

5WH Setting Questions
The Model

5WH	Questions to Start
WHAT	What are our current known issues? What are our current understanding and knowledge of those issues? What are our current gaps in knowledge? What data/ information is essential to our project? What internal data / information and support can we make use of? What are our next steps?
HOW	How will we collect this data/ information? How will we analyse & decode data and synthesise the emerging issues?
WHERE	Where will we collect the data/ information?
WHO	Who will collect the data/ information?
WHEN	How long will it take to verify issues?

RESEARCH QUESTIONS FRAMEWORK

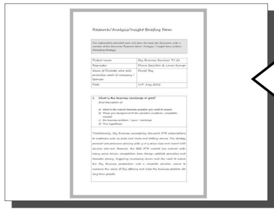

RESEARCH QUESTIONS GENERATION

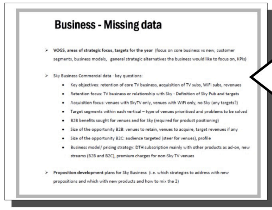
PROJECT PLANNING
5 days, reflection at the same time
3- 4 meetings
Collaborative process


SELECTED RELEVANT DATA

Betting venue challenges and Consumer Needs V21
Betting Shops UK March 2012
British Gambling Prevalence Survey 2010
Industry Statistics – April 2008 to March 2011

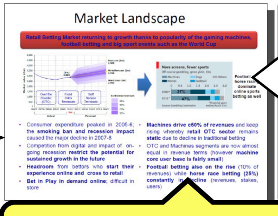
COLLECTING EXISTING DATA


LINKING DATA TO RESEARCH QUESTIONS


Business - Missing data

- **VOGS, areas of strategic focus, targets for the year** (focus on core business vs new, customer segments, business models, general strategic alternatives the business would like to focus on, KPIs)
- Sky Business Commercial data - key questions:
  - Key objectives: retention of core TV business, acquisition of TV subs, WiFi subs, revenues
  - Retention focus: TV business or relationship with Sky - Definition of Sky Pub and targets
  - Acquisition focus: venues with SkyTV only, venues with WiFi only, no Sky (any targets?)
  - Target segments within each vertical – type of venues prioritised and problems to be solved
  - B2B benefits sought for venues and for Sky (required for product positioning)
  - Size of the opportunity B2B: venues to retain, venues to acquire, target revenues if any
  - Size of the opportunity B2C: audience targeted (steer for venues), profile
  - Business model/ pricing strategy: DTH subscription mainly with other products as ad-on, new streams (B2B and B2C), premium charges for non-Sky TV venues
- **Proposition development** plans for Sky Business (i.e. which strategies to address with new propositions and which with new products and how to mix the 2)

DEFINING ADDITIONAL MISSING DATA


Market Landscape

Retail Betting Market returning to growth thanks to popularity of the gaming machines, football betting and big sport events such as the World Cup

- Consumer expenditure peaked in 2005-6; the **smoking ban and recession impact** caused the major decline in 2007-8
- Competition from digital and impact of on-going recession **restrict the potential for sustained growth in the future**
- **Headroom** from bettors who **start their experience online and cross to retail**
- **Bet in Play in demand online;** difficult in store
- **Machines drive c50% of revenues** and keep rising whereby **retail OTC sector** remains **static** due to decline in traditional betting
- OTC and Machines segments are now almost equal in revenue terms (however **machine core user base is fairly small**)
- **Football betting also on the rise** (10% of revenues) while **horse race betting (25%) constantly in decline** (revenues, stakes, users)

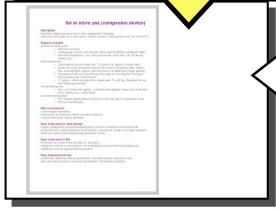
MARKET LANDCAPE

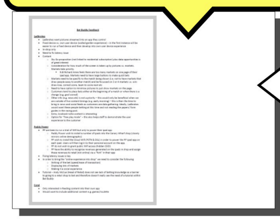
IDEA GENERATION
1 day
2 day reflection
1 meetings
Collaborative process

IDEA DEVELOPMENT
1 days
1 day reflection
2 meetings
Collaborative process

IDEA PRESENTATION
2 days
2 review meetings
Collaborative process

DATA ANALYSIS
5- 10 days, reflection at the same time
meetings
Collaborative process


iDEA GENERATION


IDEA TESTING & DEVELOPMENT

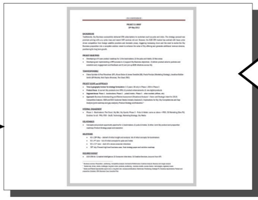
IDEA PRESENTATION

Case Study Summary

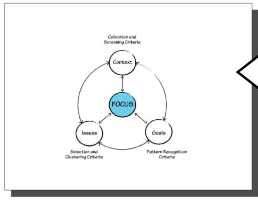
Developing a 3-5 year Product Roadmap for the [...]

PHASE 1
Establishing the problem/need

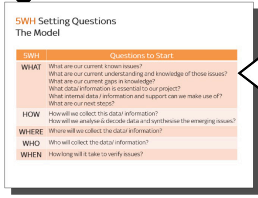
Activity 1
Planning and Brief Development



PROJECT BRIEF



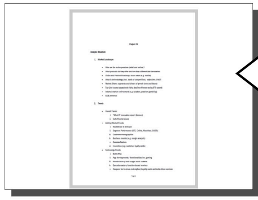
RESEARCH PLANNING



5WH Setting Questions
The Model

5WH	Questions to Start
WHAT	What are our current known issues? What are our current understanding and knowledge of those issues? What are our current gaps in knowledge? What data/ information is essential to our project? What internal data / information and support can we make use of? What are our next steps?
HOW	How will we collect this data/ information? How will we analyse & decode data and synthesise the emerging issues?
WHERE	Where will we collect the data/ information?
WHO	Who will collect the data/ information?
WHEN	How long will it take to verify issues?

RESEARCH QUESTIONS FRAMEWORK



RESEARCH QUESTION GENERATION

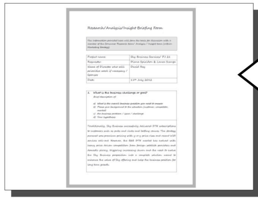
PHASE 2
Discovering the Issues

Activity 2
Data Collection

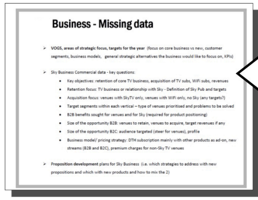
DATA SOURCE MAPPING

SELECTED RELEVANT DATA

VALUE
From phase 1 and 2 deliverable, work has be used to
•Clearly setting up and refine research questions
•Link data to research questions
•Drive a deep understanding on consumer needs & attitudes & motivations, competitors, technology trends and landscape of current UK [...] market
•To inspire identification of new opportunities for Company A business to explore in retail marketing



LINKING DATA TO RESEARCH QUESTIONS



Business - Missing data

- VOGS, areas of strategic focus, targets for the year (focus on core business vs new, customer segments, business models, general strategic alternatives the business would like to focus on, KPIs)
- Sky Business Commercial data - key questions:
  - Key objectives: retention of core TV business, acquisition of TV subs, WiFi subs, revenues
  - Retention focus: TV business or relationship with Sky - Definition of Sky Pub and targets
  - Acquisition focus: venues with SkyTV only, venues with WiFi only, no Sky (any targets?)
  - Target segments within each vertical – type of venues prioritised and problems to be solved
  - B2B benefits sought for venues and for Sky (required for product positioning)
  - Size of the opportunity B2B: venues to retain, venues to acquire, target revenues if any
  - Size of the opportunity B2C: audience targeted (steer for venues), profile
  - Business model/ pricing strategy: DTH subscription mainly with other products as ad-on, new streams (B2B and B2C), premium charges for non-Sky TV venues
- Proposition development plans for Sky Business (i.e. which strategies to address with new propositions and which with new products and how to mix the 2)

DEFINING ADDITIONAL MISSING DATA

PHASE 3
Defining the Opportunities

Activity 3
Data Decoding

Competitors

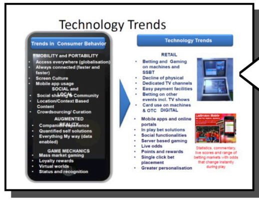
Content Providers

- Horseracing feed – UK and international
- Greyhounds
- Commentary; Virtual betting
- Betting data (inc. Footbal – match stats, form guides, league tables, live scores, booking.
- Dedicated TV channel which provides TV pictures and data to the vast majority of Licenced Betting Offices (LBOs) in the UK and Ireland.
- Owns the live broadcast rights for horse racing from 34 of the best racecourses in the UK, including Ascot
- Coral wants to replicate the atmosphere of live sporting events through Coral TV, as well as encouraging customers to stay longer
- Screens display live coverage from Sky Sports and horse racing (partnership with Turf TV) and bespoke online and mobile content - horse races and football
- Ladbrokes and William Hill have simi channels
- Freeview / terrestrial TV show a number of sports events which offer betting opportunities.
- The current IPL series shown live on ITV4 is very popular with some bookmakers

Data / Stats Providers

Supply betting-focused content ideal for a punter-facing website, such as form guides and live scores.
- This season, Opta will provide in-depth data from 50,000 fixtures from 70 countries & 17 sports.
- For football alone information on more than 55,000 players and 145,000 matches, going back to the start of each competition.
- Press Association Sport gathers, processes and delivers high-quality, comprehensive sports editorial, data, sound and pictures.
- Services for bookmakers range from betting fixtures, results and live sports betting data feeds, to hosted and managed websites .
- Virtually all of the major players have commissioned 2DB, including SIS, William Hill, Coral and Betfred in recent years
- TV graphic captioning, Teletext and internet betting through to database event management and front office user interface applications.

COMPETITOR ANALYSIS



Technology Trends

Trends in Consumer Behavior

MOBILITY and PORTABILITY
- Access everywhere (globalisation)
- Always connected (faster and faster)
- Screen Culture
- Mobile app usage

SOCIAL and LOCAL
- Social sharing & Community
- Location/Context Based Content
- Crowdsourcing/ Curation

AUGMENTED REALITY
- Companion experience
- Quantified self solutions
- Everything My way (data enabled)

GAME MECHANICS
- Mass market gaming
- Loyalty rewards
- Virtual worlds
- Status and recognition

Technology Trends

RETAIL
- Betting and Gaming on machines and SSBT
- Decline of physical
- Dedicated TV channels
- Easy payment facilities
- Betting on other events incl. TV shows
- Card use on machines & OTC

DIGITAL
- Mobile apps and online portals
- In play bet solutions
- Social functionalities
- Server based gaming
- Live odds
- Points and rewards
- Single click bet placement
- Greater personalisation

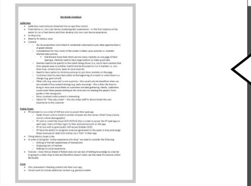
Statistics, commentary, live scores and range of betting markets with odds that change instantly during play

TECHNOLOGY TRENDS

PHASE 4
Developing the Ideas

Activity 4
Opportunity Mapping

VALUE
From phase 3 deliverable, work has been used to
• Highlight the concept and present concepts to external & internal partners
• Input for further product development



IDEA TESTING & DEVELOPMENT

IDEA PRESENTATION

3.3.5 Main Study- Case Study 5

1. Context:

This project served as a testing of Case Study 4 process. The context of the project was very similar to the previous one as it targeted a different set of external partners but sought to develop a value proposition that generated an increase in the revenue stream of Company A. Due to this fact, some of the activities were very similar to Case Study 4 although the topic and themes were bespoke to address the different needs of the project specifications. There was a latent need to develop a new strategy that could help Company A to leverage leadership in this area of the business because the subscription to Company A services was changing due to piracy and competitive prices, which was negatively impacting on their revenue.

2. Objective of the case study:

The objective of Case Study 5 centred on retesting and redeveloping: (a) innovation framework; (b) bespoke visual innovation templates; (c) an idea quality; (d) internal and external stimulus data; (e) idea generation techniques focussing on: (1) identifying and addressing project issues that need to be tackled; (2) facilitating idea generation sessions; (3) improving idea quality and (4) idea selection.

3. Main Study Case Study 5 Focus:

The focus of this project was to boost the idea roadmap for new products targeted from third partners.

4. Project team composition:

The core team in Case Study 5 were the same ones from the previous one. A key issue in this Case Study was that the project leader was the same one as in Case Study 4, whose purpose was to determine if the individual had really understood the applicability and repeatability of the process within different contexts. Allowing flexibility in methods but a clear fixed structure of Stages and Activities.

5. Research Objectives of the Main Study Case Study 5 project:

Case Study 4 informed this study by highlighting the need for a clear success criteria to trigger focused ideas. It also suggested the lack of understanding of the constructs to develop a good idea beyond following a given process. It also showed the benefits of facilitation in guiding critical thinking, keeping the focus and the scope of the project.

The research objective of this case study focussed on determining if the Framework could be used as a repeatable NPD process in different types of challenges and business objectives. It also aimed to determine the effectiveness of the framework when activating an innovation pipeline.

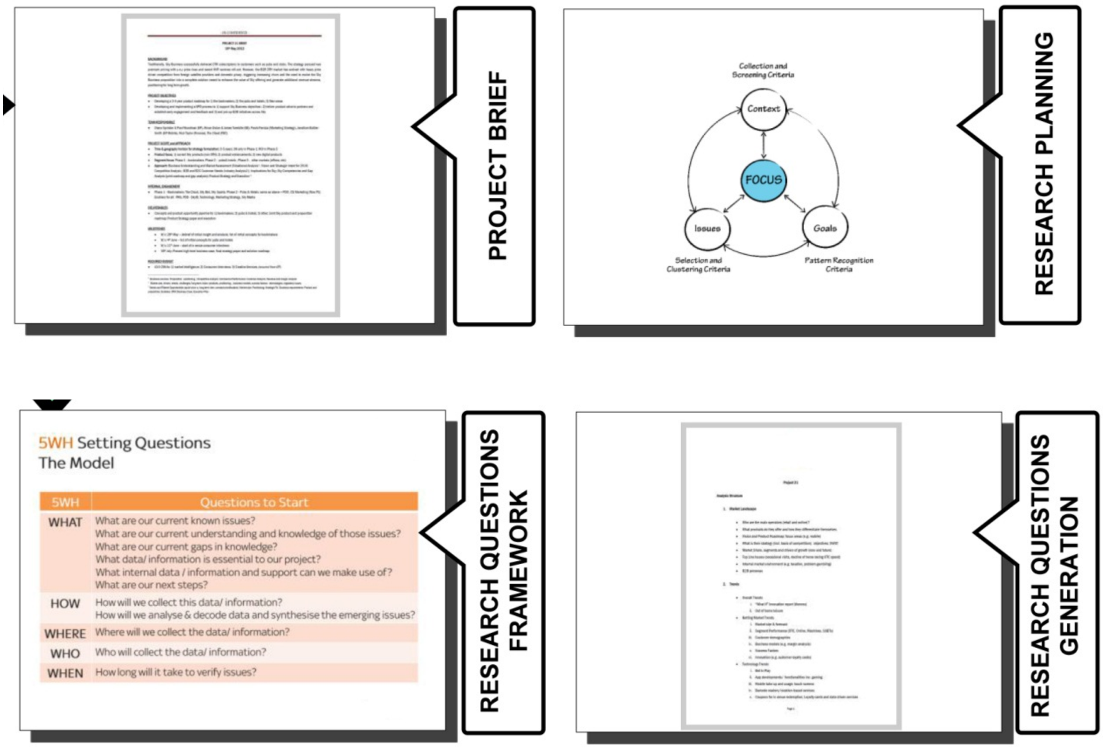
6. Main Study Case Study 5 Project Phases

CASE STUDY 5				
PHASES	PHASE 1: ESTABLISH	PHASE 2: DISCOVER	PHASE 3: DEFINE	PHASE 4: DEVELOP
ACTIVITIES	ACTIVITY 1: PLANNING & BRIEF DEVELOPMENT	ACTIVITY 2: DATA COLLECTION	ACTIVITY 3: DATA DECODING	ACTIVITY 4: OPPORTUNITY MAPPING
METHODS	Project Brief	Setting Data Source Framework	Market Landscape	Idea Template
	Research Planning	Collection of Existing Data	Consumer Insight Analysis	Idea Generation
	Research Questions Framework	Linking Data To Research Questions	Competitor Analysis	Idea Development
	Research Questions Generation	Defining Additional Missing Data	Technology Trends	Idea Presentation
TOOLS	Focusing Tool		Competitor Analysis Matrix	Nominal Brainstorming
	5WH		Technology Mapping	Visual Template
STIMULUS FOR IG	Visual Templates to Record Ideas & Technology/ Target Customer/ Market data			

This Case Study served to refine and determine the benefits and drawbacks of the process within a different context.

Activity 1: Planning and Brief Development:

This activity of the process concentrated on developing the project brief according to the problem that the project was trying to address. The team aimed to determine the most important issues in the project, as well as planning the activities to make sure all the team members were clear on what was required to be achieved. Once the Brief and the objective of the project were clear, research planning and the identification of focus, context, issues and goals of the project were pursued. As in Case Study 4, there was a research questions investigation (see Figure 51) to decide the key pieces of information that were crucial for this project, generating all the research questions that were relevant for this project.



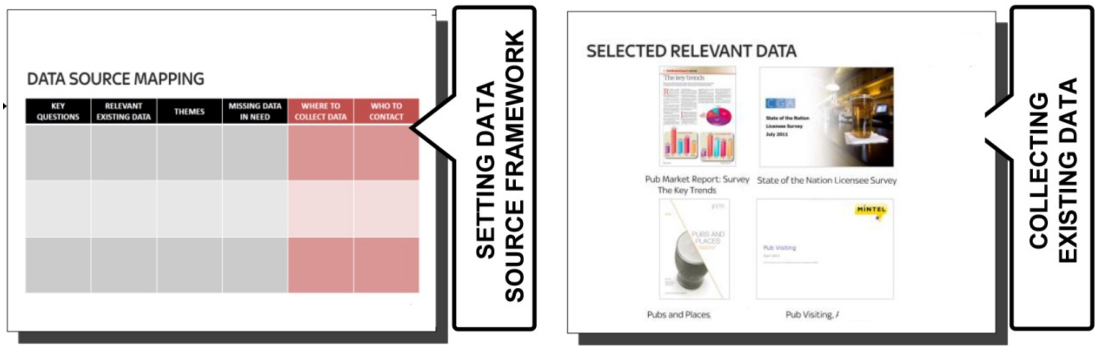
5WH Setting Questions
The Model

5WH	Questions to Start
WHAT	What are our current known issues? What are our current understanding and knowledge of those issues? What are our current gaps in knowledge? What data/ information is essential to our project? What internal data / information and support can we make use of? What are our next steps?
HOW	How will we collect this data/ information? How will we analyse & decode data and synthesise the emerging issues?
WHERE	Where will we collect the data/ information?
WHO	Who will collect the data/ information?
WHEN	How long will it take to verify issues?

Figure 51 Planning and Brief Development Activity

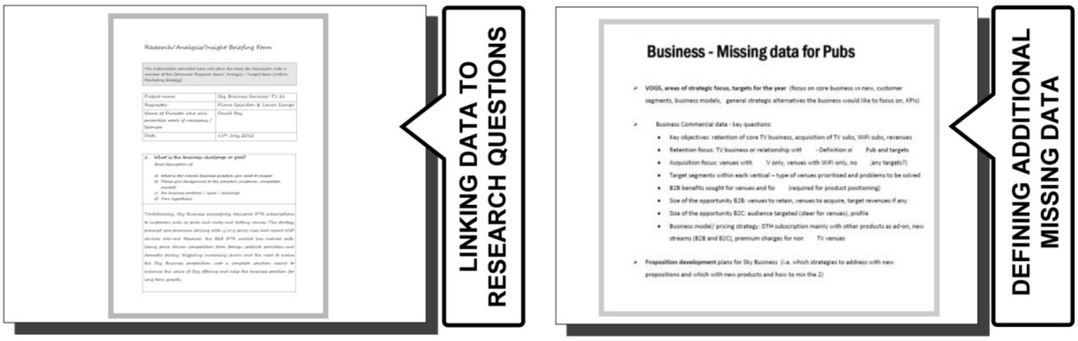
Activity 2: Data Collection:

The Data Collection for this project focused on looking for internal data to answer the research questions. The data from those reports was linked to the research questions, however, as in the previous case study, there were some questions whose answer could not being found, triggering a second set of data collection to address the missing data via desk research.



DATA SOURCE MAPPING

KEY QUESTIONS	RELEVANT EXISTING DATA	THEMES	MISSING DATA IN NEED	WHERE TO COLLECT DATA	WHO TO CONTACT



Research/Analysis/Insight Briefing Form

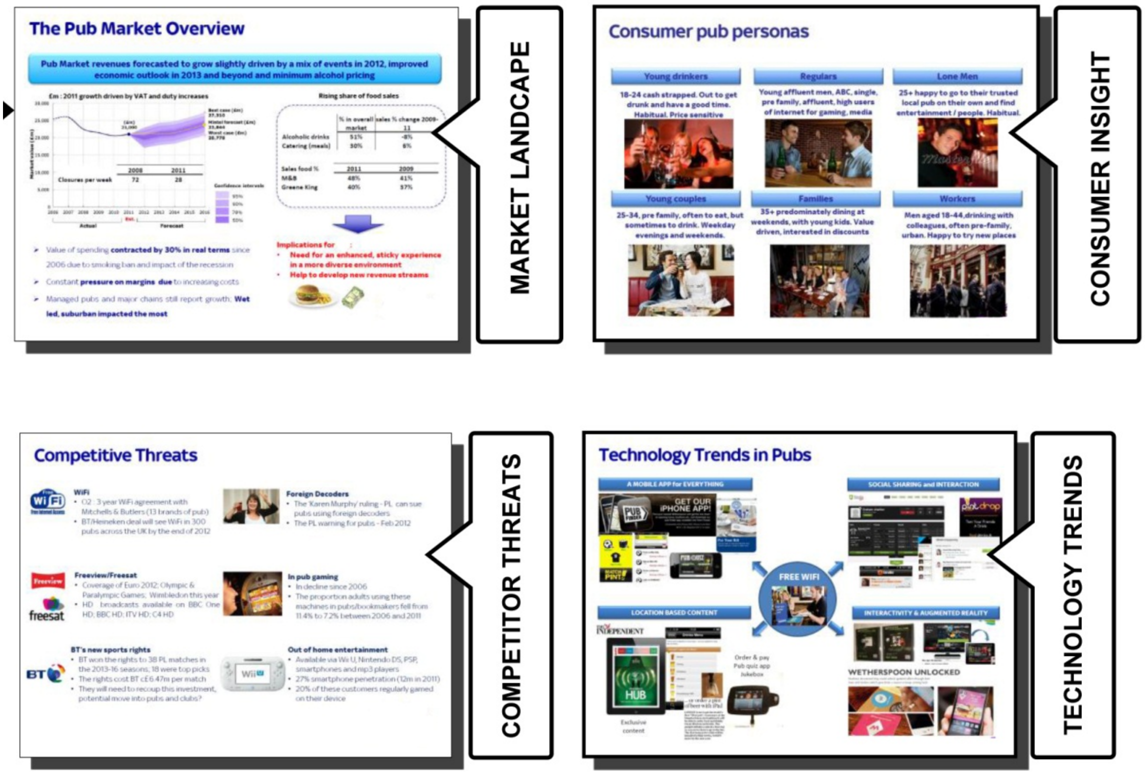
Business - Missing data for Pubs

- **VOGS, areas of strategic focus, targets for the year** (focus on core business vs new, customer segments, business models, general strategic alternatives the business would like to focus on, KPIs)
- Business Commercial data - key questions:
  - Key objectives: retention of core TV business, acquisition of TV subs, WiFi subs, revenues
  - Retention focus: TV business or relationship witl - Definition ol Pub and targets
  - Acquisition focus: venues with V only, venues with WiFi only, no (any targets?)
  - Target segments within each vertical – type of venues prioritised and problems to be solved
  - B2B benefits sought for venues and fo (required for product positioning)
  - Size of the opportunity B2B: venues to retain, venues to acquire, target revenues if any
  - Size of the opportunity B2C: audience targeted (steer for venues), profile
  - Business model/ pricing strategy: DTH subscription mainly with other products as ad-on, new streams (B2B and B2C), premium charges for non TV venues
- **Proposition development** plans for Sky Business (i.e. which strategies to address with new propositions and which with new products and how to mix the 2)

Figure 52 Data Collection Activity

Activity 3: Data Decoding:

In this activity of the study, data decoding was core to understand the meaning of all the previously gathered information. The key areas the data was mapped around were: market landscape, consumer insights, competitor threats and current technology trends impacting in this sector. In this Case Study it was very important to determine the technology trends and to distil the key insights that could trigger the Idea Generation Session.



The Pub Market Overview

Pub Market revenues forecasted to grow slightly driven by a mix of events in 2012, improved economic outlook in 2013 and beyond and minimum alcohol pricing

£m : 2011 growth driven by VAT and duty increases

	2008	2011
Closures per week	72	28

Rising share of food sales

	% in overall market	sales % change 2009-11
Alcoholic drinks	51%	-8%
Catering (meals)	30%	6%

Sales food %	2011	2009
M&B	48%	41%
Greene King	40%	37%

- Value of spending **contracted by 30% in real terms** since 2006 due to smoking ban and impact of the recession
- Constant **pressure on margins due** to increasing costs
- Managed pubs and major chains still report growth: **Wet led, suburban impacted the most**

Implications for :
- **Need for an enhanced, sticky experience in a more diverse environment**
- **Help to develop new revenue streams**

Consumer pub personas

Young drinkers	Regulars	Lone Men
18-24 cash strapped. Out to get drunk and have a good time. Habitual. Price sensitive	Young affluent men, ABC, single, pre family, affluent, high users of internet for gaming, media	25+ happy to go to their trusted local pub on their own and find entertainment / people. Habitual.
Young couples	**Families**	**Workers**
25-34, pre family, often to eat, but sometimes to drink. Weekday evenings and weekends.	35+ predominately dining at weekends, with young kids. Value driven, interested in discounts	Men aged 18-44,drinking with colleagues, often pre-family, urban. Happy to try new places

Competitive Threats

WiFi
- O2 : 3 year WiFi agreement with Mitchells & Butlers (13 brands of pub)
- BT/Heineken deal will see WiFi in 300 pubs across the UK by the end of 2012

Foreign Decoders
- The 'Karen Murphy' ruling - PL can sue pubs using foreign decoders
- The PL warning for pubs - Feb 2012

Freeview/Freesat
- Coverage of Euro 2012; Olympic & Paralympic Games; Wimbledon this year
- HD broadcasts available on BBC One HD; BBC HD; ITV HD; C4 HD

In pub gaming
- In decline since 2006
- The proportion adults using these machines in pubs/bookmakers fell from 11.4% to 7.2% between 2006 and 2011

BT's new sports rights
- BT won the rights to 38 PL matches in the 2013-16 seasons; 18 were top picks
- The rights cost BT c£6.47m per match
- They will need to recoup this investment, potential move into pubs and clubs?

Out of home entertainment
- Available via Wii U, Nintendo DS, PSP, smartphones and mp3 players
- 27% smartphone penetration (12m in 2011)
- 20% of these customers regularly gamed on their device

Technology Trends in Pubs

A MOBILE APP for EVERYTHING

SOCIAL SHARING and INTERACTION

LOCATION BASED CONTENT

INTERACTIVITY & AUGMENTED REALITY

Figure 53 Data Decoding Activity

Activity 4: Opportunity Mapping:

Once the data had been decoded and turned into powerful stimulus material the team moved on into the Opportunity Mapping Activity. The key activity for this part of the process was an Idea Generation session (see Figure 54). In this case there was no ethnographic visit to the locations, as in the previous project. Firstly, the team generated a new Visual Template and selected the key stimulus data for the session. Secondly they held an idea generation session in which the best ideas were selected and were further developed by the team to create more robust ideas. The last step of the project was to create a visual representation of the key ideas to share with a wider team to enable feedback on their suitability contribute to Company A's innovation pipeline.

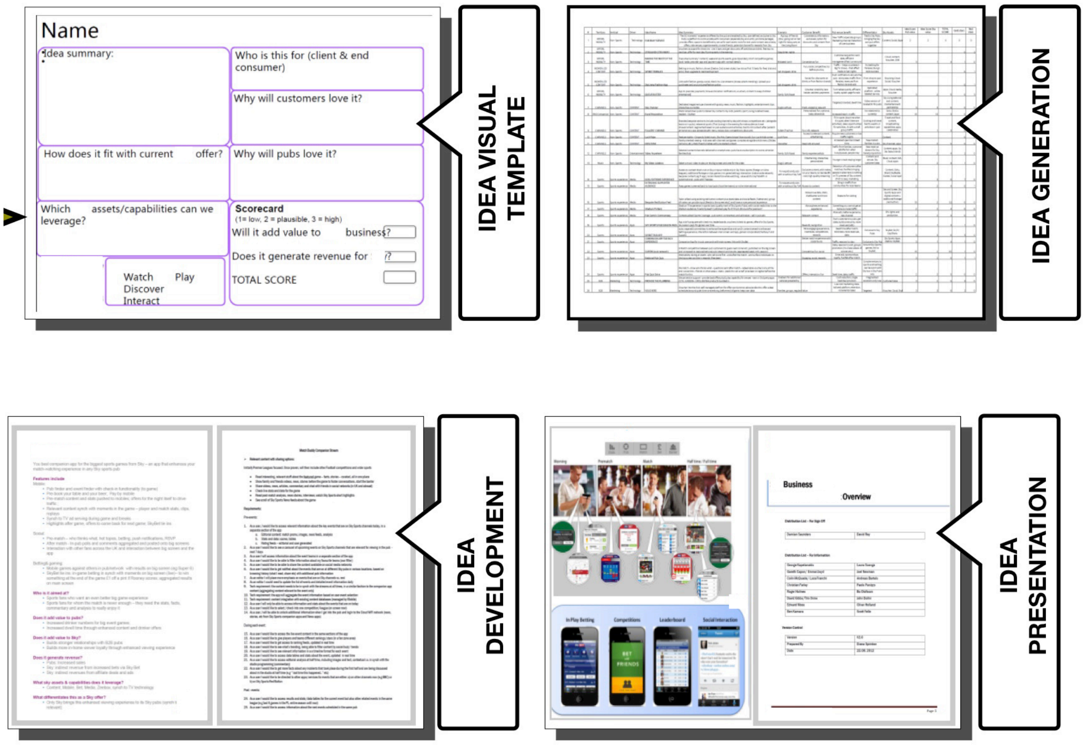


Figure 54 Opportunity Mapping Activity

7. Idea Generation Session Characteristics

Session Objectives

The main objective of the project is to develop new product ideas and propositions for Partner Pubs that could activate a new innovation pipeline for that side of the business. A second objective was to validate that the process could be repeatable across projects.

Workshop Participants

There were 20 participants in this workshop from different areas of the organisation in order to form multidisciplinary teams.

Idea Generation Techniques

The idea generation session focused on a nominal brainstorming supported by a series of visual templates and stimulus data to trigger novel, feasible and aligned to business objectives ideas. The facilitation was undertaken by an employee to demonstrate the workability of the process. It also focused on a formal nature of the process that allowed time for reflective thinking in order to maximise outcomes

Session Activities

The idea generation session was arranged as a 90 minutes activity. The participants formed a multidisciplinary team coming from different departments (including core areas such as strategy, sales and technology). The session was split into three key areas: (1) Market context overview (2) Sharing of Company A latest developments, and (3) ideation. The 20 participants were split into five teams of four people to generate ideas individually but shared and developed as a group following a nominal brainstorming technique. The session used supportive tools, specifically bespoke visual templates to trigger, record and frame the ideas generated.

Type of Team	Multidisciplinary
Number of Participants	20 people
Facilitation	Internal from organization
Timing	90 minutes session
Type of process	Formal Process allowing time for reflection
Idea Generation Techniques	Nominal Brainstorming
Main Idea Generation Tool	N/A
Supportive Tools	Visual Templates to record the ideas

Table 48 Idea Generation session characteristics

Session Tools

For this Idea Generation Session, the Visual Template was designed to address the complexity of the project and was divided into eight categories to help develop new ideas. The relevancy for business is the same one as in the previous case study, since it helped to frame ideas that were aligned to business objectives and strategy.

The complexity of this project made the template increase in the number of categories that needed to be addressed during the idea generation session, and therefore, representing eight different sections in the visual template. Another important characteristic in comparison with the previous case study is that in this case the participants of the session were targeting both the potential clients and end customers, rather than just the one of them.

It also included a scoring section to evaluate all ideas with the same criteria and objectively assess the quality of the ideas. Therefore, the idea with highest score was selected. The visual template was bespoke as in all the case studies and highlighted a series of relevant issues for the IG session. Firstly, it focused on the definition of the idea to avoid poor explanation that could waste good ideas. Secondly, it focused on the market segment that the idea was targeted to. Finally, there was an interest to keep testing the importance of establishing the idea evaluation criteria within the template to avoid idea generation that was not aligned with the session objectives.

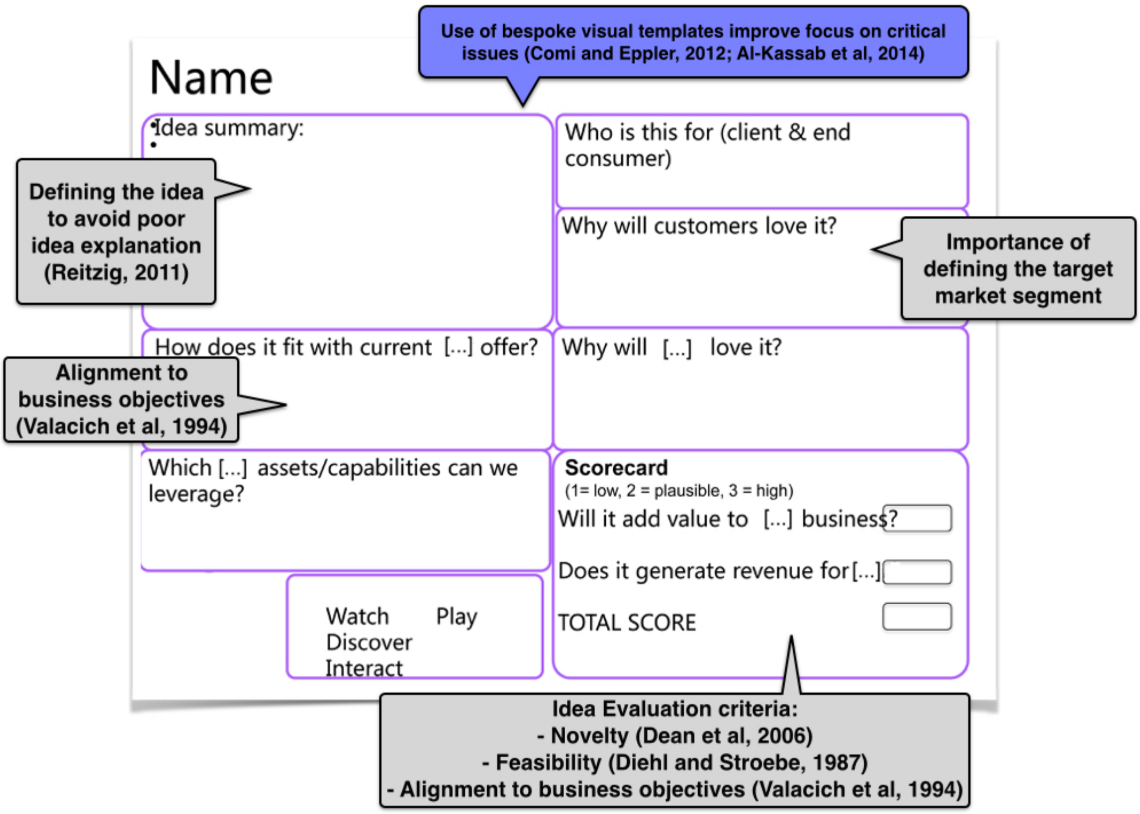


Figure 55 Template example

8. Evaluation Criteria

The Idea Evaluation criteria chosen in Case Study 5, within the Main Study, followed the same parameters as in previous case studies: (1) Novelty (Dean et al, 2006); (2) Feasibility (Diehl and Stroebe, 1987); and (3) Alignment to business objectives (Valacich et al., 1994).

In this occasion, there was a special interest in the ideas' alignment to business objectives in order to determine their potential to boost the given innovation pipeline.

9. Idea Generation Session Outcomes

The outcome from this idea generation session was a total of 26 new ideas, grouped into 7 concepts in 3 categories: enhanced interest experience (3), content led product ideas (2) and B2B solutions (2). Seven ideas were selected that met the key criteria during this entire study: feasibility, novelty and alignment to business objectives.

10. Key learnings

This idea generation session had similar outcomes from the process as Case Study 4. It showed the Idea Generation methodology was repeatable. Participants perceived the session to be very efficient due to the quality of the outcomes achieved and perceived the process to be different from previous idea generation sessions, which is the same feedback as in Case Study 4. Finally, the input of stimulus data from insights helped to target the idea generation session.

The Framework demonstrated that the process was repeatable and therefore, Company A could start to use the framework basis of a systematic approach to Front End Innovation projects (see Table 49 below).

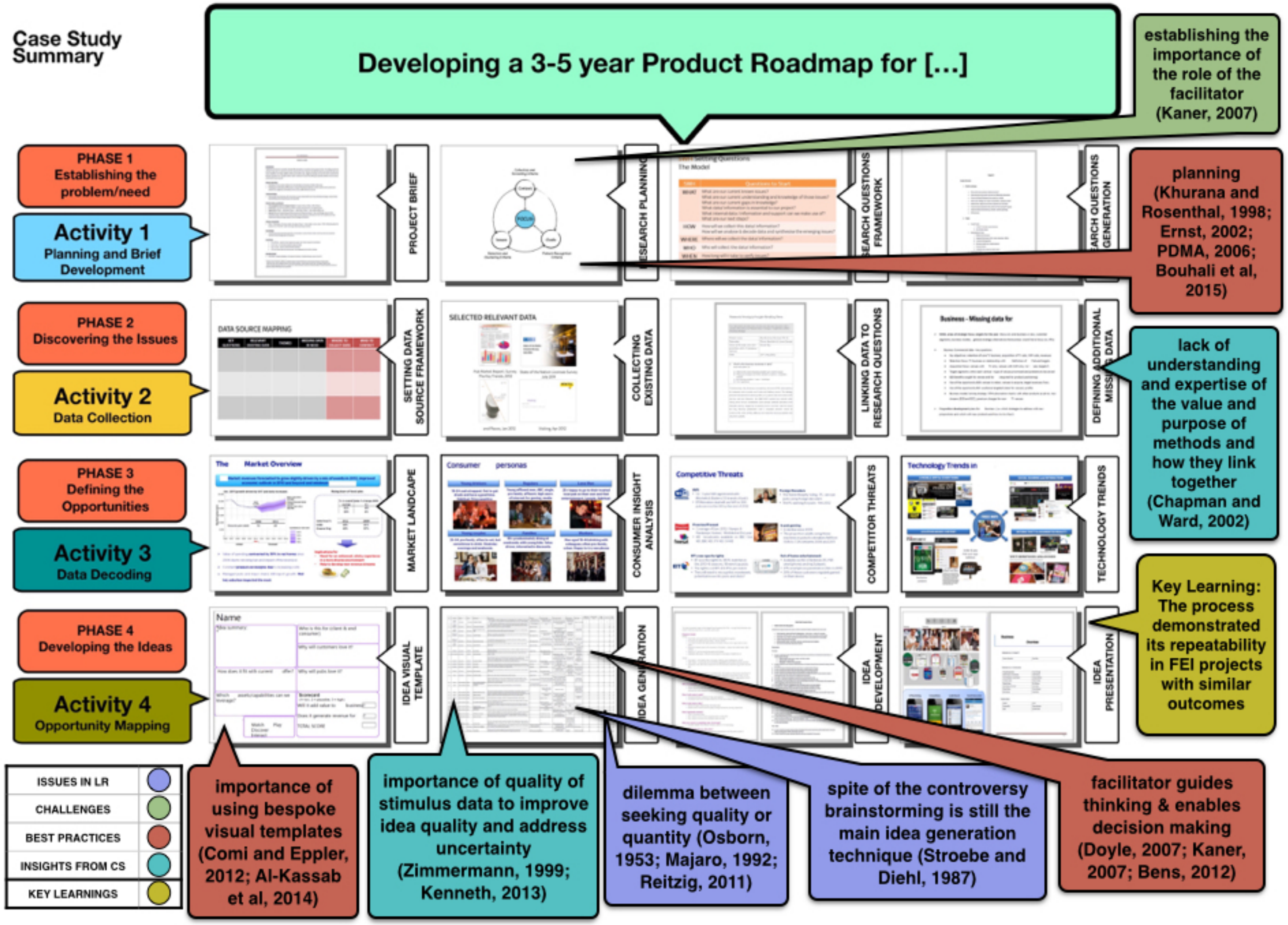
	MAIN STUDY Case Study 5 Company A
Purpose	The research objectives of cases study 5 centred on retesting and developing the (a) innovation framework; (b) innovation templates; (c) idea quality criteria (d) internal and external stimulus data; and (e) idea generation techniques on: 1) identifying and addressing project issues that needed to be tackled; (2) facilitating idea generation; and (3) improving idea quality; and (4) idea selection
Type of Project	The project focussed on the generation of **new value proposition ideas to boost a specific innovation pipeline.** The key area of concern was to create and develop a 3 to 5 year product roadmap for new value proposition ideas for specific innovation pipelines for range of third parties
Practises	Project brief, focussing tool, 5wh, research questions framework, desk research, data analysis, nominal brainstorming
Scoping Tools used	The innovation framework, innovation templates and idea quality criteria enabled the clarification and structuring of the key issues and categories that need to be addressed. Specifically, the complexity of this project increased the number of issues (market, competitors, insights and technology mapping) that needed to be addressed in the idea generation session. This impacted on the complexity of the visual template, which visualised the core areas that needed to be developed during the Idea Generation. It also

	impacted on the stimulus data, which highlighted the key issues for the project in order to generate aligned ideas with project challenges.
Key Learnings	The Case Study demonstrated the Framework could be used in multiple types of NPD projects with similar outcomes. It also demonstrated a proper analysis and decoding of quality data makes powerful stimulus data, that combined with bespoke innovation templates and group facilitation helps to improve IG.

Table 49 Main Study Case Study 5 Review Framework

OVERALL VIEW OF PROCESS, PRACTICES AND TOOLS

Figure 56 visualises Case Study 5 and it highlights the most relevant issues and where they were identified. In terms of the Literature Review, this case study highlighted that despite the controversy around group brainstorming, it is still the most common idea generation technique: and the clear dilemma between seeking quantity or quality of ideas in FEI practices. As for the challenges, the new emergent issue was the need to establish the importance of the role of the facilitator. The key insights form this Case Study were: (1) the importance of the quality of stimulus data to improve quality of ideas; (2) impact of addressing the uncertainty of using IG practices of participants and (3) the negative impact on the development of the project when there is a lack of understanding of activities purpose.



Case Study Summary

Developing a 3-5 year Product Roadmap for […]

PHASE 1
Establishing the problem/need

Activity 1
Planning and Brief Development

PHASE 2
Discovering the Issues

Activity 2
Data Collection

PHASE 3
Defining the Opportunities

Activity 3
Data Decoding

PHASE 4
Developing the Ideas

Activity 4
Opportunity Mapping

establishing the importance of the role of the facilitator (Kaner, 2007)

planning (Khurana and Rosenthal, 1998; Ernst, 2002; PDMA, 2006; Bouhali et al, 2015)

lack of understanding and expertise of the value and purpose of methods and how they link together (Chapman and Ward, 2002)

Key Learning: The process demonstrated its repeatability in FEI projects with similar outcomes

importance of using bespoke visual templates (Comi and Eppler, 2012; Al-Kassab et al, 2014)

importance of quality of stimulus data to improve idea quality and address uncertainty (Zimmermann, 1999; Kenneth, 2013)

dilemma between seeking quality or quantity (Osborn, 1953; Majaro, 1992; Reitzig, 2011)

spite of the controversy brainstorming is still the main idea generation technique (Stroebe and Diehl, 1987)

facilitator guides thinking & enables decision making (Doyle, 2007; Kaner, 2007; Bens, 2012)

ISSUES IN LR	🟣
CHALLENGES	🟢
BEST PRACTICES	🔴
INSIGHTS FROM CS	🔵
KEY LEARNINGS	🟡

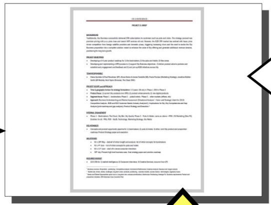
Figure 56, Case Study 5 Summary

Case Study Summary

Developing a 3-5 year Product Roadmap for [...]

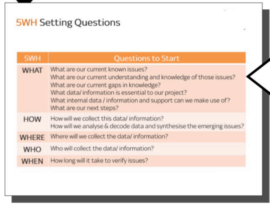
PHASE 1
Establishing the problem/need

Activity 1
Planning and Brief Development



PROJECT BRIEF

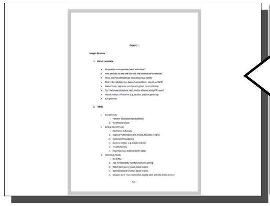
DATA COLLECTION
10- 15 days, reflection at the same time
5- 6meetings
Collaborative process



5WH Setting Questions

5WH	Questions to Start
WHAT	What are our current known issues? What are our current understanding and knowledge of those issues? What are our current gaps in knowledge? What data/ information is essential to our project? What internal data / information and support can we make use of? What are our next steps?
HOW	How will we collect this data/ information? How will we analyse & decode data and synthesise the emerging issues?
WHERE	Where will we collect the data/ information?
WHO	Who will collect the data/ information?
WHEN	How long will it take to verify issues?

RESEARCH QUESTIONS FRAMEWORK

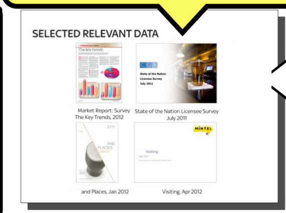


RESEARCH QUESTIONS GENERATION

PHASE 2
Discovering the Issues

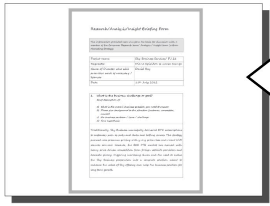
Activity 2
Data Collection

PROJECT PLANNING
5 days, reflection at the same time
3- 4 meetings
Collaborative process

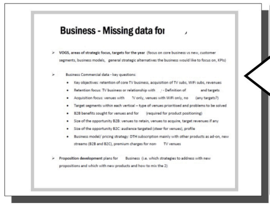


SELECTED RELEVANT DATA

COLLECTING EXISTING DATA



LINKING DATA TO RESEARCH QUESTIONS

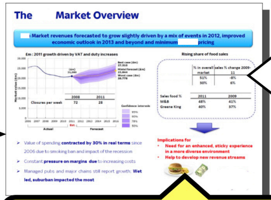


Business - Missing data for

DEFINING ADDITIONAL MISSING DATA

PHASE 3
Defining the Opportunities

Activity 3
Data Decoding



The Market Overview

MARKET LANDCAPE

IDEA GENERATION
1 days
1 day reflection
1 meetings
Collaborative process

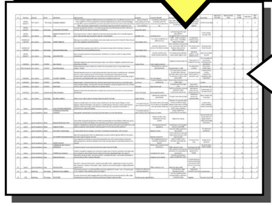
IDEA DEVELOPMENT
5 days, reflection at the same time
1 meetings
Collaborative process

IDEA PRESENTATION
10 days
5 review meetings
Collaborative process

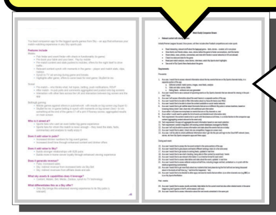
PHASE 4
Developing the Ideas

Activity 4
Opportunity Mapping

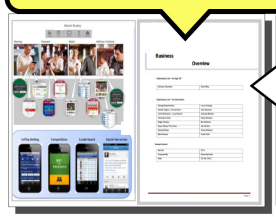
DATA ANALYSIS
15 days, reflection at the same time
3 meetings
Collaborative process



IDEA GENERATION



IDEA DEVELOPMENT



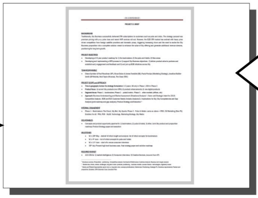
IDEA PRESENTATION

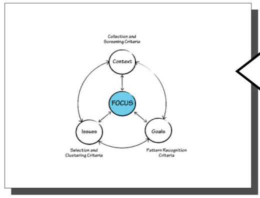
Case Study Summary

Developing a 3-5 year Product Roadmap for […]

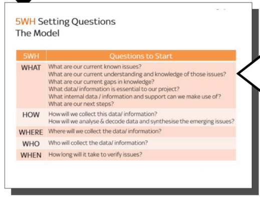
PHASE 1
Establishing the problem/need

Activity 1
Planning and Brief Development


PROJECT BRIEF

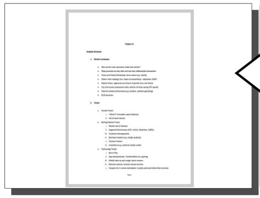


RESEARCH PLANNING


5WH Setting Questions
The Model

5WH	Questions to Start
WHAT	What are our current known issues? What are our current understanding and knowledge of those issues? What are our current gaps in knowledge? What data/ information is essential to our project? What internal data / information and support can we make use of? What are our next steps?
HOW	How will we collect this data/ information? How will we analyse & decode data and synthesise the emerging issues?
WHERE	Where will we collect the data/ information?
WHO	Who will collect the data/ information?
WHEN	How long will it take to verify issues?

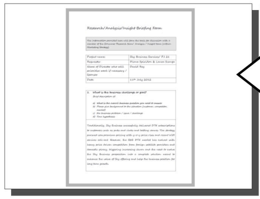
RESEARCH QUESTIONS FRAMEWORK


RESEARCH QUESTIONS GENERATION

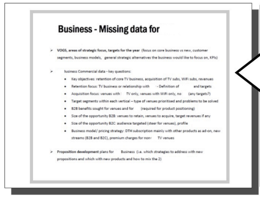
PHASE 2
Discovering the Issues

Activity 2
Data Collection

SELECTED RELEVANT DATA


Research/Analysis/Insight Briefing Form

LINKING DATA TO RESEARCH QUESTIONS


Business - Missing data for

DEFINING ADDITIONAL MISSING DATA

PHASE 3
Defining the Opportunities

Activity 3
Data Decoding

VALUE
From phase 1 and 2 deliverable, work has be used to
- Clearly setting up and refine research questions
- Map out existing data and define additional missing data
- Link data to research questions
- Drive a deep understanding on consumer needs & attitudes & motivations, competitors, technology trends and market of UK [..]
- To inspire identification of new opportunities for Company A business to complement its existing offer for Company A B2B customers


Competitive Threats

COMPETITOR THREATS

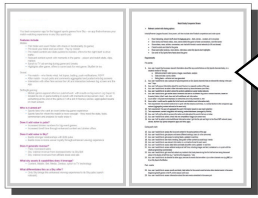

Technology Trends in

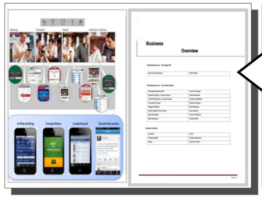
TECHNOLOGY TRENDS

PHASE 4
Developing the Ideas

Activity 4
Opportunity Mapping

VALUE
From phase 3 deliverable, work has been used to
- Develop further product strategy
- Drive developing business requirements, proposition, and product & solution plan
- Request for initial funding for the pilot
- Communicate internally for delivering the product


IDEA DEVELOPMENT


IDEA PRESENTATION

Preliminary Findings from Main Study

This Main Study helped recognize strengthens and weaknesses of both systematic and reflective approaches in helping to accelerate idea generation flows. For instance, systematic idea generation practices showed that they can help encourage an innovation culture within the organization (Staw, 1990) but they also have shown that ideas generated under overly systematic practices tend to lack creativity (Boeddrich, 2004). On the other hand, organizations with a non-systematic idea management process generate creative ideas but they are usually not aligned to business objectives and therefore, happen by serendipity or managers' criteria (Murphy and Kumar, 1997; Desouza *et al.*, 2009), which is what happened prior this study in Company A.

The Main Study has highlighted two contradictions between theory and practice. Firstly, although planning has been considered a success factor in Front End Innovation Activities (Khurana and Rosenthal, 1998), individuals, teams and organizations do not tend to prepare adequately in terms of preparation, planning, time, resources and tools to innovate in practice, which highlights a contradiction between theory and practice.

The second contradiction refers to the fact that although the use of criteria to evaluate ideas is not a new issue, as it has been explored since the 1950's when Taylor et al (1957) considered a good idea had to solve a problem. Since then, many authors have researched around different ways to determine the quality of an idea, such as its feasibility (Diehl and Stroebe, 1987), its alignment to the organization business objectives (Valacich et al, 1994) and its novelty, defined as the originality and uniqueness of the idea (Dean et al, 2006; MacCrimmon and Wagner, 1994). These three criteria are the ones that this research study has adopted to evaluate ideas. However, within an organisational setting, there is still a lack of understanding of what constitutes a good idea and how to evaluate and select through the whole cycle of the idea generation process. Multinational organisations still select ideas based on managers' gut feel (Murphy and Kumar, 1997) and ideas that represent the safest choice.

3.3.6 The Validation Study: Case Study 6

1. Context:

The background of the problem was that over the past three years Organization A had not delivered any new ideas that supported the delivery of communication products roadmap. Much of the exploratory capabilities had been disregarded and no longer form part of the roadmap. There was recognition that the market needs were not being met sufficiently and new ideas were not being generated to address those needs. It became apparent there was a need to spend time exploring new opportunities and to do it in a way that could be repeated.

2. Objective of the case study:

The objective of Case Study 6 was to retest and redevelop (a) the innovation framework; (b) the bespoke visual innovation templates; (c) the idea quality criteria; (d) the internal and external data research collection and analysis; (e) the use of specific analytical and mapping tools; (f) the field work; and (g) the use of idea generation techniques and how they would impact on: (1) defining the issues that need to be addressed; (2) facilitating idea generation; (3) improving idea quality; and (4) idea selection.

3. Test Study Case Study 6 Focus:

The intention of the test case study was to ensure there is a pipeline of thinking and activity that occurs in parallel to the roadmap that is being delivered for consumption. In this study the goal was to identify opportunities to drive value, growth and innovation to the organization as well as develop a repeatable process for generating quality ideas.

4. Project team composition:

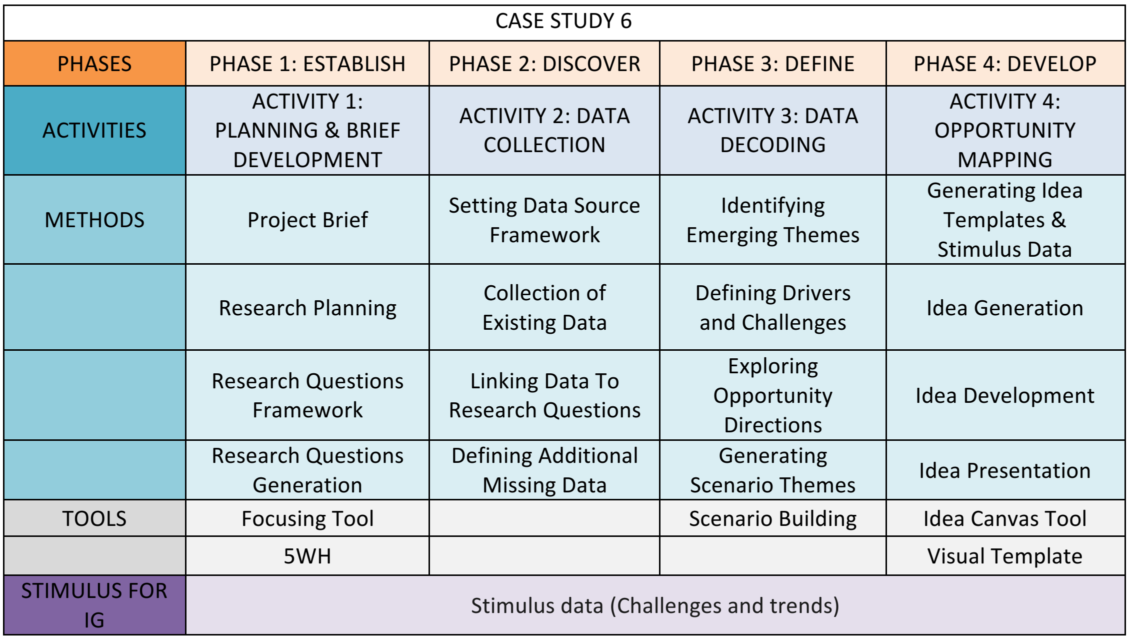
The project team was formed by eight people from senior roles within the organization from the departments of New Product Development, Strategy and Marketing so that they could provide a range of expertise, experience and ability to resolve issues as they arose. We revisited the Company Framework in the Communications Category which included: competitive threats, customer needs, market and technology trends and Company A's strengths because it was a logical framework and had been used previously. We assigned two people to a specific area of the framework to focus on, which would help with speed and diary challenges. In the planning phase, we had created milestones around key meetings/ workshops in advance, which helped keep the team on track. Importantly, at each meeting we aimed to share knowledge, evaluate findings and generate ideas.

5. Research Objectives of the Test Study Case Study 6 project

Case Study 5 demonstrated the repeatability of the Framework in different FEI projects with similar outcomes. It also showed proper analysis and decoding of data, bespoke visual templates and group facilitation helps to improve Idea Generation.

The research objectives of Case study 6 focussed on retesting the effectiveness of the SIGF, comprising the innovation framework, the visual templates, idea quality criteria, the role of the facilitator and the importance of stimulus data and its potential to improve the quality of ideas in FEI practices.

6. Test Study Case Study 6 Project Phases



CASE STUDY 6				
PHASES	PHASE 1: ESTABLISH	PHASE 2: DISCOVER	PHASE 3: DEFINE	PHASE 4: DEVELOP
ACTIVITIES	ACTIVITY 1: PLANNING & BRIEF DEVELOPMENT	ACTIVITY 2: DATA COLLECTION	ACTIVITY 3: DATA DECODING	ACTIVITY 4: OPPORTUNITY MAPPING
METHODS	Project Brief	Setting Data Source Framework	Identifying Emerging Themes	Generating Idea Templates & Stimulus Data
	Research Planning	Collection of Existing Data	Defining Drivers and Challenges	Idea Generation
	Research Questions Framework	Linking Data To Research Questions	Exploring Opportunity Directions	Idea Development
	Research Questions Generation	Defining Additional Missing Data	Generating Scenario Themes	Idea Presentation
TOOLS	Focusing Tool		Scenario Building	Idea Canvas Tool
	5WH			Visual Template
STIMULUS FOR IG	Stimulus data (Challenges and trends)			

Figure 57 Case Study 6 Project Phases

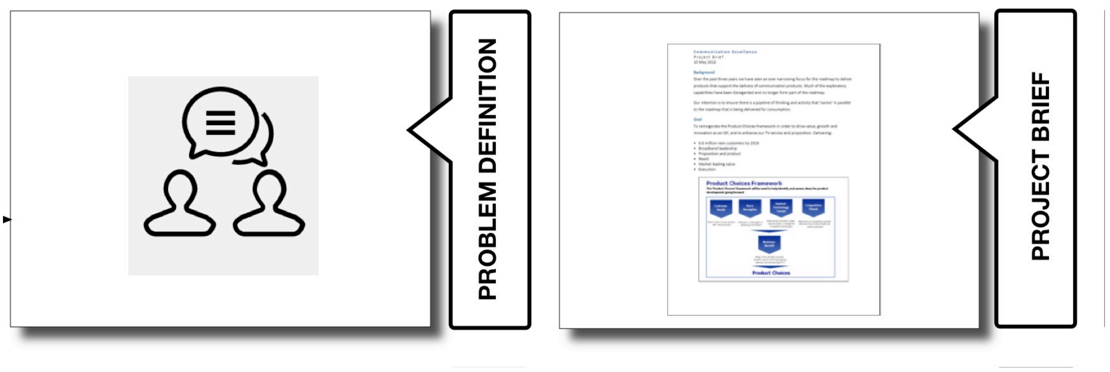
The process, stages and activities in this project followed the same Framework as previous case studies. However, in this Case Study the methods changed to adapt to the specifics of the project, maintain the same Stages and Activities as in previous projects.

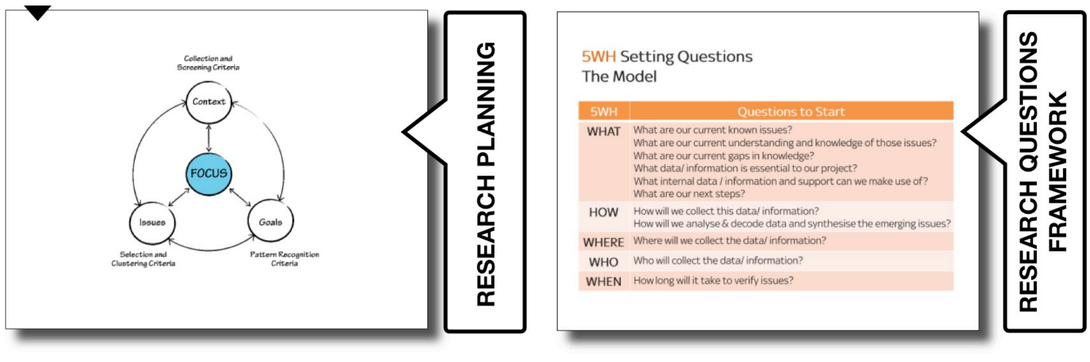
A key difference was the development of a new Idea Generation tool that aimed at testing the principles of effective practice of these kind of tools, blended into one tool. This tool was designed to improve the quality of the ideas generated during the process by combining the stimulus data (key insights from the Stages of Data Collection and Decoding) and a series of Visual Templates.

<u>Activity 1: Planning and Brief Development:</u>

The first step was to define the problem to tackle. Secondly, according to the problem, identifying the objectives, criteria, people and timelines of the project a project brief was created. In this project, it was very important to establish a shared data source for future use e.g. Basecamp. The group was split into four teams to collect information around four themes: 1) Competitive Threats: To review competitor strengths and business drivers. Go beyond just the traditional competitors; (2) Customer Needs: To review the social and communication needs and Company A’s customer needs; (3) Market / Technology Trends: To pull together and agree on key market and technology trends. What are the key trends and which do we think are the most 'important'?; (4) Company A Strengths: To review Company A strengths as a communications business but also our core competencies. This will help direct the validation of any new opportunities.

The second key action in this step was to develop a Research Questions framework under four categories that included all the Questions that needed to be answered during the data collection stage in order to establish a solid knowledge base (see Figure 58).





5WH Setting Questions
The Model

5WH	Questions to Start
WHAT	What are our current known issues? What are our current understanding and knowledge of those issues? What are our current gaps in knowledge? What data/ information is essential to our project? What internal data / information and support can we make use of? What are our next steps?
HOW	How will we collect this data/ information? How will we analyse & decode data and synthesise the emerging issues?
WHERE	Where will we collect the data/ information?
WHO	Who will collect the data/ information?
WHEN	How long will it take to verify issues?

Figure 58 Planning and Brief Development Activity

Activity 2: Data Collection

This step in the process sought to identify the hypotheses and answer the research questions. The way to address this was to collect data already gathered within the organization via internal or external sources and to identify additional missing data and find a way to find it (see Figure 59). The final activity was to link data to the previously set research questions and refine key questions for the project.

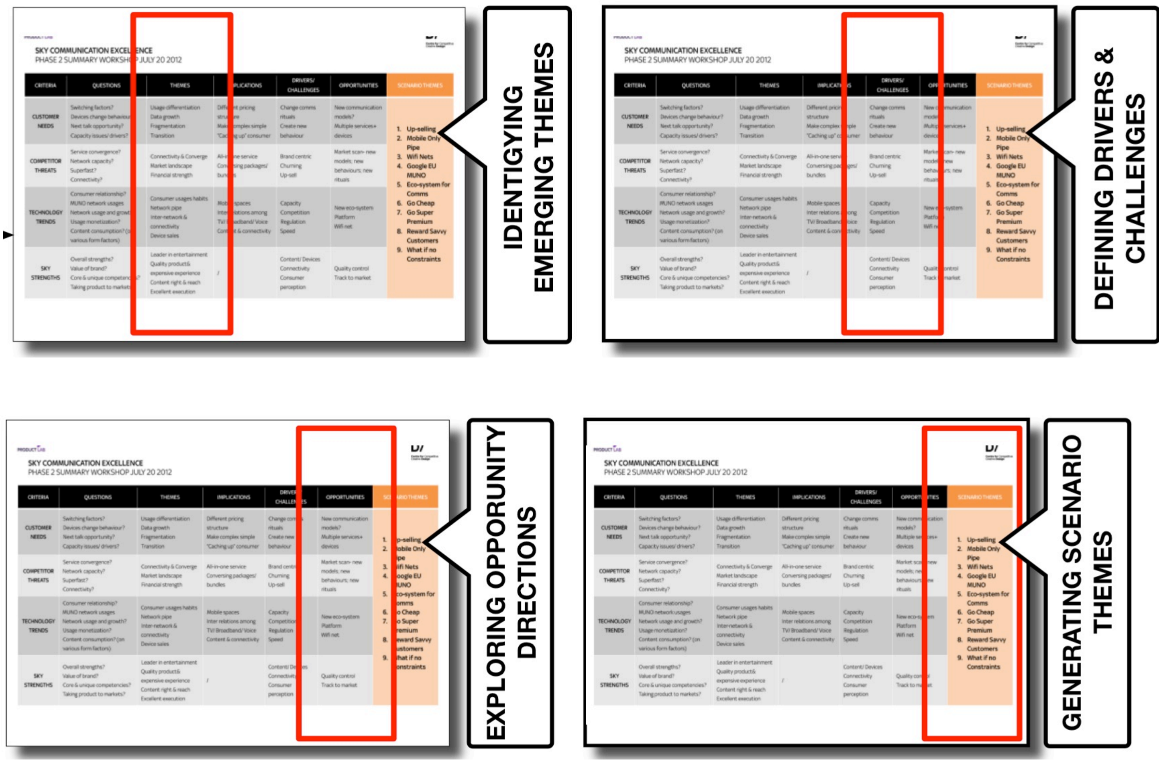
DATA SOURCE MAPPING

KEY QUESTIONS	RELEVANT EXISTING DATA	THEMES	MISSING DATA IN NEED	WHERE TO COLLECT DATA	WHO TO CONTACT

Figure 59: Data Collection Activity

Activity 3: Data Decoding:

This stage worked around sharing key learnings about customer needs, competitors, market and technology trends and Company A's strengths. Team members had to map issues and to identify innovation drivers, challenges, potential opportunities and create initial scenarios for further exploration during the idea generation session (see Figure 60).



SKY COMMUNICATION EXCELLENCE
PHASE 2 SUMMARY WORKSHOP JULY 20 2012

CRITERIA	QUESTIONS	THEMES	IMPLICATIONS	DRIVERS/ CHALLENGES	OPPORTUNITIES	SCENARIO THEMES
CUSTOMER NEEDS	Switching factors? Devices change behaviour? Next talk opportunity? Capacity issues/ drivers?	Usage differentiation Data growth Fragmentation Transition	Different pricing structure Make complex simple 'Caching up' consumer	Change comms rituals Create new behaviour	New communication models? Multiple services+ devices	1. Up-selling 2. Mobile Only Pipe 3. Wifi Nets 4. Google EU MUNO 5. Eco-system for Comms 6. Go Cheap 7. Go Super Premium 8. Reward Savvy Customers 9. What if no Constraints
COMPETITOR THREATS	Service convergence? Network capacity? Superfast? Connectivity?	Connectivity & Converge Market landscape Financial strength	All-in-one service Converging packages/ bundles	Brand centric Churning Up-sell	Market scan- new models; new behaviours; new rituals	
TECHNOLOGY TRENDS	Consumer relationship? MUNO network usages Network usage and growth? Usage monetization? Content consumption? (on various form factors)	Consumer usages habits Network pipe Inter-network & connectivity Device sales	Mobile spaces Inter relations among TV/ Broadband/ Voice Content & connectivity	Capacity Competition Regulation Speed	New eco-system Platform Wifi net	
SKY STRENGTHS	Overall strengths? Value of brand? Core & unique competencies? Taking product to markets?	Leader in entertainment Quality product& expensive experience Content right & reach Excellent execution	/	Content/ Devices Connectivity Consumer perception	Quality control Track to market	

Figure 60 Data Decoding Activity

<u>Activity 4: Opportunity Mapping:</u>

Based on the establishment of an idea generation session, to build on the opportunities and challenges to generate quality ideas, the first action was to turn issues from data decoding into stimulus material to help trigger idea generation in the session (see Figure 61). The second was to design a series of visual templates that targeted the key issue the idea needs to describe and explain. The final idea generation workshop helped to generate a remarkable volume of product opportunities that fed into the innovation roadmap of the communications department.

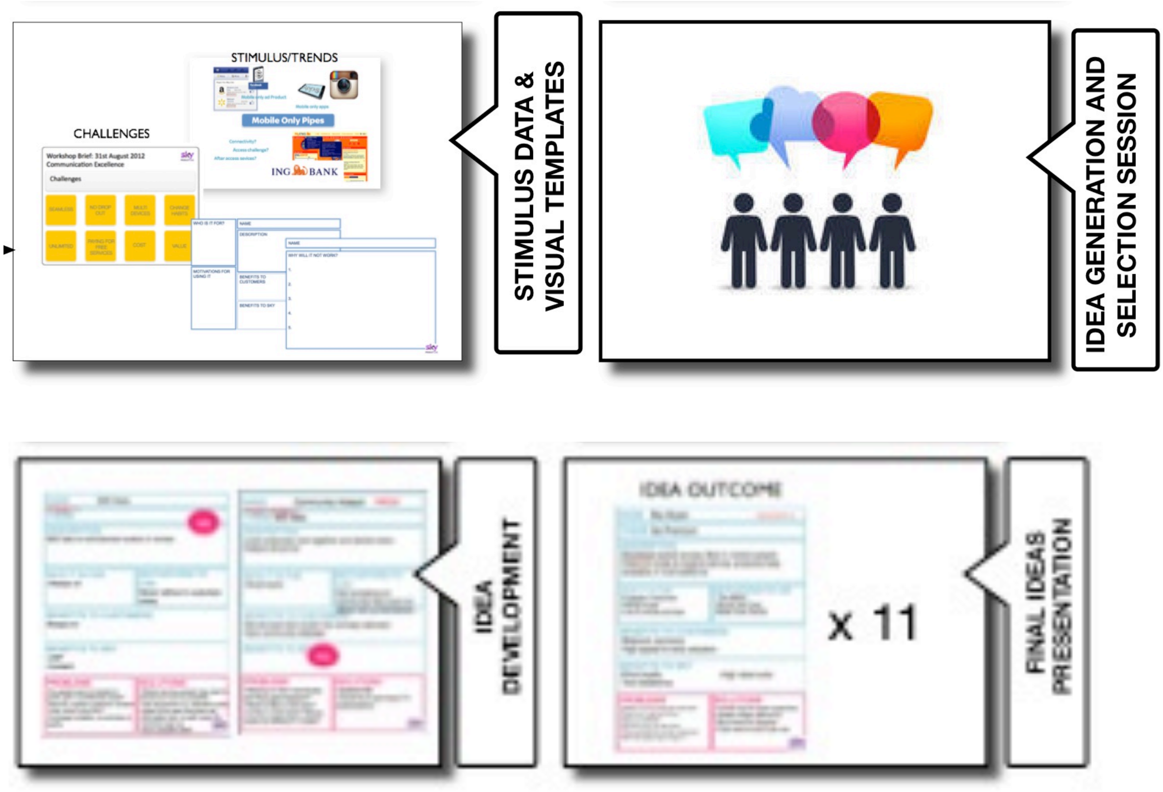


Figure 61 Opportunity Mapping Activity

7. Idea Generation Session Characteristics

Session Objectives

To reinvigorate the Company's framework in certain department via the generation of a series of product ideas to drive the innovation pipeline in the department.

Workshop Participants

There were fifteen multidisciplinary participants (Cooper, 1988) split into five teams of three people. The participants ranged from very junior roles within the organization to senior roles. In this specific Idea Generation session people belonged to the technology, marketing, design, strategy and sales departments.

Idea Generation Techniques

At the beginning of the idea generation session there is a short presentation in which the session objectives are set and explained to the participants. This explanation sought to narrow the scope of the session and will be reminded by facilitators along the session if any team is losing focus. Furthermore, establishing the session objectives aims to encourage a focus on quality of ideas rather than quantity (Ulrich and Eppinger, 2000), as it is not about generating as many ideas as possible in order to find a quality one (Osborn, 1963) but trying to generate ideas that are aligned to the session objectives.

For this IG session, the Idea Generation techniques used aimed at generating radical innovation ideas, rather than incremental techniques such as SCAMPER (Eberle, 1996). It also combined the principles of (1) Nominal Brainstorming to engage in an iterative process to improve idea generation and idea quality; (2) HIT principle to combine ideas to create more robust ones; and (3) Directed Brainstorming characteristic of fixing ideas from other participants in order to improve them.

The combination of Idea Generation techniques aimed to combine effective practices to improve the quality of outcomes. Lastly, the techniques were supported by a series of bespoke visual templates and stimulus data, formed by the analysis of trends and challenges in previous phases.

Type of Team	Multidisciplinary
Number of Participants	15 (5 teams of 3 people)
Facilitation	External from organisation
Timing	90 minutes session
Type of process	Systematic Reflection approach
Idea Generation Techniques	Combination of Nominal Brainstorming, HIT and Directed Brainstorming principles.
Idea Generation Tool	Visual Templates and Stimulus data (Challenges and trends

Table 50 Idea Generation Session Characteristics

Session Activities

The session followed the principles of a systematic reflection approach, as in previous case studies because of the benefits following a structured process that allowed some time to reflect on the ideas had on Idea Quality.

Each team member generated ideas individually and then shared them as a group to develop them (iteratively). They then swap ideas with another team and broke down the ideas by identifying the weak spots and drawbacks. The third step was about swapping ideas again with another team and re-build the ideas by fixing the problems the previous team had identified. At the end of this process, teams had been part of 3 different sets of ideas and had a good understanding of them.

Later there was a sharing of the ideas to prepare the idea evaluation and selection. Each team described each idea, the problems that had been identified and the solutions develop. Once they had finished, the session objectives were one more time reminded to participants in order to reinforce them and select ideas according to the evaluation criteria. This criteria for this Idea Generation session was the same one as in previous case studies: alignment to business objectives, novelty and feasibility of ideas.

Eleven ideas were selected to be included in the Communications Team innovation pipeline. This result represented an 80% of the total ideas generated in the session, which highlighted the high number of quality ideas that the use of this process and tool helped to generate.

Session Tools

There were two main tools: (a) Stimulus data to trigger ideation via Breaking the rules technique (Plesk, 2014) and visual images and words (Michalko, 2004) and (b) Bespoke visual templates to record the ideas during idea generation, development, evaluation and selection stages. (Suther et al, 2003). These two supportive tools helped to shape the discussion topic and focus on the idea generation objectives.

The visual template was designed to address the core issues in this project: to determine the target customer the idea would appeal to, the motivations the customers would have for using the product/service and the benefits that would represent to both customers and Company A. As in previous projects, the Visual Template is always adapted to the needs of the project, more specifically the objective the project is trying to achieve, so the Visual Templates work as an enabler to generate relevant ideas for the business.

It followed a technique of build-break-rebuild in which each team would generate a series of ideas, break the ideas of a second team and rebuild the ideas of a third team. This rotation technique was designed to generate relevant ideas, to address weaknesses of ideas and to work on the best way to solve the problems that they would represent. This way the templates visualized all the relevant data of each idea and helped teams to work on the ideas in a very focused way.

The template encouraged collaboration among session participants as it decreased the ownership of the ideas and enabled teams to acknowledge all the ideas. The purpose for this collaborative way of building ideas was to target the poor Idea Selection process that currently happens in many organizations, where participants typically vote for their own idea and fail at evaluating the ideas judgmentally.

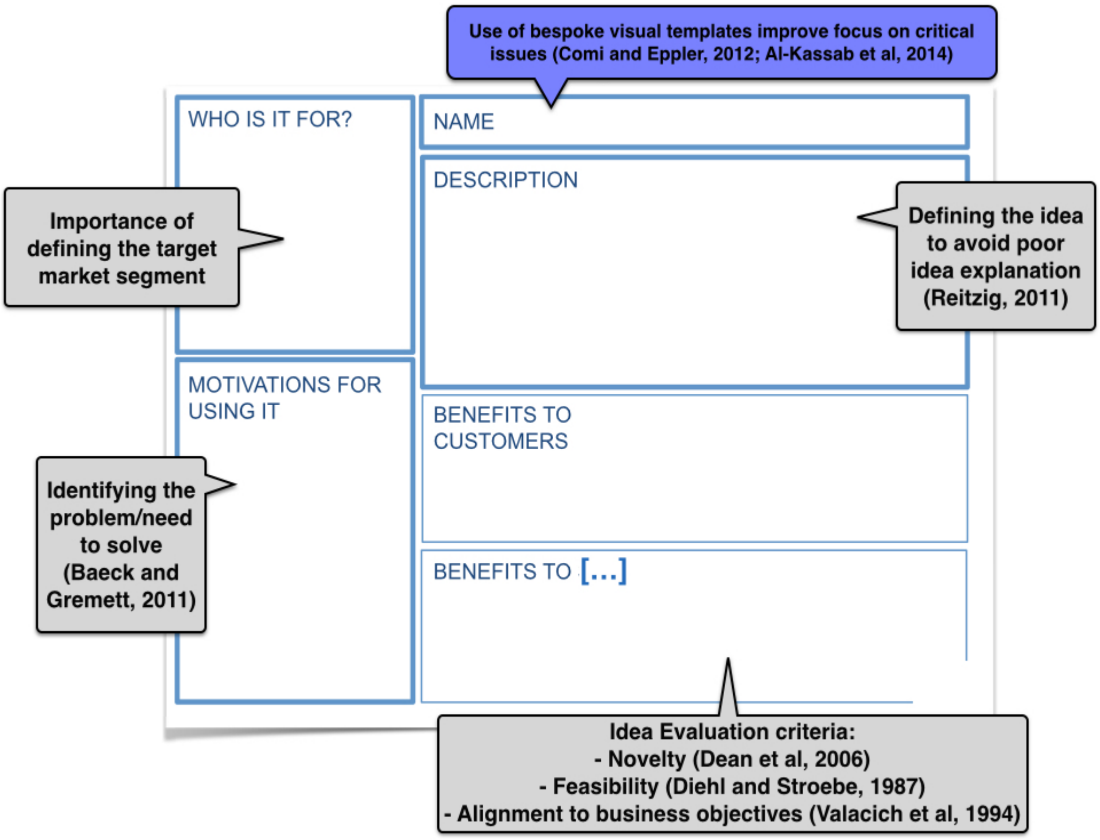


Figure 62 Template example

The bespoke Visual Template (Figure 62) aimed to simplify the complexity of all issues involved in the Idea Generation session in order to drive critical thinking focused on the core issues being tackled. Firstly, it encouraged defining the problem the idea was trying to solve to maintain the focus of the IG session around the given need. Secondly it directed idea generation towards a specific target market segment, which had been demonstrated as beneficial in the Main Study. Thirdly, it encouraged the explanation of idea, which had also shown its effectiveness for idea sharing and idea development, as participants could be clear about the rationality behind the idea and therefore, evaluate it accordingly. Lastly, there was an important area that covered the critical evaluation of the idea in relationship with the sample company by identifying the benefits of the idea around novelty, feasibility and alignment to business objectives.

8. Evaluation Criteria

Since the Test Study focused on generating high quality ideas for an innovation pipeline the Evaluation criteria for ideas followed the same parameters as in previous case studies: (1) Novelty (Dean et al, 2006); (2) Feasibility (Diehl and Stroebe, 1987); and (3) Alignment to business objectives (Valacich et al., 1994).

9. Idea Generation Session Outcomes

The Rapid Idea Canvas tool (Bolton, 2011) has been able to blend a formal process (Cooper and Edgett, 2012) allowing reflective thinking (Paterson and Chapman, 2013) to participants in the session. This balance has had a positive impact on idea generation.

This tool did not require a certain level of knowledge, expertise or experience, nor a creative background to use it. Participants of the session ranged from junior to senior roles and across departments and there was not a set knowledge level to be met to be able to use this tool. Nobody gave negative feedback on the difficulty to use the tool.

The rotation technique among the teams for the idea development helped to break down ownership of ideas, creating an atmosphere of collaboration across the session. In previous Case Studies we had observed there was a tendency to vote for own ideas rather than pursuing the ones that met the session objectives. Therefore, by allowing individuals to participate in three different set of ideas, a collaborative approach emerged and the idea selection process was truly focused on the quality of ideas rather than whose ideas they were. Breaking the ideas and fixing them afterwards helped strengthen the ideas, identifying the weaknesses and developing solutions to address them. This step was crucial to achieve a range of feasible ideas with a strong set of principles behind them.

The Rapid Idea Canvas tool seeks quality rather than quantity. There is not a set of ideas that teams need to generate, such as 6-3-5 Brainstorming (Rohrbach, 1968), but it seeks to structure thinking and objectives to trigger an idea generation session that focuses on quality of ideas that can lead to radical new product opportunities.

The quantity of people in the room (five teams of three people) seemed to be suitable for the use of this tool. Five teams were manageable for the facilitator but still representing a good size of participants from different departments.

The visual templates improved collaboration (Eppler et al, 2011) and idea sharing (Bresciani and Eppler, 2009). However, there is still a dysfunction between the performance effectiveness perception of visual templates for the business and the participants of the session. Participants did not feel the templates constrained their creativity, but they suggested they did not represent a competitive advantage over previously used templates, which is the same issue than Bresciani and Eppler (2009) and Comi and Eppler (2011) identified in their research studies.

Regarding the stimulus data used during the session, the gathered feedback from participants was not very positive, since the type of information created was not perceived to be very relevant to the idea generation. Nevertheless, this did not have a negative impact on the results.

In terms of the quality of ideas, the Framework demonstrated a 20% improvement in the quality of ideas. This was determined by following the Idea Evaluation criteria: feasibility, novelty and alignment of business objectives. The department employees in which this project took place evaluated the outcomes from previous projects (prior intervention) and established the Test Study had generated 20% of ideas that had never been generated in the organisation, that were feasible and aligned to the business strategy, therefore demonstrating the relevancy and effectiveness of the Framework in the sample company. The outcome from the final workshop led to 11 ideas, 80% of which are currently being included in the category team product development process.

10. Key Learnings

There were five key learnings from the Idea Generation Session, more specifically from the use of the Idea Canvas Tool: (1) An Iterative Idea Generation process improves idea quality by allowing participants to reflect on their own ideas and share them collectively; (2) The rotation technique of teams breaks down ownership and idea selection biased, becoming a more collaborative process; (3) Setting the Idea Generation Workshop objectives at the beginning of the session improves focus; (4) A systematic reflection approach allows balance between productivity and creativity as there is a clear structure of the methodology to follow but allowing time for reflective thinking to generate ideas that are relevant to the business as well as creative; and (5) generating ideas individually and developing collectively improves idea quality. This technique enables participants to generate their own ideas but building them up as a group to generate more valuable input by developing the ideas or merging them with similar ones.

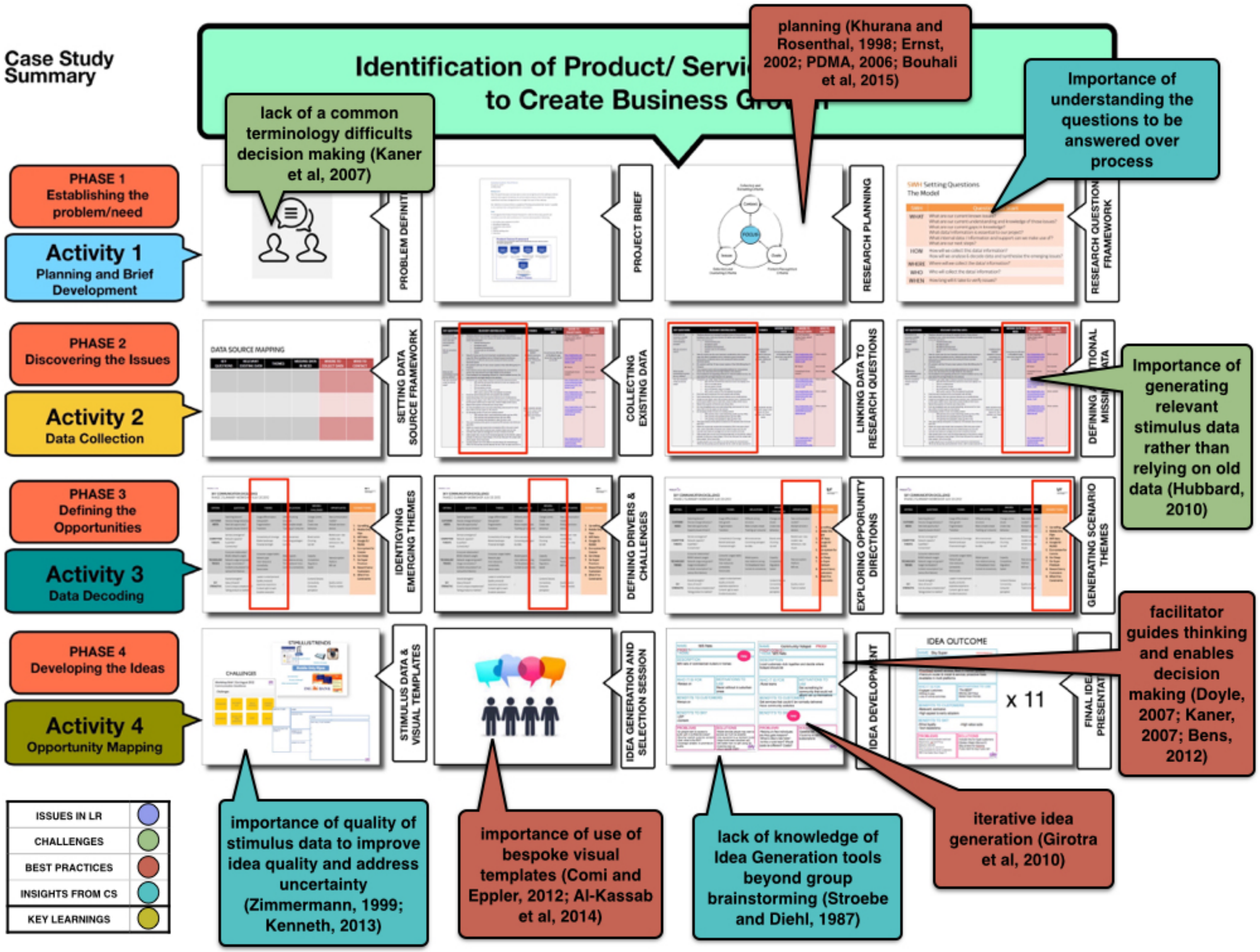
The key learnings from the process can be summarized into four core areas: (1) The process demonstrated that can be used as a repeatable one; (2) The use of multidisciplinary teams and their performance was an enriching input due the large scope of the project and should be an example for future ones; (3) This project proved the research needs to be analysed and decoded to stimulate adventurous and potentially breakthrough ideas. Otherwise the outcome will not be very competitive; (4) A project leader is indispensable to manage the timelines, preparation, structure and development of the project to ensure continuity between sessions and momentum in the project.

	TEST STUDY Case Study 6 Company A
Purpose	The research objectives of cases study 6 focussed on retesting and developing the (a) innovation framework; (b) innovation templates; (c) idea quality criteria (d) internal and external research collection and analysis; (e) use of specific analytical and mapping tools; (f) field work and (g) use of idea generation techniques would impact on: (1) defining the issues that needed to be addressed; (2) facilitating idea generation; and (3) improving idea quality; and (4) idea selection
Type of Project	The project focussed on the generation of **new high quality ideas for** an innovation pipeline. The project concentrated on creating and developing an innovation pipeline by exploring new opportunities in a target category.
Practises	Project brief, 5WH, research questions framework, Desk research, data analysis (innovation drivers, challenges, and potential opportunities.), nominal Brainstorming, HIT and Directed Brainstorming principles.
Scoping Tools used	The innovation framework, innovation templates and idea quality criteria helped to simplify the complexity of the project by turning complex data into relevant insights and creating bespoke visual templates that highlighted the core issues the project was focused on. They helped to drive critical thinking around the given problem. For instance, the stimulus data focused on key challenges and trends from data collection in order to shape the discussion and focus inspiration around Idea Generation objectives.
Key Learnings	This Case Study demonstrated the Framework was able to improve Idea Quality in FEI practices by generating 20% more feasible, novel and aligned to business objectives ideas compared to projects prior intervention (based on the sample company perception)

Table 51 Test Study Case Study 6 Review Framework

OVERALL VIEW OF PROCESS, PRACTICES AND TOOLS

Figure 63 visualises Case Study 6 and it highlights the core emergent issues. Specifically, it draws attention to (1) challenges, such as the lack of a common terminology difficult decision making in FEI practices and the importance of creating new stimulus data instead of relying on old data; (2) reconfirms the importance of understanding the questions the study is trying to answer; and (3) the importance of creating valuable and relevant stimulus data to drive the IG session and the lack of knowledge and understanding of idea generation techniques that go beyond group brainstorming.



lack of a common terminology difficults decision making (Kaner et al, 2007)

planning (Khurana and Rosenthal, 1998; Ernst, 2002; PDMA, 2006; Bouhali et al, 2015)

Importance of understanding the questions to be answered over process

Importance of generating relevant stimulus data rather than relying on old data (Hubbard, 2010)

facilitator guides thinking and enables decision making (Doyle, 2007; Kaner, 2007; Bens, 2012)

iterative idea generation (Girotra et al, 2010)

importance of quality of stimulus data to improve idea quality and address uncertainty (Zimmermann, 1999; Kenneth, 2013)

importance of use of bespoke visual templates (Comi and Eppler, 2012; Al-Kassab et al, 2014)

lack of knowledge of Idea Generation tools beyond group brainstorming (Stroebe and Diehl, 1987)

Figure 63, Case Study 6 Summary

Case Study Summary

Identification of Product/ Service Opportunities to Create Business Growth

PHASE 1
Establishing the problem/need

Activity 1
Planning and Brief Development

PHASE 2
Discovering the Issues

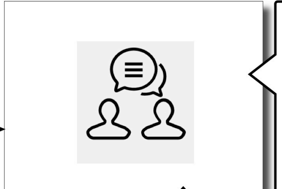
Activity 2
Data Collection

PHASE 3
Defining the Opportunities

Activity 3
Data Decoding

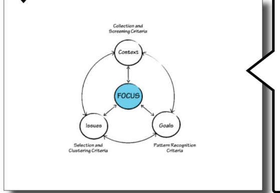
PHASE 4
Developing the Ideas

Activity 4
Opportunity Mapping

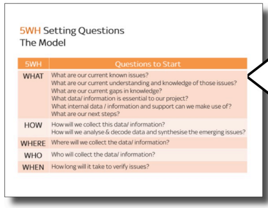


PROBLEM DEFINITION

DATA COLLECTION
10-20 days
(usually 5-10 days)
3- 5 days reflection
1-2 meetings
Collaborative process



RESEARCH PLANNING

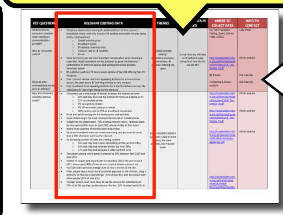


5WH Setting Questions
The Model

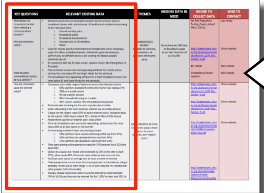
5WH	Questions to Start
WHAT	What are our current known issues? What are our current understanding and knowledge of those issues? What are our current gaps in knowledge? What data/ information is essential to our project? What internal data / information and support can we make use of? What are our next steps?
HOW	How will we collect this data/ information? How will we analyse & decode data and synthesise the emerging issues?
WHERE	Where will we collect the data/ information?
WHO	Who will collect the data/ information?
WHEN	How long will it take to verify issues?

RESEARCH QUESTIONS FRAMEWORK

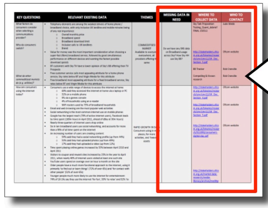
PROJECT PLANNING
1-3 days
2 days reflection
1 meetings
Collaborative process



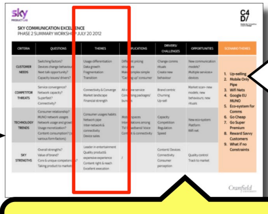
COLLECTING EXISTING DATA



LINKING DATA TO RESEARCH QUESTIONS



DEFINING ADDITIONAL MISSING DATA



IDENTIGYING EMERGING THEMES

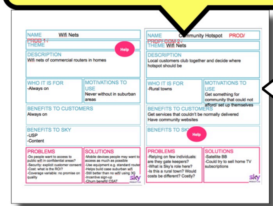
CONCEPT GENERATION
days
day reflection
meetings
Collaborative process

CONCEPT DEVELOPMENT
days
day reflection
meetings
Collaborative process

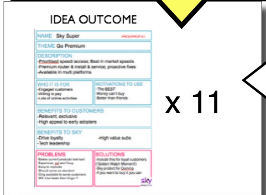
PROJECT PRESENTATION
days
review meetings
Collaborative process

DATA ANALYSIS
3-5 days
1-2 days reflection
1-2 meetings
Collaborative process

IDEA GENERATION AND SELECTION SESSION



IDEA DEVELOPMENT



x 11

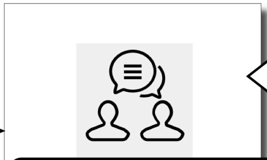
FINAL IDEAS PRESENTATION

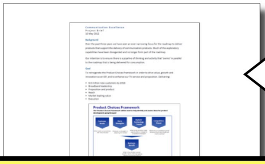
Case Study Summary

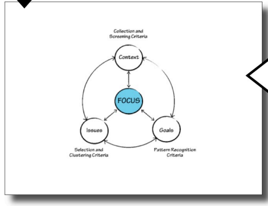
Identification of Product/ Service Opportunities to Create Business Growth

PHASE 1
Establishing the problem/need

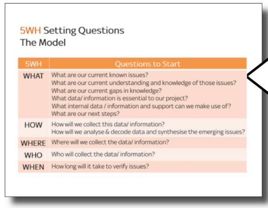
Activity 1
Planning and Brief Development


PROBLEM DEFINITION


PROJECT BRIEF



RESEARCH PLANNING


5WH Setting Questions
The Model

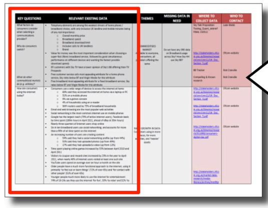
5WH	Questions to Start
WHAT	What are our current known issues? What are our current understanding and knowledge of those issues? What are our current gaps in knowledge? What data/ information is essential to our project? What internal data / information and support can we make use of? What are our next steps?
HOW	How will we collect this data/ information? How will we analyse & decode data and synthesise the emerging issues?
WHERE	Where will we collect the data/ information?
WHO	Who will collect the data/ information?
WHEN	How long will it take to verify issues?

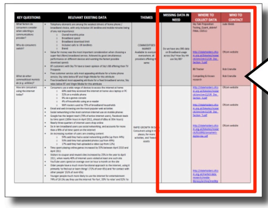
RESEARCH QUESTIONS FRAMEWORK

VALUE
From phase 1 deliverable, work has been used to
- •Mapping out existing data and define additional missing data
- •Link data to research questions and refine those questions
- •Setting up shared data source for future use

PHASE 2
Discovering the Issues

Activity 2
Data Collection

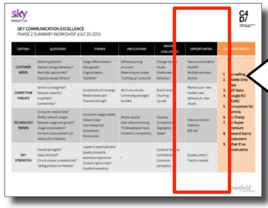

LINKING DATA TO RESEARCH QUESTIONS

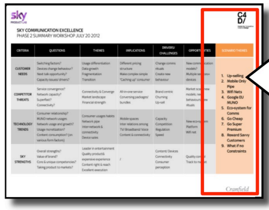

DEFINING ADDITIONAL MISSING DATA

VALUE
From phase 2 deliverable, work has been used to
- •Drive overall understanding on consumer needs & behaviours, competitors, technology trends and Sky strength in communication territory
- •Identify drivers & challenges and potential opportunities in each criteria
- •Position initial scenario themes for further exploration

PHASE 3
Defining the Opportunities

Activity 3
Data Decoding

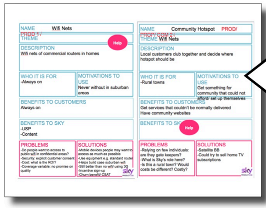

EXPLORING OPPORUNITY DIRECTIONS


GENERATING SCENARIO THEMES

VALUE
From phase 3 deliverable, work has been used to
- •Create relevant stimulus data for Idea Generation
- •Develop ideas from the IG workshop
- •11 final quality ideas that met the proposed project brief objectives and workshop criteria to nurture communication product opportunities pipeline.

PHASE 4
Developing the Ideas

Activity 4
Opportunity Mapping


IDEA DEVELOPMENT

x 11

FINAL IDEAS PRESENTATION

3.3.7 The Validation Study- Case Study 7

1. Context:

This organization is technology-driven and has a very specific focus on identifying new trends and new technologies that can play a key role to leverage market. A key issue in this project is to help identify and explore potential future opportunities (2020) for a type of manufacturing process that could create value for the organization. Subsequently, translate the opportunities into a feasibility plan for a Creative Manufacturing Lab.

2. Objective of the case study:

The objective of this case study was to validate the results from the Test Study in order to demonstrate effectiveness of: (a) the innovation framework; (2) innovation templates; (3) the idea quality criteria; (4) the internal and external data and knowledge; and (5) the idea generation techniques to: (a) identify and address the project issues that need to be resolved; (b) facilitate idea generation more effectively; (c) improve the quality of ideas and (d) idea selection.

3. Validation Study Case Study 7 focus:

The focus of this study was to identify future design and manufacturing opportunities for products and services based on a specific type of manufacturing approach. It aims to bring together brand, consumer, sustainability and technologies in the first stages of the innovation process in order to identify key opportunities for the future.

4. Project team composition:

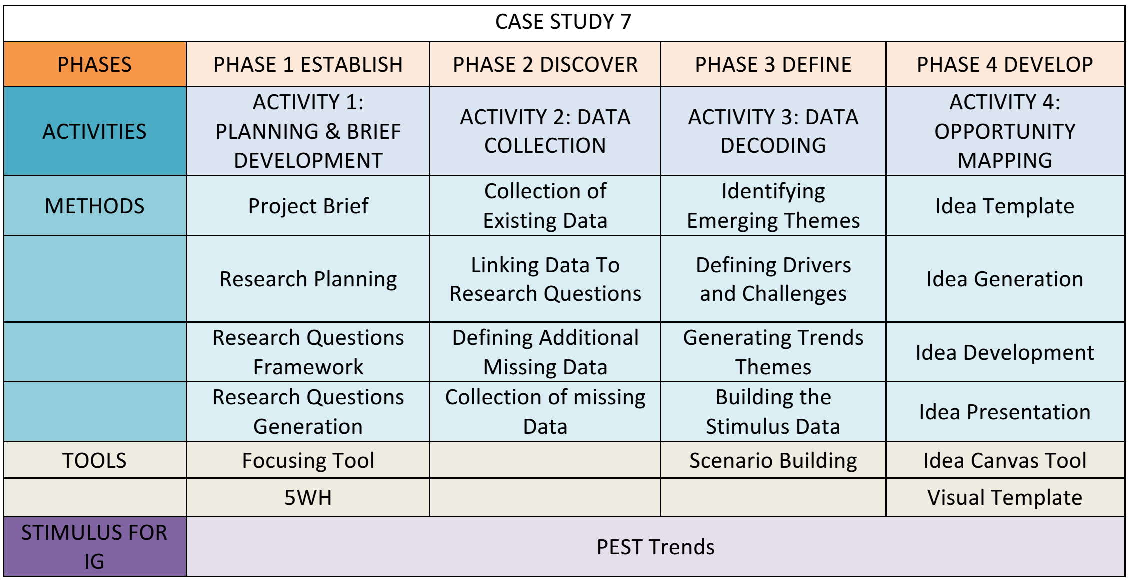
Six external and three internal company members formed the team. The external team members drove the project and the company's employees supervised the outcomes at each milestone stage. Both internal and external teams were multidisciplinary teams ranging from product design, design research, technology, engineers and marketing. However, the internal organization members played senior roles in the Design and Design Research fields.

5. Research objectives of the Validation Study Case Study 7 project:

The Test Study (Case Study 6) showed the effectiveness of the Framework in Company A in generating better quality ideas using a series of constructs that formed the SIGF.

Case Study 7 followed the same set of processes, practices and tools used in Case Study 6 as well as the same Idea Generation Techniques and supportive tools. Therefore, this case study (the Validation Case Study) focused on validating the results from Case Study 6 in order to demonstrate the adaptability of the Framework process, practices and tools in different industries and settings without compromising its effectiveness in generating quality ideas.

6. Validation Study Case Study 7 Project Phases:



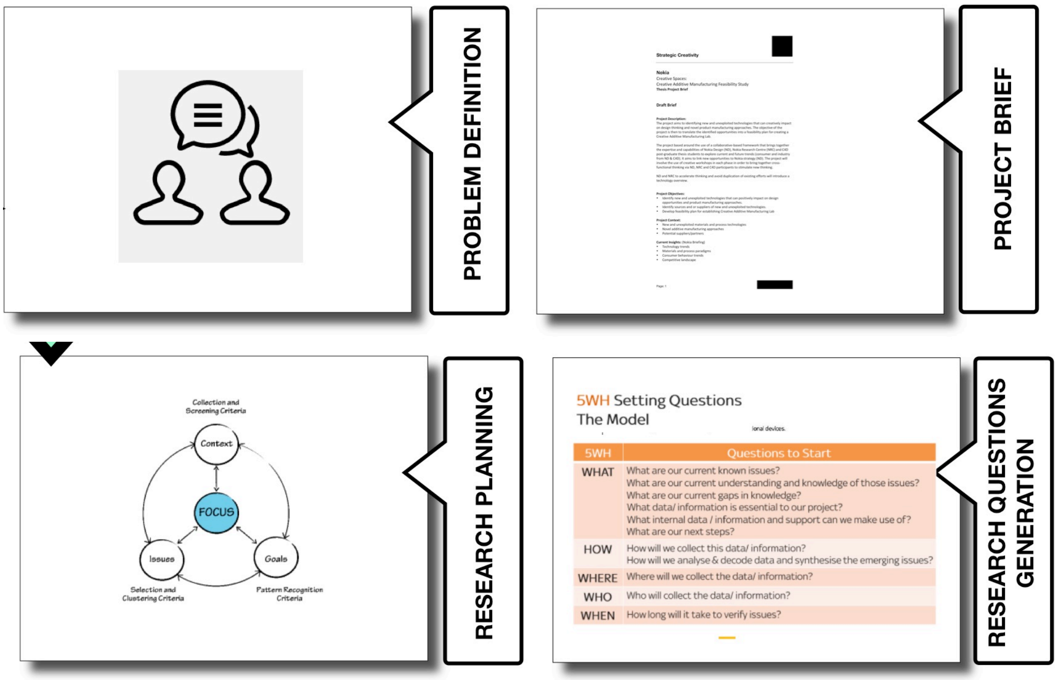
CASE STUDY 7				
PHASES	PHASE 1 ESTABLISH	PHASE 2 DISCOVER	PHASE 3 DEFINE	PHASE 4 DEVELOP
ACTIVITIES	ACTIVITY 1: PLANNING & BRIEF DEVELOPMENT	ACTIVITY 2: DATA COLLECTION	ACTIVITY 3: DATA DECODING	ACTIVITY 4: OPPORTUNITY MAPPING
METHODS	Project Brief	Collection of Existing Data	Identifying Emerging Themes	Idea Template
	Research Planning	Linking Data To Research Questions	Defining Drivers and Challenges	Idea Generation
	Research Questions Framework	Defining Additional Missing Data	Generating Trends Themes	Idea Development
	Research Questions Generation	Collection of missing Data	Building the Stimulus Data	Idea Presentation
TOOLS	Focusing Tool		Scenario Building	Idea Canvas Tool
	5WH			Visual Template
STIMULUS FOR IG	PEST Trends			

Figure 64 Case Study 7 Project Phases

The process for Case Study 7 followed the same structure as Case Study 6 as it looked at validating the repeatability of the process as well as the performance and efficacy of the Framework. The steps were also similar ones, proving the process could be applied in different industries and different kind of innovation projects during the first stages of the Fuzzy Front End.

Activity 1: Planning and Brief Development:

The planning of the project focused on the problem definition, subsequent brief development and research planning. The project brief looked at defining the objective of the project and determine the resources involved in the project. The research planning focused on identifying key challenges, core goals and set up the context of the project. These steps helped to trigger the research questions that needed answer during this project, which were split into two phases, the framework generation and the questions generation (see Figure 65).



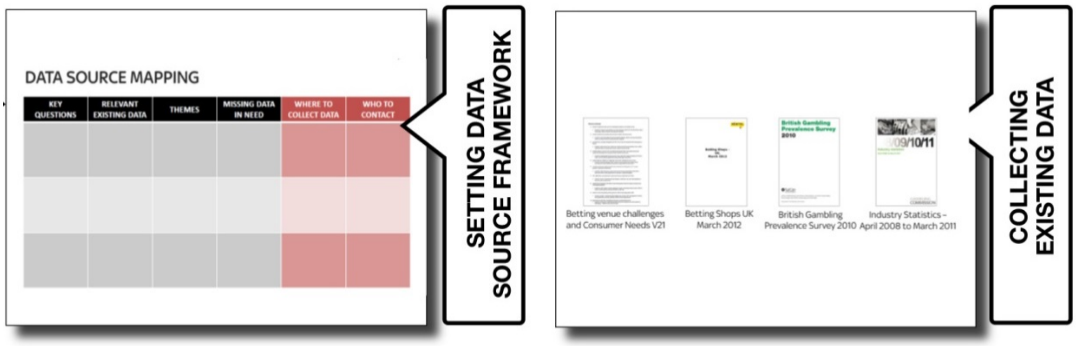
5WH Setting Questions
The Model

5WH	Questions to Start
WHAT	What are our current known issues? What are our current understanding and knowledge of those issues? What are our current gaps in knowledge? What data/ information is essential to our project? What internal data / information and support can we make use of? What are our next steps?
HOW	How will we collect this data/ information? How will we analyse & decode data and synthesise the emerging issues?
WHERE	Where will we collect the data/ information?
WHO	Who will collect the data/ information?
WHEN	How long will it take to verify issues?

Figure 65 Planning and Brief Development Activity

Activity 2: Data Collection:

The data collection activity started by sorting the existing data into predefined categories within the framework based on the key PEST trends (Political, Economic, Social and Technological), which were considered the most relevant to this project. Most of collected data was already in-house but had not been previously collected nor been utilized before. The third step focused on linking the data collected to the research questions, highlighting gaps that were addressed by gathering additional data (see Figure 66).



DATA SOURCE MAPPING

KEY QUESTIONS	RELEVANT EXISTING DATA	THEMES	MISSING DATA IN NEED	WHERE TO COLLECT DATA	WHO TO CONTACT

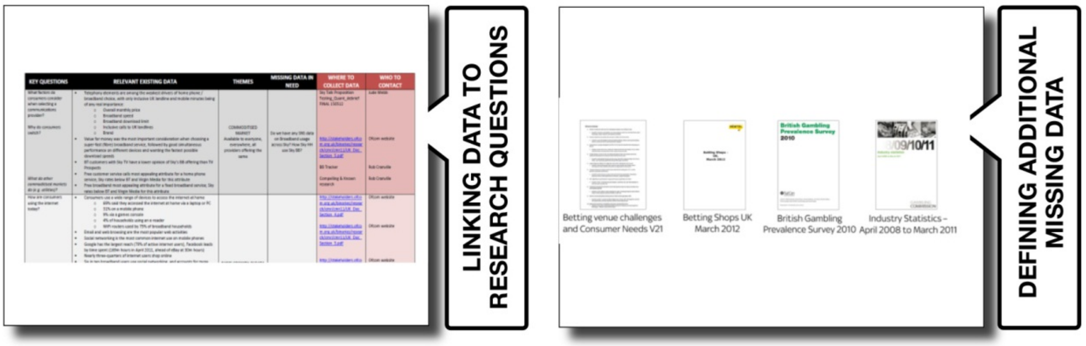


Figure 66 Data Collection Activity

Activity 3: Data Decoding:

The analysis of the data helped to create an understanding of emerging themes, challenges and drivers of the project topic that were impacting on consumers' lives. It also enabled a more extensive understanding of the target segment lifestyle and in particular their common benefits (see Figure 67). The last stage focused on generating scenario themes to help enhance the idea generation session.

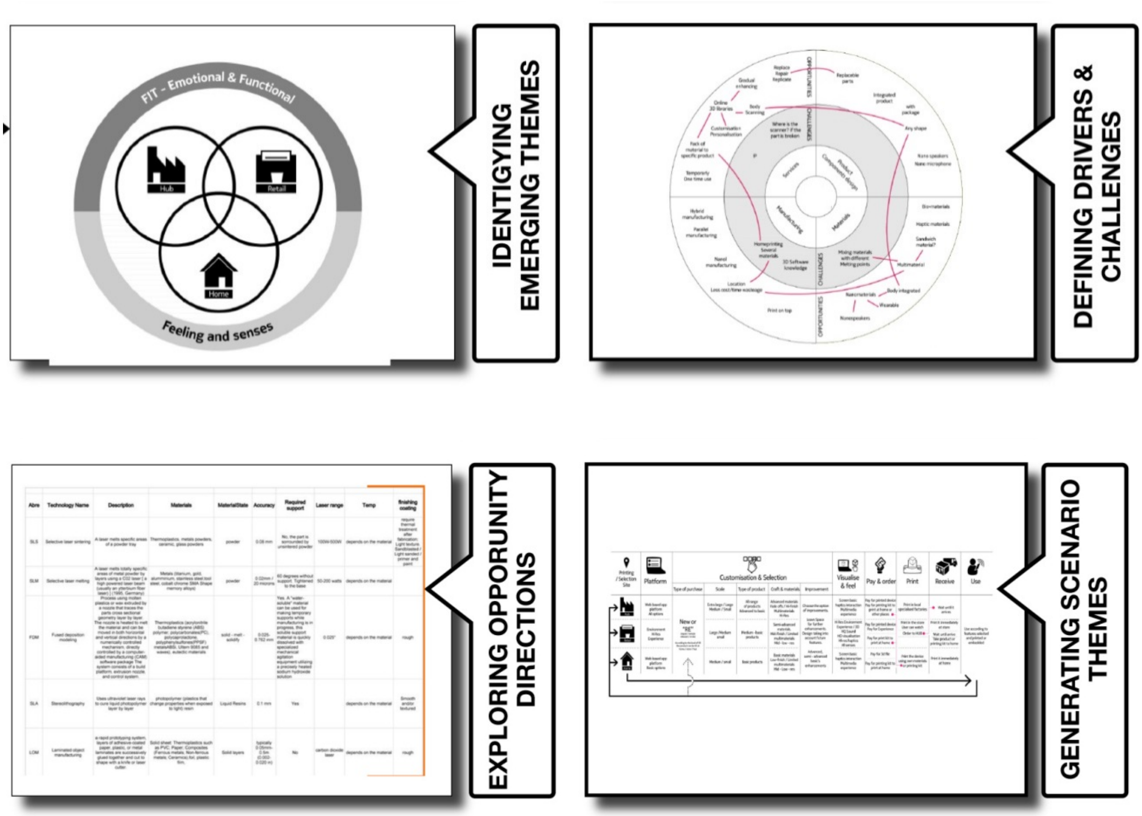


Figure 67 Data Decoding Activity

Activity 4: Opportunity Mapping:

This last activity, the Opportunity Mapping, focused on the idea generation session. The first step was the Stimulus Data Generation phase in which all the decoded information was turned into stimulus data, in this case it was visualised in a card format, with the aim of acting as a supportive tool for the generation of quality ideas. As seen in Case Study 6 there were a series of templates and stimulus to carry out the session (see Figure 68). Once the ideas had been evaluated under the set criteria there was an idea development to strengthen the selected ideas and were turned into a compelling presentation of the high-quality ones.

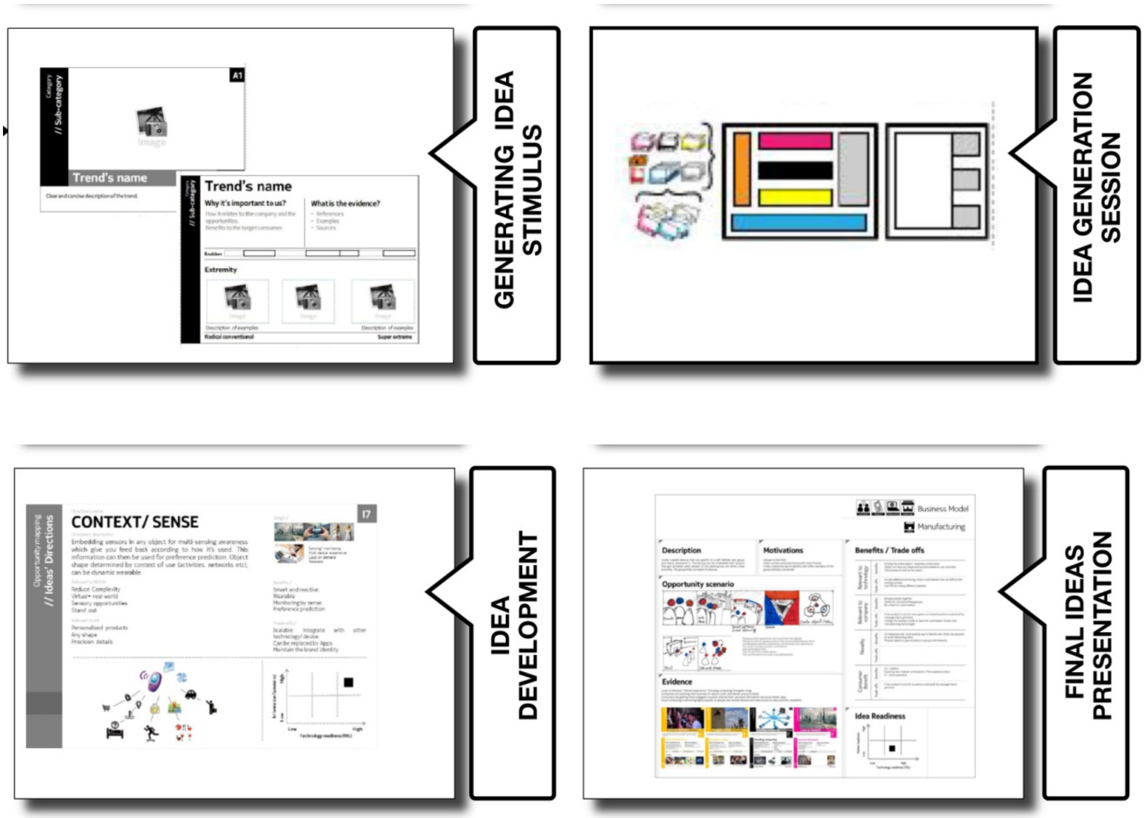


Figure 68 Opportunity Mapping Activity

7. Idea Generation Session Characteristics

Session Objectives

The main objective of the Idea Generation Session was to develop ideas for a product, service, system and business model that can become a game changer for the organization.

Workshop Participants

Fifteen multidisciplinary participants (Cooper, 1988) split into five teams formed the team.

Idea Generation Techniques

The Idea Generation session followed a very similar setting as the one in the Test Study.

The nature of the process relied on a systematic practice combined with reflective thinking to maximise critical thinking. The Idea Generation techniques chosen for this session were a combination of principles of Nominal Iterative Brainstorming, HIT and Directed Brainstorming, for the same reasons as Test Study (Case Study 6). The supportive tools were comprised by a series of Stimulus data focused on trends and bespoke visual templates.

Type of Team	Multidisciplinary
Number of Participants	15 (5 teams of 3 people)
Facilitation	External from organization
Timing	4 hours
Type of process	Systematic Reflection approach
Idea Generation Techniques	Combination of Nominal Brainstorming, HIT and Directed Brainstorming principles.
Idea Generation Tools	Visual templates and stimulus data (Trends)

Table 52 Idea Generation Session Characteristics

Session Activities

This Idea Generation Session built upon the same process as the one from Case Study 6, but incorporating a different type of stimulus data and enhanced format.

The stimulus data cards were divided into five categories: context, design, technical, user profile and rules, considered the most relevant trends to the project focus. A second reason behind this selection of categories lied in a balance between key information for the organization ranging from low to high level of innovation potential in a form of a visual market landscape.

The role of the facilitator in this stage was to make sure the ideas generated came from the stimulus data and not from the participant personal reference. These stimulus cards had three key functions: (1) To transform data through visualisation methods into usable information, (2) to engage participants with relevant information and (3) to stimulate combination of information in order to create new ideas. However, the technical information on the Technology stimulus cards did not turn up as helpful as expected. The data did not focus on the benefits that the technologies offered but in their technical specifications, therefore not representing a useful trigger for idea generation.

To facilitate idea generation in the early development stages, using all the information, a conceptual framework was developed which helped integrate the trend, brand, consumer and additive manufacturing information and translate it into future consumer scenarios. Using the scenarios, ideas were generated that reflected how additive manufacturing could be employed in the future and what kind of products/ services could be developed around it. Finally, translating ideas into strategic directions by proposing different manufacturing processes and business models strengthened the ideas.

Session Tools

The visual template had the same components as all the case studies. In this occasion, there was no special interest in generating ideas towards a specific target segment as the project aimed to improve internal processes and therefore, customer profiles were not relevant. (1) The definition of the problem or need being tackled appeared in this visual template as in previous studies to guide thinking toward the core problem. As seen in previous case studies, the visual template encouraged an (2) idea explanation to avoid poor idea definition and enhance idea sharing and development. Finally, the (3) evaluation criteria of ideas followed the same principles of novelty, feasibility and alignment to business objectives, which were really clear in this visual template to evaluate results.

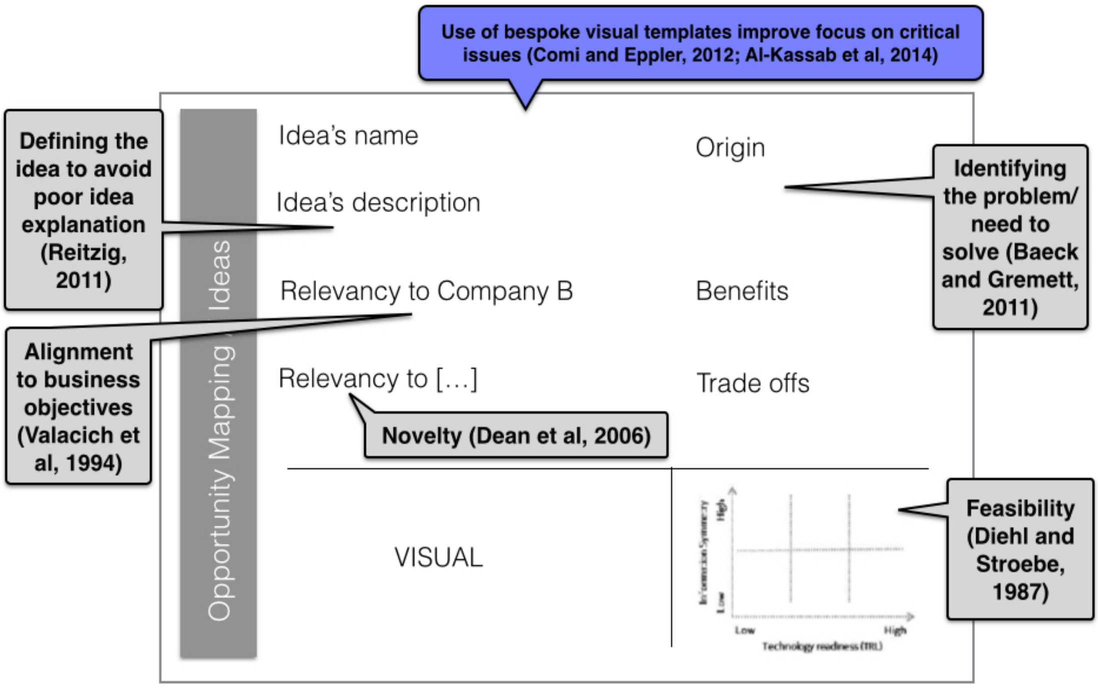


Figure 69 Template example

8. Evaluation Criteria

As the objective of Case Study 7, the Validation Study, was to generate ideas to help an innovation pipeline in Company B the case study adopted an Idea Evaluation criteria focused on the same parameters as in previous Case Studies in order to validate their effectiveness: (1) Novelty (Dean et al, 2006); (2) Feasibility (Diehl and Stroebe, 1987); and (3) Alignment to business objectives (Valacich et al., 1994).

9. Idea Generation Session Outcomes

The outcome from the Idea Generation workshop was a set of eight ideas that had been evaluated and selected as potential opportunities for Company B processes, technologies, benefits and trade-offs.

The eight ideas from the workshop were further developed into a series of scenarios to illustrate how the idea would work. The team created a complex set of visual scenarios to further explain the quality ideas and demonstrate their articulation across technology, manufacturing and brand experience.

In summary, the visual templates helped to inform about the feasibility of the ideas as well as their robustness. When working with multinational organizations, this step is crucial to share the results from a project across departments and provide very complex information in a simple and easy way.

10. Key Learnings

There have been three key learnings from the use of the Rapid Idea Canvas in Case Study 7: (1) The use of multidisciplinary teams provided a deep understanding of the issues, accelerating the idea development stage; (2) The role of the facilitator in Idea Generation sessions has been crucial to support teams in the process of generating ideas but also to remind the constraints of the evaluation criteria, making sure the performance of the teams and the process during the session are outstanding; and (3) That each team needed to describe all their ideas before moving on to the next team, so there is a holistic understanding of the primary ideas and therefore, better developed by the following teams. A common way to describe ideas to get a clear understanding of each others' ideas could be of interest for future research.

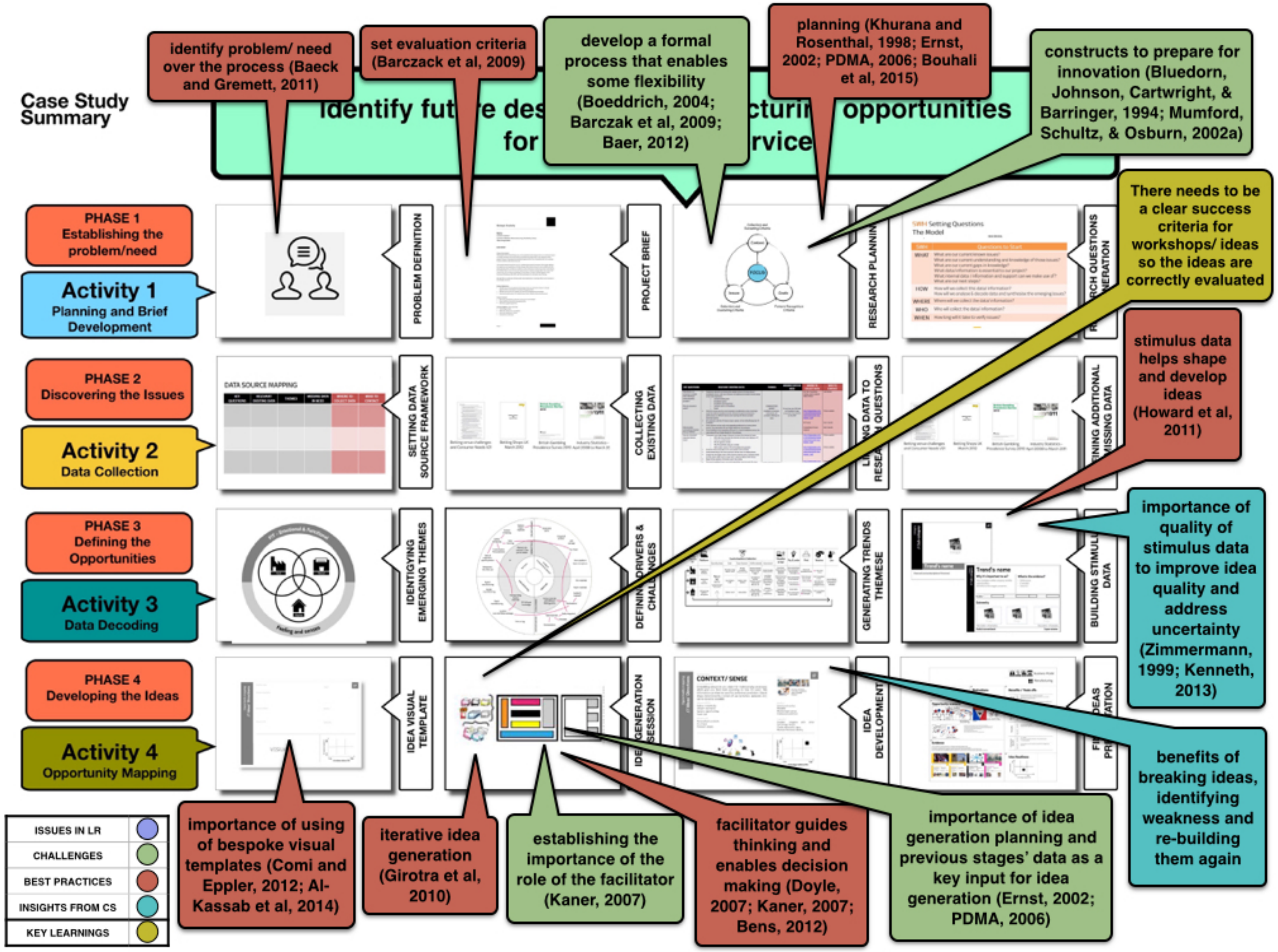
Table 53 shows there have been two main observations during the Validation Case Study regarding the process: (1) when generating ideas, the activities needs to be taken into account specifically the target market and the need for the idea. If there is not a clear opportunity the idea will be destined to fail; and (2) there needs to be a clearly defined success criteria for idea selection so that ideas are correctly evaluated and participants of the session avoid off-topic talks and concepts that are not relevant for the session.

	VALIDATION STUDY Case Study 7 Company B
Purpose	The research objectives of case study 7 was to validate the results from the test study in order to demonstrate effectiveness the use of (a) innovation framework; (b) innovation templates; (c) idea quality criteria (d) internal and external data and knowledge; and (e) idea generation techniques on: (1) identifying and addressing project issues that needed to be tackled; (2) facilitating idea generation; and (3) improving idea quality; and (4) idea selection.
Type of Project	The project focussed on the generation of **ideas to help boost a new innovation pipeline**. The main emphasis was on determining and developing potential future opportunities (2020) for a type of manufacturing process that could create value for the organization.
Practises	Project brief, focussing tool, 5WH, Research Questions Framework, data collection and data analysis, Nominal Brainstorming, HIT and Directed Brainstorming principles.
Scoping Tools used	The innovation framework, innovation template and idea quality criteria helped team members identify, discuss and generate ideas more easily. (1) The visual templates draw special attention to the problem or need being tackled to guide thinking toward the core problem. It also encouraged an idea explanation to avoid poor idea definition and enhance idea sharing and development. (2) The stimulus data played a key role to address the need of the project. They summarised the core data in trends, brand, consumer behaviours and technology in order to support and guide thinking during the idea generation session.
Key Learnings	This Case Study highlighted the appropriateness of the Framework's process, practices and tools across organisations by demonstrating its capability to drive innovation in different types of projects, organisations and complexity of problems improving the quality of the ideas generated.

Table 53 Validation Study Case Study 7 Review Framework

OVERALL VIEW OF PROCESS, PRACTICES AND TOOLS

Figure 70 highlights the most important issues that appeared in Case Study 7. For instance, it draws attention to (1) challenges, such as the importance to establish the role of the facilitator, the importance of planning and the quality of data in idea generation practices, and the need for a formal process that allows a certain level of flexibility to address a wider set of challenges; (2) insights from the study, such as the importance of the stimulus data to improve quality of ideas and address uncertainty in IG session; and (3) a key learning that focuses on the need to establish a clear success criteria for workshops and ideas so the outcomes are correctly evaluated.



identify problem/ need over the process (Baeck and Gremett, 2011)

set evaluation criteria (Barczack et al, 2009)

develop a formal process that enables some flexibility (Boeddrich, 2004; Barczak et al, 2009; Baer, 2012)

planning (Khurana and Rosenthal, 1998; Ernst, 2002; PDMA, 2006; Bouhali et al, 2015)

constructs to prepare for innovation (Bluedorn, Johnson, Cartwright, & Barringer, 1994; Mumford, Schultz, & Osburn, 2002a)

There needs to be a clear success criteria for workshops/ ideas so the ideas are correctly evaluated

stimulus data helps shape and develop ideas (Howard et al, 2011)

importance of quality of stimulus data to improve idea quality and address uncertainty (Zimmermann, 1999; Kenneth, 2013)

benefits of breaking ideas, identifying weakness and re-building them again

importance of using of bespoke visual templates (Comi and Eppler, 2012; Al-Kassab et al, 2014)

iterative idea generation (Girotra et al, 2010)

establishing the importance of the role of the facilitator (Kaner, 2007)

facilitator guides thinking and enables decision making (Doyle, 2007; Kaner, 2007; Bens, 2012)

importance of idea generation planning and previous stages' data as a key input for idea generation (Ernst, 2002; PDMA, 2006)

Figure 70, Case Study 7 Summary

Preliminary Findings from Validation Study

The validation study applied the synthesised idea generation Framework and tested an Idea Generation tool during the Idea Generation session. A series of insights have come up as a result of using these approaches.

The validation study highlighted the importance of understanding the right questions that the project needs to answer during the first phase of FEI projects. It identified that the teams were able to follow the process more efficiently when it came to answer the research questions, rather than following a process structure. This insight is crucial to determine how multinational organisations could adopt more question-driven processes within their innovation practices, rather than just structured methods. Multiple processes often drive large corporations and this question-driven approach could represent an easy way to enhance an innovation culture and to improve their idea pipelines.

This study tested the three key identified observations that influence idea generation practices: (1) the dilemma between quality versus quantity in idea generation practices; (2) the dilemma between individual versus collective idea generation practices and (3) the role that the quality of the data put into the idea generation session plays to trigger ideation.

Seeking quantity over quality does not typically result in market innovation (Ulrich and Eppinger, 2000), as ideas generated with that purpose tend to be out of scope by not aligning to business objectives, or not being novel or feasible. Moreover, this validation study established that when participants are explained the set criteria that ideas will be evaluated against, it helps them to focus on the important aspects to generate focused and relevant ideas. This observation highlights the benefits of clearly stating the success criteria for ideas, and therefore, for the workshops so the ideas are correctly stimulated and evaluated accordingly.

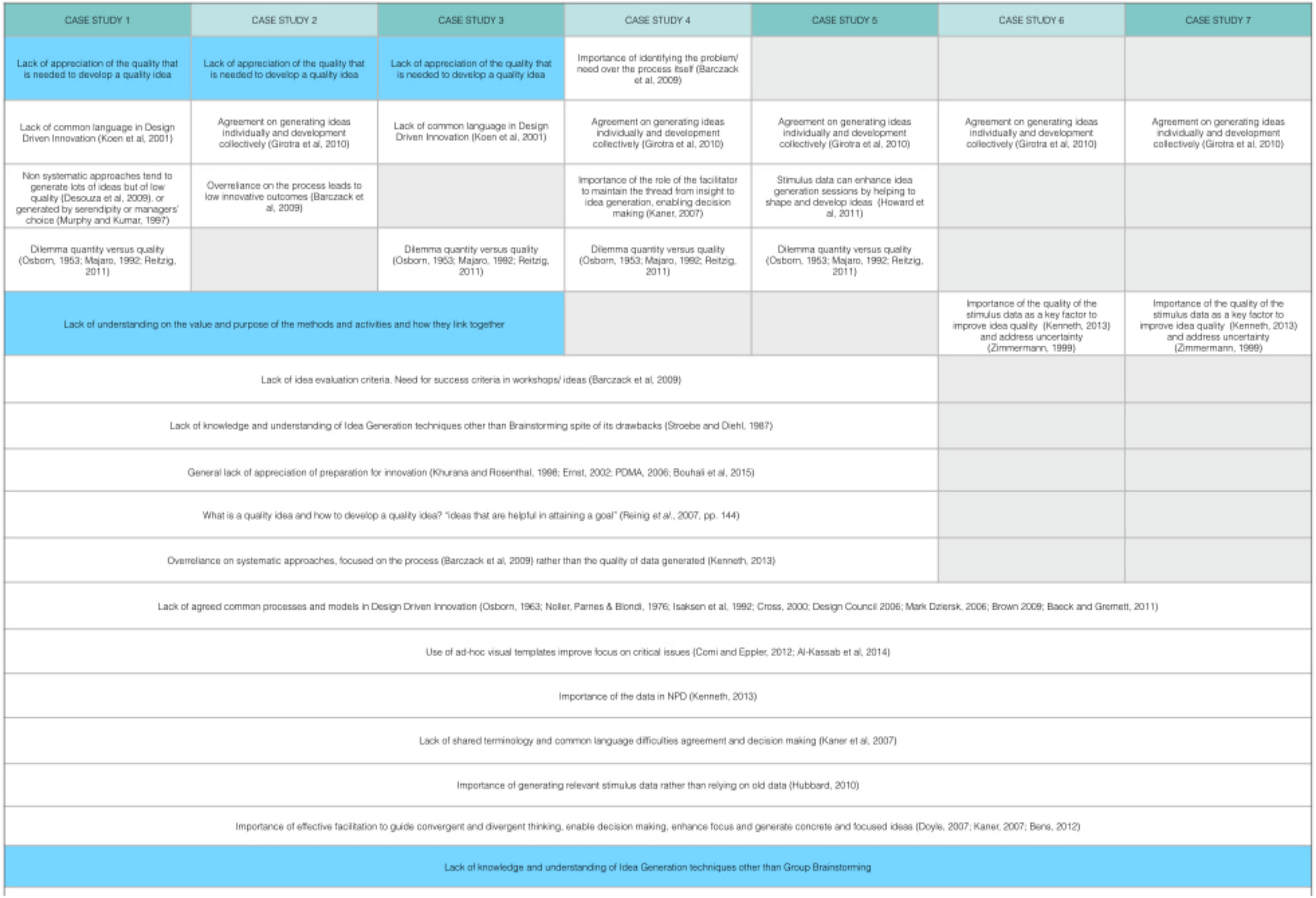
The validation study proved the benefits of iterative thinking in Idea Generation Practices in a different sample organisation. It showed individual and collective practices not only have an impact on idea generation but also in the quality of the ideas generated. Iterative thinking where individuals generate ideas individually but developing as a group collectively has demonstrated a positive impact on the quality of the ideas generated based upon collective discussion driven by personal reflection with peer evaluation. This is based on the principles of nominal brainstorming (Sutton and Hargadon, 1996), which have been previously discussed in this study, that relate to the improved efficacy of generating ideas individually and then sharing them as a group, improving the quality of ideas generated, ideas developed and the selection of the ideas (Girotra, 2010; Stroebe and Diehl, 1994).

The third key learning from this exploratory study was the impact that the use of quality of information within idea generation workshop session has on improving the generation of quality ideas (generation of more ideas that fulfil agreed criteria that have some distinctive characteristic). Based upon the use of rigorous data collection and decoding processes, focussed on the synthetisation and visualisation of data into useable information and knowledge (Kenneth, 2013).

3.4 Summary of the Case Studies

To conclude, this section will reflect on the emerging issues form the case studies against their appearance in literature. The following table (Figure 66) visualises the repeatability of issues across the Case Studies. As the image shows, there are some issues that happen in isolation while others appear repeatedly across case studies, up to the point that several of them appear across the seven case studies: (1) Lack of agreed common processes and models in Design Driven Innovation (Osborn, 1963; Noller, Parnes & Blondi, 1976; Isaksen et al, 1992; Cross, 2000; Design Council 2006; Mark Dziersk, 2006; Brown 2009; Baeck and Gremett, 2011); (2) Use of bespoke visual templates improves focus on critical issues (Comi and Eppler, 2012; Al-Kassab et al, 2014); (3) The importance of the data quality in NPD (Kenneth, 2013) in order to improve usability and IG results; (4) Lack of shared terminology and common language difficulties agreement and decision-making (Kaner et al, 2007); (5) The need of generating relevant stimulus data rather than relying on old data (Hubbard, 2010); and (6) The importance of effective facilitation to guide convergent and divergent thinking, enable decision-making, enhance focus and generate concrete and focused ideas (Doyle, 2007; Kaner, 2007; Bens, 2012).

Figure 71 identifies three issues (highlighted in blue): (1) Lack of appreciation of the components that are needed to develop a quality idea; (2) Lack of knowledge and understanding of Idea Generation techniques other than Group Brainstorming; and (3) Lack of understanding on the value and purpose of the methods and activities in Innovation processes (specifically their lack of experience in innovation processes difficult their understanding of the reason the activities have a certain order and how they link together, so the output from a phase becomes the input in the next one). These insights have not been identified in literature but represent important emerging issues within the topic and play a key role within this research study, as seen in the related Case Studies.



CASE STUDY 1	CASE STUDY 2	CASE STUDY 3	CASE STUDY 4	CASE STUDY 5	CASE STUDY 6	CASE STUDY 7
Lack of appreciation of the quality that is needed to develop a quality idea	Lack of appreciation of the quality that is needed to develop a quality idea	Lack of appreciation of the quality that is needed to develop a quality idea	Importance of identifying the problem/ need over the process itself (Barczack et al, 2009)			
Lack of common language in Design Driven Innovation (Koen et al, 2001)	Agreement on generating ideas individually and development collectively (Girotra et al, 2010)	Lack of common language in Design Driven Innovation (Koen et al, 2001)	Agreement on generating ideas individually and development collectively (Girotra et al, 2010)	Agreement on generating ideas individually and development collectively (Girotra et al, 2010)	Agreement on generating ideas individually and development collectively (Girotra et al, 2010)	Agreement on generating ideas individually and development collectively (Girotra et al, 2010)
Non systematic approaches tend to generate lots of ideas but of low quality (Desouza et al, 2009). or generated by serendipity or managers' choice (Murphy and Kumar, 1997)	Overreliance on the process leads to low innovative outcomes (Barczack et al, 2009)		Importance of the role of the facilitator to maintain the thread from insight to idea generation, enabling decision making (Kaner, 2007)	Stimulus data can enhance idea generation sessions by helping to shape and develop ideas (Howard et al, 2011)		
Dilemma quantity versus quality (Osborn, 1953; Majaro, 1992; Reitzig, 2011)		Dilemma quantity versus quality (Osborn, 1953; Majaro, 1992; Reitzig, 2011)	Dilemma quantity versus quality (Osborn, 1953; Majaro, 1992; Reitzig, 2011)	Dilemma quantity versus quality (Osborn, 1953; Majaro, 1992; Reitzig, 2011)		
Lack of understanding on the value and purpose of the methods and activities and how they link together					Importance of the quality of the stimulus data as a key factor to improve idea quality (Kenneth, 2013) and address uncertainty (Zimmermann, 1999)	Importance of the quality of the stimulus data as a key factor to improve idea quality (Kenneth, 2013) and address uncertainty (Zimmermann, 1999)
Lack of idea evaluation criteria. Need for success criteria in workshops/ ideas (Barczack et al, 2009)						
Lack of knowledge and understanding of Idea Generation techniques other than Brainstorming spite of its drawbacks (Stroebe and Diehl, 1987)						
General lack of appreciation of preparation for innovation (Khurana and Rosenthal, 1998; Ernst, 2002; PDMA, 2006; Bouhali et al, 2015)						
What is a quality idea and how to develop a quality idea? "ideas that are helpful in attaining a goal" (Reinig *et al.*, 2007, pp. 144)						
Overreliance on systematic approaches, focused on the process (Barczack et al, 2009) rather than the quality of data generated (Kenneth, 2013)						
Lack of agreed common processes and models in Design Driven Innovation (Osborn, 1963; Noller, Parnes & Biondi, 1976; Isaksen et al, 1992; Cross, 2000; Design Council 2006; Mark Dziersk, 2006; Brown 2009; Baeck and Gremett, 2011)						
Use of ad-hoc visual templates improve focus on critical issues (Comi and Eppler, 2012; Al-Kassab et al, 2014)						
Importance of the data in NPD (Kenneth, 2013)						
Lack of shared terminology and common language difficulties agreement and decision making (Kaner et al, 2007)						
Importance of generating relevant stimulus data rather than relying on old data (Hubbard, 2010)						
Importance of effective facilitation to guide convergent and divergent thinking, enable decision making, enhance focus and generate concrete and focused ideas (Doyle, 2007; Kaner, 2007; Bens, 2012)						
Lack of knowledge and understanding of Idea Generation techniques other than Group Brainstorming						

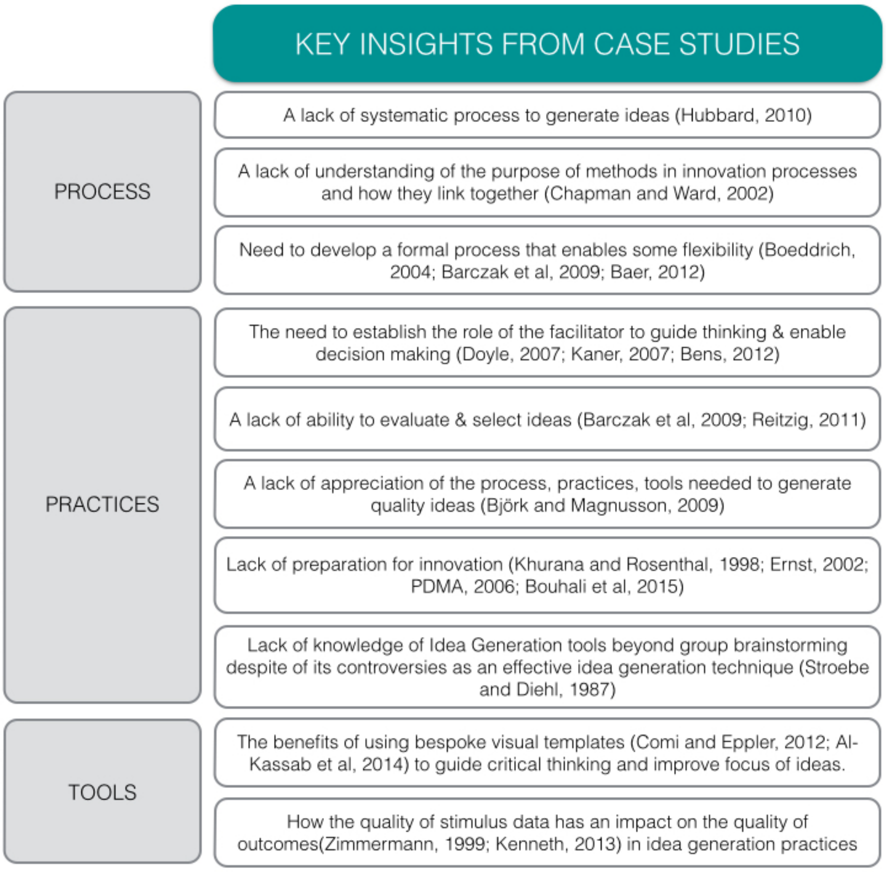
Figure 71 Key Issues in Case Studies linked to literature, Author

The Case Studies have consistently shown there is a lack of appreciation and awareness of the importance of facilitating the process of generating and selecting ideas to ensure alignment and fit with impact measures at all stages of the idea generation process. This was identified in the exploratory interviews as well as in Case Studies 3, 4 and 5 where there was a tendency to turn the project leader into the facilitator of the IG session without considering his or her suitability or knowledge to successfully run it. This insight links back to the issue of 'preparing to innovate'. If a facilitator is chosen randomly (whether it is externally or internally) and does not really understand the purpose of the idea generation session and the process in which it fits, the session will typically not hit the targeted objectives.

The Case Studies have shown that there are common processes, phases and activities that take place in idea generation activities. Flexibility is needed in the methods and tools required to accommodate variations in project types and required outcomes. A key contributing factor in successful group based idea generation is facilitation. The facilitator acts as the enabler of decision-making by maintaining the thread from the insight to the final validated idea. The importance of the group facilitator links back to the Preparation for Innovation constructs.

The Case Studies Sample demonstrated an improvement on different aspects of the projects, such as setting clear objectives, allocation of roles among team members, and planning of projects. However, before starting the research study, Company A saw planning and preparation as an occasional activity (considered only in complex or business critical projects) and was not considered to be a key influencing factor on the output of the project. For example, employees in organisation A did not have a clear idea on the specific purpose of activities and phases within the innovation process, which made difficult the planning stage. The Case Study sample has shown that there needs to be a clear outcome from each activity before moving to the next planned activity. Therefore, there is a need for the development and focus of the Establishing Phase where emphasis is placed on the planning and objectives of each phase of the project. Preparation for innovation is based on three factors: material, financial and human resources (Claver et al, 1998), however, there needs to be a culture in the organization to support these resources in order to help fuel innovation. Therefore, organisations that invest time in planning the process and the methodology of an innovation process but lack a constant culture will fail at their innovation performance (Letamendia and Marzo, 1993). In the case of Organisation A, the case studies have shown their idea of Planning was to allocate resources, people involved in the project and a draft timeline. However, in terms of Preparation for Innovation, there was not a preconceived idea of what considerations would an innovation project bring upon the team and the organization.

The Case Studies have led to the identification of a series of insights and take away messages (see Figure 72) that have repeatedly appeared across them and that address gaps in knowledge, support previous research studies or contradict them. Hence, the Case Studies have shed light into the difference between theory and practice, for instance regarding Preparation for Innovation, while the literature advocates it as a key success factor for innovation projects, organizations still do not consider it as a crucial phase due to the fast pace they typically work.



	KEY INSIGHTS FROM CASE STUDIES
PROCESS	A lack of systematic process to generate ideas (Hubbard, 2010)
	A lack of understanding of the purpose of methods in innovation processes and how they link together (Chapman and Ward, 2002)
	Need to develop a formal process that enables some flexibility (Boeddrich, 2004; Barczak et al, 2009; Baer, 2012)
PRACTICES	The need to establish the role of the facilitator to guide thinking & enable decision making (Doyle, 2007; Kaner, 2007; Bens, 2012)
	A lack of ability to evaluate & select ideas (Barczak et al, 2009; Reitzig, 2011)
	A lack of appreciation of the process, practices, tools needed to generate quality ideas (Björk and Magnusson, 2009)
	Lack of preparation for innovation (Khurana and Rosenthal, 1998; Ernst, 2002; PDMA, 2006; Bouhali et al, 2015)
	Lack of knowledge of Idea Generation tools beyond group brainstorming despite of its controversies as an effective idea generation technique (Stroebe and Diehl, 1987)
TOOLS	The benefits of using bespoke visual templates (Comi and Eppler, 2012; Al-Kassab et al, 2014) to guide critical thinking and improve focus of ideas.
	How the quality of stimulus data has an impact on the quality of outcomes(Zimmermann, 1999; Kenneth, 2013) in idea generation practices

Figure 72 Insights from Case Studies, Author

In terms of the process, the Case Studies Sample has demonstrated there is a lack of systematic processes typically used to generate ideas, as they typically tended to be held very informally. Secondly, it has suggested a lack of understanding of purpose of methods to be used, primarily due to a lack of familiarity with innovation processes (i.e. an understanding of the specific purpose of each stage or phase and the typical outcomes required). Thirdly, it has demonstrated that the way to resolve these problems is to develop a systematic framework that provides guidance but which is not prescriptive and constraining, enabling flexibility to address different types of projects and issues.

In relation to practices a key emergent insight is that there is a lack of appreciation of what is needed to generate a quality ideas (Björk and Magnusson, 2009). The Idea Generation Framework has demonstrated the need for The Establishing Phase, which embeds the principles of Preparation for Innovation as well as planning activities. The integration of the Establishing Phase at the beginning of each Case Study has helped to enhance the outcomes from the Idea Generation sessions. Secondly, the establishment of idea evaluation criteria helps to determine the different aspects linked to quality by which all ideas generated will be evaluated against.

There is also typically (and frequently) an underestimation of the Establishing phase, which impacts on quantity of resources put into it. For instance, case Studies 1, 2, 3, 4 and 5 have demonstrated there is a lack of preparation for innovation (Khurana and Rosenthal, 1998; Ernst, 2002; PDMA, 2006; Bouhali et al, 2015).

There are three insights in the Case Study Sample regarding practices that belong to the different components of the idea generation session. The first one relates to the lack of knowledge of Idea Generation tools beyond group brainstorming despite of its controversies as an effective idea generation technique (Stroebe and Diehl, 1987). The Idea Generation Framework has demonstrated the benefits of other IG techniques to improve quality of outcomes (New business opportunities, new value proposition ideas, new ideas to boost the innovation pipeline). Secondly, there is a lack of ability to evaluate & select ideas (Barczak et al, 2009; Reitzig, 2011) due to a lack of experience of establishing an evaluation criteria to help prioritise and select the appropriate ideas. Lastly, the Case Study Sample has identified the need to establish the importance of the role of the facilitator to guide thinking & enable decision-making (Doyle, 2007; Kaner, 2007; Bens, 2012) in the Idea Generation session.

In terms of tools, there are two core insights from this study. Firstly, a lack of appreciation for bespoke visual templates (Comi and Eppler, 2012; Al-Kassab et al, 2014) to guide critical thinking, address the specific challenges of the process. Instead, Case Study showed that Sample Company A, had a tendency in using generic templates, which led to low quality of ideas. Secondly, there is an underestimation of the importance of using Stimulus Data to trigger and drive the idea generation session. In fact, the Synthesized Idea Generation Framework has demonstrated the importance of the quality of stimulus data (analised data) to enhance the quality of ideas and address uncertainty around the given problem (Zimmermann, 1999; Kenneth, 2013)

Therefore, the Synthesized Idea Generation Framework showcased the identified gaps in the literature:

- The struggle to generate a flow of actionable ideas in FEI practices
- The inability to establish the importance of the role of the facilitator
- Inability to understand the constructs to prepare for innovation
- The difficulty of balancing structured and informal practices
- The inability to create bespoke visual templates and stimulus data

4. Findings

Introduction

The following information will present and examine the findings obtained from the sample case studies. This chapter is composed of five sections that tackle the main research questions of this study (please see page 132). Each subsection summarises the core findings as well as discusses emerging themes from the data gathered answering the relevant research questions.

In order to highlight the core findings in data, each chapter includes a table that visualises the qualitative findings to rapidly pick out the key information. This information is derived from a series of large data maps in which each Case Study was mapped against literature review, emerging issues, insights and key learnings (see Appendix 5).

This chapter explores the findings to the study's research questions (see page 132). Firstly, this chapter will introduce the outcomes to the investigation of the improvement of Front End Idea Generation practices in MNCs (RQ1). Secondly, it will tackle the processes and methods that are typically used in Front End Innovation activities (RQ2), which triggers the establishment of issues and factors around Idea Quality (RQ3). This chapter is brought to an end by examining The Idea Generation Framework, which brings together the outcomes related to the way MNCs can enhance their Idea Generation practices.

This investigation has focused on the following topics on the sample organisations, which have demonstrated a series of insights and emerging trends. All the data gathered was qualitative in nature. The following sections will present the summarized findings.

4.1. Processes and Practices in Front End Innovation

The purpose of this section is to help answer the research question: How can Front End Idea Generation practices in Multinational Organisations be enhanced to improve (a) the quality (defined as the novelty, feasibility and alignment to business objectives) of idea generation. To do so this section will expand the findings from this research study around the involvement of MNCs in Front End Innovation practices within the sample New Product Development companies and the insights that have been discovered, which will help answer such research question. The reason behind this subchapter is to draw attention to the insights gained from the case studies within the specific Front End Innovation activities in the Case Studies sampled. This helps to unpack and further develop previous studies (Boland and Collopy, 2004; Barczak et al., 2009; Kenneth, 2013) that have shed light to some issues currently happening in New Product Development processes but have not got into detail on the specifics of Front End Idea Generation activities. This section addresses the importance of acknowledging what is needed to develop a good idea.

These activities have enabled to answer the research question (see page 132). The following sections will explore the findings through a series of explanatory tables format.

Answering the Research Question (RQ1: How can Front End Idea Generation practices in Multinational Organisations be enhanced to improve (a) the quality of idea generated and their (b) alignment to business objectives?)

The analysis of importance, effectiveness and nature (formal or informal) of practices within Front End Innovation processes, more specifically Idea Generation and Selection, has established there is an overall difficulty to (1) understand the constructs to develop a good idea and (2) a lack of general understanding and familiarity with innovation processes and practices. Repeatedly the sample has shown that there is a current lack of understanding of the constructs to develop a good idea and that the sample did not allocate enough time to Front End Innovation practices. Therefore, Idea Quality can be improved by adopting a more structured and systematic process that guides participants across the different constructs that need to be explored and addressed in order to improve the quality of outcomes in Idea Generation Practices. The adoption and development of a Synthesised Framework demonstrated how an improvement in the quality of the ideas in Front End Innovation practices can be achieved, creating ideas that are better alignment to the business objectives of the organization.

The importance of Undertaking Effective Front End Innovation Activities

The sample organisations were asked about their typical Front End Innovation practices. The results indicated a lack of familiarity, within the sample organisations, with current effective innovation processes and practices (Barczack et al, 2009). The consequence of this is a lack of a common understanding with individuals and teams of both the value and the purpose of the activity. The key stage that was not being considered, contrary to literature and previous studies, is the planning stage. This raises the question why planning and preparation is the most overlooked stage in the innovation processes? Table 54 visualizes the emerging insights regarding the lack of familiarity with innovation processes during the case studies.

<table>
<tr><td colspan="7">FEI ACTIVITIES ISSUES</td></tr>
<tr><td>CASE STUDY
1- PILOT</td><td>CASE STUDY
2 - MAIN</td><td>CASE STUDY
3 - MAIN</td><td>CASE STUDY
4 - MAIN</td><td>CASE STUDY
5 - MAIN</td><td>CASE STUDY
6 - TEST</td><td>CASE STUDY
7 -VALIDATION</td></tr>
<tr><td colspan="3">Lack of understanding on the value and purpose of the methods and activities and how they link together</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">General lack of appreciation of preparation for innovation (Khurana and Rosenthal, 1998; Ernst, 2002; PDMA, 2006; Bouhali et al, 2015)</td><td></td><td></td></tr>
</table>

Table 54 Summary Issues in Front End Innovation activities

Reasons for Success when undertaking Front End Innovation practices

Both sample companies were investigated to get a thorough understanding of the key success factors in Front End Innovation practices. The qualitative data from the case studies (see Table 55 below) helped to shed light in the emerging issues that the Sample Companies typically faced when undertaking Front End Innovation practices and reasons for success.

- The acknowledgment that ideas are important to business success.
- Understanding of what is needed to develop a good idea.
- Planning and preparation for innovation improves idea quality.
- Quality stimulus data for Idea Generation activities improves idea quality
- Bespoke visual templates improve idea quality.

<table>
<tr><td colspan="7">REASONS FOR SUCCESS IN FEI ACTIVITIES</td></tr>
<tr><td>CASE STUDY 1 PILOT</td><td>CASE STUDY 2 MAIN</td><td>CASE STUDY 3 MAIN</td><td>CASE STUDY 4 MAIN</td><td>CASE STUDY 5 MAIN</td><td>CASE STUDY 6 TEST</td><td>CASE STUDY 7 VALIDATION</td></tr>
<tr><td colspan="7">The acknowledgment that ideas are important to business success.</td></tr>
<tr><td>;</td><td></td><td></td><td colspan="4">Understanding of what is needed to develop a good idea.</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td colspan="2">Planning and preparation for innovation improves idea quality.</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td colspan="2">Quality stimulus data for Idea Generation activities improves idea quality</td></tr>
<tr><td colspan="7">Bespoke visual templates improve idea quality</td></tr>
</table>

Table 55 Summary Reasons for Success in Front End Innovation activities

Reasons for Failure when MNCs undertake Front End Innovation practices

As important as finding out about the success factors, it was to identify the reasons that contribute to failure. The sample companies were investigated to determine indicative reasons for failure when undertaking Front End Idea Generation practices. These are the following reasons that emerged in the Case Studies (see Table 56):

- Lack of expertise in Front End Activities
- Lack of knowledge of the use of methods and tools in Idea Generation practices
- Lack of ability to evaluate outcomes (lack of evaluation criteria at every stage of the innovation process as well as in Idea Generation sessions)
- Lack of common and systematic Idea Generation processes
- Lack of generation of high quality ideas

<table>
<tr><th colspan="7">REASONS FOR FAILURE IN FRONT END INNOVATION ACTIVITIES</th></tr>
<tr><th>CASE STUDY 1 PILOT</th><th>CASE STUDY 2 MAIN</th><th>CASE STUDY 3 MAIN</th><th>CASE STUDY 4 MAIN</th><th>CASE STUDY 5 MAIN</th><th>CASE STUDY 6 TEST</th><th>CASE STUDY 7 VALIDATION</th></tr>
<tr><td>Lack of expertise in Front End Activities</td><td colspan="6">▨</td></tr>
<tr><td colspan="5">Lack of knowledge of the use of methods and tools in Idea Generation practices</td><td>▨</td><td>▨</td></tr>
<tr><td colspan="5">Lack of ability to evaluate outcomes</td><td>▨</td><td>▨</td></tr>
<tr><td colspan="5">Lack of common and systematic Idea Generation processes</td><td>▨</td><td>▨</td></tr>
<tr><td colspan="3">Lack of generation of high quality ideas</td><td>▨</td><td>▨</td><td>▨</td><td>▨</td></tr>
</table>

Table 56 Summary Reasons for Failure in Front End Innovation activities

Answering the Research Question <u>(RQ2: What are the effectiveness and weaknesses of current methods and approaches in Idea Generation and Selection practices?)</u>

Analysing the effectiveness and weaknesses of current MNCs Idea Generation and Selection practices within the sample, it was possible to identify the following issues (see Table 57): (1) A lack of frequency of undertaking the process due to the fact that idea generation often happens in isolation; (2) A lack of experience carrying out Idea Generation and Selection processes, which leads to uncertainty caused by a lack of understanding of the value and purpose of processes; (3) A lack of knowledge and use of Idea Generation techniques other than Group Brainstorming leads to repeatability, lack of engagement by participants and influences a lack of effective results; (4) A lack of idea evaluation criteria at every stage of the innovation process as well as in idea generation and selection workshops, which impacts on the ability of participants to evaluate outcomes; and (5) A lack of appreciation of the constructs needed to develop a quality idea provokes project participants to underestimate the time needed to innovate.

<table>
<tr><th colspan="7">WEAKNESSES OF CURRENT METHODS & APPROACHES IN IDEA GENERATION AND SELECTION PRACTICES</th></tr>
<tr><th>CASE STUDY 1 PILOT</th><th>CASE STUDY 2 MAIN</th><th>CASE STUDY 3 MAIN</th><th>CASE STUDY 4 MAIN</th><th>CASE STUDY 5 MAIN</th><th>CASE STUDY 6 TEST</th><th>CASE STUDY 7 VALIDATION</th></tr>
<tr><td>Lack of frequency of undertaking the process due to the fact that idea generation often happens in isolation</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">A lack of experience carrying out Idea Generation and Selection processes</td><td></td><td></td></tr>
<tr><td colspan="5">A lack of knowledge and use of Idea Generation techniques other than Group Brainstorming</td><td></td><td></td></tr>
<tr><td colspan="5">A lack of idea evaluation criteria at every stage of the innovation process</td><td></td><td></td></tr>
<tr><td colspan="5">Underestimation of the time and constructs needed to innovate</td><td></td><td></td></tr>
</table>

Table 57 Summary weaknesses of current methods and approaches in Idea Generation and Selection practices

On the other hand, the sample has helped to identify four success factors that lead to successful outcomes in Idea Generation and Selection sessions: (1) effective planning and preparation; (2) the establishment of an idea evaluation criteria prior the session and their clear explanation to participants so they understand the benchmarking of ideas; (3) the role of the group facilitator is crucial in order to guide thinking, enabling decision-making and supporting the participants of the session; and (4), the importance of the supporting tools, specifically the stimulus data and the visual templates. The study has shown the benefits of generating bespoke supporting tools in order to narrow the scope of idea generation as well as helping to focus ideas around the project objectives and the idea evaluation criteria.

Effectiveness and Weaknesses in current MNCs Idea Generation and Selection practices

The sample study investigated the current Idea Generation and selection practices within the MNCs. Table 58 summarises the findings. What was apparent from the case studies was that the use of informal approaches often leads to low quality outcomes. However, it could be amended by the right facilitation and stimulus data in the session. Specifics regarding these issues are further explored in this section.

Idea Generation and Selection Practices	
Effectiveness	**Weaknesses**
Group facilitation	Informal and unstructured nature
Importance of the quality of stimulus data	Dilemma of quantity versus quality
	Lack of knowledge of IG techniques

Table 58 Effectiveness and Weaknesses in current Idea Generation and Selection practices

By analysing the practices from the sample it was possible to identify the following emerging patterns in relation to the facilitation of idea generation activities: (1) The group facilitator avoids dispersion of the group by (a) planning a focused session and (b) keeping momentum in sessions; (2) the group facilitator enhances idea generation by helping participants to go beyond generic ideas; and (3) the group facilitator promotes a shared language among participants to enhance understanding of methods, idea sharing and objectives of the session. The impact these patterns have on the idea generation session relates to enabling the decision-making process by following the set idea quality criteria. By analysing the sample, it was clear that the facilitator plays a core role in delimiting the thinking during idea generation and selection sessions, enabling a shift from divergent (idea generation) to convergent (idea evaluation and idea selection) thinking.

The findings demonstrated that the quality of data gathered and analysed in the process has a positive impact on the generation of quality ideas. Previous research had shown the importance of quality data in NPD (Kenneth, 2013) and this study sample has pointed out the strengths that quality data in the form of stimulus data has in Idea generation sessions.

The sample study has shown a core weakness, which relies on informal and unstructured idea generation practices. During the informal interviews, the sample company A indicated that their typical practices, informal and sporadic idea generation sessions, based on group brainstorming techniques, used prior to this study, typically resulted in the generation of large quantities of ideas that often lacked feasibility, alignment to business objectives and novelty.

Another weakness in current Idea Generation practices is a lack of knowledge and understanding of idea generation techniques beyond Group Brainstorming. The findings have shown this is an operational issue. The sample organisation demonstrated a lack of knowledge of tools for innovation (other than general visual templates (Comi and Eppler, 2012) and tended to rely on old data (Hubbard, 2010). For example, idea generation activities tend to rely on the same tools (group brainstorming) over and over, which result making the same mistakes (generating a large quantity of ideas that lacked feasibility, alignment to business objectives and novelty).

<table>
<tr><th colspan="7">REASONS FOR FAILURE IN FRONT END INNOVATION ACTIITIES</th></tr>
<tr><th>CASE STUDY 1 PILOT</th><th>CASE STUDY 2 MAIN</th><th>CASE STUDY 3 MAIN</th><th>CASE STUDY 4 MAIN</th><th>CASE STUDY 5 MAIN</th><th>CASE STUDY 6 TEST</th><th>CASE STUDY 7 VALIDATION</th></tr>
<tr><td colspan="2">Use of general visual templates</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Tendency to rely on the same IG tools</td><td></td><td>Tendency to rely on the same IG tools</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="2">Tendency to rely on old data</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

Table 59 Summary Reasons for Failure in Front End Innovation activities

The sample has shown there has been a shift from seeking quantity to quality over the Case Study. The findings indicate the process and the supporting tools (i.e. visual templates) help to shape this dilemma and enabling an idea generation that is driven toward specific objectives.

Nature of Idea Generation and Selection practices

The primary purpose of this section is to establish the nature of process and issues in the sample Idea Generation and Selection practices. The data has been gathered qualitatively across the scoping interviews and observation. The Pilot study highlighted there was a lack of established idea generation process, which was typically undertaken in isolation and did not follow a common structure, impacting negatively on its development and results. The

Idea Generation and Selection practices happened under two situations: embedded into FEI projects or as standalone activities.

The findings indicated that the frequency of ideation sessions were typically sporadic in nature. The overall picture that emerged was that a lack of frequency in undertaking the Idea Generation practices had an impact on the quality of outcomes.

The overall picture that emerged from this section was the establishment of the four key factors that influence idea generation practices: (1) There is recognition that ideas are important, even more than design, but organisations do not usually know how to generate quality ideas; (2) Companies also tend to lack an understanding of what is needed to develop them, which difficult an effective idea management process; (3) Organisations typically lack an impact criteria to evaluate ideas and outcomes at all stages of the innovation process due to the informal and unstructured nature of Idea Generation and Selection practices (what is a good idea); and (4) the lack of a common process or systematic approach to generate quality ideas.

<table>
<tr><th colspan="7">NATURE OF IDEA GENERATION AND SELECTION PRACTICES</th></tr>
<tr><th>CASE STUDY 1 PILOT</th><th>CASE STUDY 2 - MAIN</th><th>CASE STUDY 3 - MAIN</th><th>CASE STUDY 4 - MAIN</th><th>CASE STUDY 5 - MAIN</th><th>CASE STUDY 6 - TEST</th><th>CASE STUDY 7 VALIDATION</th></tr>
<tr><td>Idea Generation session happened in isolation</td><td>▨</td><td>▨</td><td>▨</td><td>▨</td><td>▨</td><td>▨</td></tr>
<tr><td colspan="3">Lack of systematic approach to generate quality ideas</td><td>▨</td><td>▨</td><td>▨</td><td>▨</td></tr>
</table>

Table 60 Summary Nature of Idea Generation and Selection practices

4.2. Idea Quality in Front End Practices

The sample case studies have demonstrated how crucial idea quality is for successful Front End Innovation practices. The activities carried out during the case studies have helped to deep dive into this emerging concept.

Answering the Research Question <u>(RQ3: What are the critical factors that impact on Idea Quality?)</u>

Analysing the importance, the processes and the nature of evaluation practices within Front End Innovation practices has enabled the discovery of a series of key factors that impact on Idea Quality.

The Company sample clearly lacked an understanding on how to generate Quality ideas and therefore, did not acknowledge the factors that influence that outcome in Idea Generation and Selection sessions. The data indicates there is a tendency for a lack formal and structured way to identify evaluation criteria but through the case studies sample enabled to identify the seven factors that influence it: (1) a common terminology; (2) a lack of preparation for innovation; (3) a lack of iterative performance in idea generation practices; (4) pursuing quantity over quality; (5) a lack of evaluation criteria; (6) the quality of data of the process; and (7) not using bespoke templates.

This research study has also identified the three factors that enhance team performance in innovation projects: (i) use of evaluation criteria at all stages of the innovation process, (ii) importance of asking the right question over processes, methods and or tools and (iii) the flexibility Design Thinking tools that can be applied to a wide range of business challenges. These discoveries have triggered the development of the Idea Generation Framework, which is comprised by a series of processes, practices and tools that have proved an improvement of Idea Quality in Front End Innovation Practices of 20% compared to the same type of projects within the sample company prior intervention. This was measured by the evaluation criteria (novelty, feasibility and alignment of business objectives of the ideas).

CRITICAL FACTORS THAT IMPACT ON IDEA QUALITY						
CASE STUDY 1 PILOT	CASE STUDY 2 - MAIN	CASE STUDY 3 - MAIN	CASE STUDY 4 - MAIN	CASE STUDY 5 - MAIN	CASE STUDY 6 - TEST	CASE STUDY 7 VALIDATION
Lack formal and structured way to identify evaluation criteria						
;			Establishing research questions at the beginning of the project			

Table 61 Summary Critical Factors that impact on Idea Quality

Importance of Idea Quality in Front End Innovation practices

Although Idea Quality is very important for the Case Studies sample, the findings have shown it is often an undervalued concept within the process. The validity of this data is related to a dysfunction between the data collection and data decoding stage and the idea generation session. The sample has shown a lack of appreciation of what it is needed to deliver quality ideas, which is reflected both in the lack of planning, a lack of evaluation criteria and a lack of understanding of the quality data that is needed to enable a successful Idea Generation and Selection session. In summary, the dominant issue within this area is a general lack of understanding of what is needed to develop a good quality idea.

However, from Case Study 4 onwards, participants' perception of Idea Quality started to shift when a set Idea Evaluation Criteria was established. They began to acknowledge Idea Quality could be defined and pursued under a series of parameters (novelty, feasibility and alignment to business objectives) and that following introduction of the criteria, more focused and more potential ideas appeared to be generated.

IMPORTANCE OF IDEA QUALITY IN FRONT END INNOVATION PRACTICES						
CASE STUDY 1 PILOT	CASE STUDY 2 - MAIN	CASE STUDY 3 - MAIN	CASE STUDY 4 - MAIN	CASE STUDY 5 - MAIN	CASE STUDY 6 - TEST	CASE STUDY 7 VALIDATION
		Lack of understanding of linkage between data collection, data decoding and how it fits into idea generation				
;			Understanding of what is needed to develop a good idea			

Table 62 Summary Importance of Idea Quality in Front End Innovation practices

Processes and methods to evaluate Idea Quality

The sample companies were asked to indicate the processes carried out to evaluate the quality of ideas, which typically involved an evaluation setting at the end of the Idea Generation sessions, not previously introduced to the participants, or after the event among a few senior managers. It therefore raises the question: why are businesses avoiding to accurately developing methods to evaluate Idea Quality? This study has demonstrated that an effective method to evaluate Idea Quality starts by the planning and preparation of the project.

The Idea Generation Framework indicated the value of setting the Idea Quality criteria at the beginning of the project and maintaining a thread across the project until its completion, including the importance of setting evaluation criteria during idea generation in order to encourage a focused ideation practice (See Table 63). These findings were evidence of the importance to structure methods to evaluate Idea Quality in MNCs Front End Innovation practices.

IDEA EVALUATION PROCESSES AND METHODS						
CASE STUDY 1 PILOT	CASE STUDY 2 - MAIN	CASE STUDY 3 - MAIN	CASE STUDY 4 - MAIN	CASE STUDY 5 - MAIN	CASE STUDY 6 - TEST	CASE STUDY 7-VALIDATION
		Setting Idea Evaluation Criteria during the Idea Generation Session				
;					Setting the Idea Quality criteria at the beginning of the project	

Table 63 Summary Idea Evaluation Processes and Methods in Case Study Sample

Nature of Idea Quality practices

The two sample companies were investigated in order to determine the nature of the Idea Quality Evaluation practices. As previously discussed, the findings demonstrated a lack of formal evaluation criteria but in terms of the nature of the process the qualitative data, however, the qualitative data denoted the root of the problem was the lack of knowledge and understanding of what constitutes a good quality idea (see Table 64). What was significant about this finding is that without the acknowledgement of the meaning of Idea Quality how organisations can develop processes and methods de improve the quality of ideas?

NATURE OF IDEA QUALITY PRACTICES						
CASE STUDY 1 PILOT	CASE STUDY 2 - MAIN	CASE STUDY 3 - MAIN	CASE STUDY 4 - MAIN	CASE STUDY 5 - MAIN	CASE STUDY 6 - TEST	CASE STUDY 7- VALIDATION
General lack of appreciation of what is a good idea and how to develop it						

Table 64 Summary Nature of Idea Quality practices

Idea Quality Criteria

The Synthesized Idea Generation Framework helps to bring together common criteria for Idea Quality that helps to address the identified issue in both literature review and in practice. Organisations still tend to ignore idea criteria until the end of the idea generation session and fail at informing idea generation participants of the evaluation criteria, which is what happened in the Pilot Study and Case Study 2 in the Main Study. The Idea Generation

Framework promotes effective practices in literature in which feasibility, novelty of ideas and their alignment to business objectives are the core evaluation criteria to determine idea quality. Establishing this common criteria for Idea Quality across the process helps to embed it both in the process, practices and tools (including stimulus data and visual templates), which is what Case Studies 3, 4, 5, 6 and 7 demonstrated.

IDEA QUALITY CRITERIA SUMMARY						
CASE STUDY 1 PILOT	CASE STUDY 2 - MAIN	CASE STUDY 3 - MAIN	CASE STUDY 4 - MAIN	CASE STUDY 5 - MAIN	CASE STUDY 6 - TEST	CASE STUDY 7-VALIDATION
		Novelty (Dean et al, 2006)				
;		Feasibility (Diehl and Stroebe 1987)				
		Alignment to Business Objectives (Valacich et al, 1994)				

Table 65 Summary Idea Quality Criteria

4.3. Summary of Findings

This chapter has helped to communicate the core findings from the case studies with the sample organisations and answers the four research questions. It concludes by summarizing the emerging issues related to the findings.

Level of Involvement in Front End Idea Generation Practices

Company A stated the idea quality (being defined as ideas that were novel, feasible and aligned to business objectives) had increased by 20% compared with equivalent projects undertaken prior to the Framework intervention. Therefore, under the same type of resources, the change of nature of unstructured to structured practices had an impact on the performance of FEI projects. However, the nature of Idea Generation practices, in terms of frequency and effectiveness, Company A had shown there is still a tendency to hold informal idea generation sessions that often happen in isolation and are not effective in terms of outcomes. Therefore, the emerging issue from the Case Studies is that the understanding and knowledge of both processes and methods for Front End Idea Generation practices helps to reinforce its importance, and thus impacting on the quality of results. Table 67 highlights how this happened across the case studies. For instance, in Case Studies 2 and 3, where there was not an understanding on how the process and methods linked together, and what was the purpose of the activities, which impacted on the development of the project.

Therefore, a key observation to emerge was that a clear understanding of what is needed to develop a good idea appeared to be a game-change during the Front End Innovation approach for the Case Study sample. Once the sample organisations acknowledged the different elements to be considered to enhance the quality of the ideas in FEI IG they were able to appreciate its value and effectiveness. In this moment, the coordination of resources within the organisation became decisive when undertaking FEI projects.

Processes and Methods undertaken to Generate and Select ideas

The findings have denoted that very structured New Product Development processes are used while Front End Idea Generation practices are still of very informal nature. These findings have indicated that the sample organisations typically relied on the process itself rather than in the quality of its constructs, for instance, the quality of data collected and analysed to drive generation and selection activities. Internally, there was a lack of understanding of issues around Idea Generation and Selection. This resulted in the standard process comprising of informal and unstructured practices with ideas being randomly selected (see Case Study 1 in Table 67). In evaluating existing practices prior to case study samples, Company A revealed that the organization only typically undertook Idea Generation sessions on a needs-must basis.

In determining who typically undertook Front End Innovation processes, it became clear that it was dominated by senior managers who were interested in pursuing innovation based projects as a means of achieving their business objectives (see Case Study 1 in Table 67).. Company A's Emerging Products department had control over the first stages of the New Product Development cycle (research, idea generation and selection, whose outcome were a series of validated ideas to feed into the organisations' pipeline). Design only emerged as part of the multidisciplinary participants in the Idea Generation session, often an overseen function by senior managers until the product design stage (previously discussed regarding the importance of a shared language and terminology in Design-Driven Innovation practices). Therefore, the pattern that emerged in the main study sample (See Case Studies 2 and 3 in Table 67) implied that processes and methods used to generate and select ideas in FEI were typically informal, unstructured and did not follow a common process in nature, often failing to connect to the organisations' business objectives and consumer insights with the ideation stage. An additional observation was that there was a tendency, previously, to rely on external stakeholders to carry out this type of activities.

Types of issues involved in Idea Evaluation

Table 67 indicates that idea evaluation was typically based upon a senior managers' personal choice instead of following a previously idea evaluation criteria. The importance of generating ideas was evident but the significance of following a structured way to evaluate and validate an idea was often overlooked. This reinforced the fact that the sample companies lacked an understanding of the importance of evaluation and validation.

In terms of evaluation criteria, the most frequent metric was feasibility, due to the nature of the organisations in which the technical viability of the ideas is crucial. If the idea is not feasible it does not tend to pass to the next phase. However, when it came to the idea generation and selection sessions, the data sample showed a lack of shared criteria. This was highlighted again when the Idea Generation Framework evaluation criteria was established and focused on three main metrics, demonstrating an improvement not only in the selection of ideas but also in their previous generation. As seen in the literature chapter, Idea Quality cannot be defined in a single parameter but it can be done in several. It was difficult to define quality in Design Practices so a series of management criteria were selected: (1) *feasibility* (Diehl and Stroebe, 1987); (2) *novelty* (MacCrimmon and Wagner, 1994); and (3) *alignment to business strategy* (Valacich et al, 1994). These three parameters have demonstrated its effectiveness in defining Idea Quality across different challenges in FEI as they balance the reliability and implementation of the idea, its originality and uniqueness and how it links together with the organisations objectives.

Key Factors that influence Idea Quality

The progressive learning's from case studies enabled the identification and development of the key factors that influence Idea Quality in Front End Innovation practices in Multinational settings (see Table 66). It helped to shape and formalise the emerging patterns from the findings and to encourage further discussion in this section.

KEY FACTORS THAT INFLUENCE IDEA QUALITY

(A) ESTABLISHING THE PROBLEM / NEED Planning and Brief Development	(B) DISCOVERING THE ISSUES Data Collection	(C) DEFINING THE OPPORTUNITIES Data Decoding	(D) DEVELOPING THE IDEAS Opportunity Mapping
Preparation for innovation	Collecting quality data	Allocating time to decode data	Use of bespoke visual templates
Establishing an effective facilitation plan		Creating meaningful and valuable stimulus data	Generating Ideas Individually and developing them collectively
Establishing an evaluation criteria (both for milestones and idea generation session)			Seeking quality versus quantity
Establishing a common terminology			

Table 66 Key Factors that influence Idea Quality

Idea Quality in the case study sample emerged as an undervalued aspect in Front End activities. This trend was evident across the case study sample projects. The Idea Generation Framework applied the findings on the factors that influence Idea Quality. They were then put them together so the framework enabled the sample companies to improve their performance in Idea Generation practices.

A contributing factor that was impacting on Idea Quality could be attributed to a general lack of understanding of both the term itself (what are idea quality evaluation criteria: what is a good idea?). This manifested itself through seven specific factors: (i) lack of preparation for innovation; (ii) lack of effective facilitation; (iii) lack of establishing an idea evaluation criteria; (iv) lack of supporting idea generation tools (bespoke visual templates and stimulus data); (v) lack of common language in innovation processes; (vi) a lack of appreciation of the quality data gathered across the process; and (vii) seeking quality of ideas instead of quantity. This helps to establish new opportunities to this emerging area, such as the lack of a common process that would bring together these factors in order to improve idea generation outcomes.

Reflection on the Findings

To conclude this section, the Review Framework table below (table 67) shows the development and evolution of the process, practices and tools of the Framework. This has helped to reflect on the key observed problems and develop the improvement of practices in order to evolve the Idea Generation Framework. One of the most relevant issues in the Case Study Sample was the understanding in practice on how different processes, practices and tools are used, acknowledged and understood. Moreover, the ladder up strategy of learnings was crucial to develop the SIGF. It helped to identify emerging issues in each of the case studies that could be applied and explored in the following case study, this way the innovation framework could be applied to different FEI scenarios with a wide range of challenges. The structure of the research study, divided in Pilot, Main, Test and Validation study helped to define the different purposes of each one in order to reach the study objective, to improve Idea Quality in FEI. Table 67 helps to link each case study outcomes and learnings into the next one, helping to structure thinking and understanding about the reasons behind the framework performance during the projects. The outcome was a complex detailed set of data that could be used to generate an effective Idea Generation Framework able to combine effective practices in literature with professional practices in two MNCs from different industries.

	PILOT STUDY **Case Study 1** **Company A**	**MAIN STUDY** **Case Study 2** **Company A**	**MAIN STUDY** **Case Study 3** **Company A**	**MAIN STUDY** **Case Study 4** **Company A**	**MAIN STUDY** **Case Study 5** **Company A**	**TEST STUDY** **Case Study 6** **Company A**	**VALIDATION STUDY** **Case Study 7** **Company B**
Purpose	The objective of the Pilot Project was **to understand the type and range of issues explored, the tools and methods typically used in Company A's idea generation activities**. In order to help develop and test an idea generation framework.	The research objectives of case study 2 focussed on determining how the use of (**a) innovation framework; (b) innovation templates; and (c) idea quality criteria would impact on:** 1) identifying and addressing project issues that needed to be tackled; (2) facilitating idea generation; and (3) improving idea quality; and (4) idea selection	The research objectives built upon case study 2 and added an additional factor (d). The objectives focussed upon determining how the use of (a) innovation framework; (b) innovation templates; (c) idea quality criteria **(d) internal and external stimulus data; and (e) idea generation techniques would impact on**: 1) identifying and addressing project issues that needed to be tackled; (2) facilitating idea generation; and (3) improving idea quality; and (4) idea selection	The research objectives of case study 4 focussed on increasing the complexity of issues and activities focussed upon. The objectives focussed upon determining how the use of (a) innovation framework; (b) innovation templates; (c) idea quality criteria **(d) internal and external research collection and analysis; (e) use of specific analytical and mapping tools; (f) field work and (g) use of idea generation techniques would impact on:** (1) defining the issues that needed to be addressed; (2) facilitating idea generation; and (3) improving idea quality; and (4) idea selection.	The research objectives of cases study 5 centred on retesting and developing the (a) innovation framework; (b) innovation templates; (c) idea quality criteria (d) internal and external stimulus data; and (e) idea generation techniques on: 1) identifying and addressing project issues that needed to be tackled; (2) facilitating idea generation; and (3) improving idea quality; and (4) idea selection	The research objectives of cases study 6 focussed on retesting and developing the (a) innovation framework; (b) innovation templates; (c) idea quality criteria (d) internal and external research collection and analysis; (e) use of specific analytical and mapping tools; (f) field work and (g) use of idea generation techniques would impact on: (1) defining the issues that needed to be addressed; (2) facilitating idea generation; and (3) improving idea quality; and (4) idea selection	The research objectives of case study 7 was to validate the results from the test study in order to demonstrate effectiveness the use of (a) innovation framework; (b) innovation templates; (c) idea quality criteria (d) internal and external data and knowledge; and (e) idea generation techniques on: (1) identifying and addressing project issues that needed to be tackled; (2) facilitating idea generation; and (3) improving idea quality; and (4) idea selection
Type of Project	The project focussed validating the potential of a **given idea**. The main emphasis was on determining the potential of identified ideas to create new product propositions that would resonate in the market and increase revenue.	The project focussed on identification of a potential **given technology**. The key area of concern of the project was to understand the market landscape, to define the current social trends and behaviours across target segments to identify market opportunities.	The project focussed on the activation of an **existing identified idea pipeline** The project concentrated on identifying market opportunities and the generation of insight driven ideas for an existing idea pipeline	The project focussed on the **generation of ideas to increase new business opportunities**. The main emphasis was on creating and developing a 3 to 5 year product roadmap to increase new business opportunities with a range of third parties.	The project focussed on the generation of **new value proposition ideas to boost a specific innovation pipeline.** The key area of concern was to create and develop a 3 to 5 year product roadmap for new value proposition ideas for specific innovation pipelines for range of third parties	The project focussed on the generation of **new high quality ideas for** an innovation pipeline. The project concentrated on creating and developing an innovation pipeline by exploring new opportunities in a target category.	The project focussed on the generation of **ideas to help boost a new innovation pipeline**. The main emphasis was on determining and developing potential future opportunities (2020) for a type of manufacturing process that could create value for the organization.
Practises	Project brief, nominal brainstorming.	Project Brief, focussing tool, 5WH and desk research, nominal brainstorming.	Project brief, focussing tool, internal and external data gathering, data analysis, group brainstorming.	Project brief, focussing tool, research questions framework, data gathering, data analysis, fieldwork visits, nominal brainstorming.	Project brief, focussing tool, 5wh, research questions framework, desk research, data analysis, nominal brainstorming	Project brief, 5WH, research questions framework, Desk research, data analysis nominal Brainstorming, HIT and Directed Brainstorming principles.	Project brief, focussing tool, 5WH, Research Questions Framework, data collection and data analysis, Nominal Brainstorming, HIT and Directed Brainstorming principles.
Scoping Tools used	The innovation framework, innovation templates and idea quality criteria helped address key issues in the idea generation session such as the poor definition of ideas, lack of understanding of the potential of an idea and the lack of appreciation of structured idea generation practices by utilising bespoke visual templates and promoting guided critical thinking by the group facilitator. The reason behind it was to address the poor idea definition that had preceded failed idea generation practices in Company A.	The innovation framework, innovation templates and idea quality criteria helped facilitated an organized thinking of ideas as it visually highlighted key issues to be taken into account. For instance, the relevancy of ideas to key target segments and their behavioural insights and the alignment of new ideas to the business strategy in order to help evaluate their potential and quality for Company A.	The innovation framework, innovation templates and idea quality criteria allowed the teams to organise and structure information and issues more effectively. The complexity of the project required the template to increase the number of issues around idea evaluation criteria in order to control the scope during the IG session. On the other hand, the stimulus data helped to highlight key issues for the project in order to generate ideas that aligned with current challenges. This helped to connect the insights gained during data collection and analysis with idea generation.	The innovation framework, innovation templates and idea quality criteria helped to promote precise thinking on three issues: (1) the market, (2) target segment and (3) business opportunity of the idea. The quality of data helped to create meaningful stimulus data and determine key issues for IG by turning a large quantity of data into a series of insights, trends and target segments. However, this project suggested the relevancy and importance of the role of the facilitator to guide critical thinking, manage the scope and focus of the IG session through the scoping tools.	The innovation framework, innovation templates and idea quality criteria enabled the clarification and structuring of the key issues and categories that need to be addressed. Specifically, the complexity of this project increased the number of issues (market, competitors, insights and technology mapping) that needed to be addressed in the idea generation session. This impacted on the complexity of the visual template, which visualised the core areas that needed to be developed during the Idea Generation. It also impacted on the stimulus data, which highlighted the key issues for the project in order to generate aligned ideas with project challenges.	The innovation framework, innovation templates and idea quality criteria helped to simplify the complexity of the project by turning complex data into relevant insights and creating bespoke visual templates that highlighted the core issues the project was focused on. They helped to drive critical thinking around the given problem. For instance, the stimulus data focused on key challenges and trends from data collection in order to shape the discussion and focus inspiration around Idea Generation objectives.	The innovation framework, innovation template and idea quality criteria helped team members identify, discuss and generate ideas more easily. (1) The visual templates draw special attention to the problem or need being tackled to guide thinking toward the core problem. It also encouraged an idea explanation to avoid poor idea definition and enhance idea sharing and development. (2) The stimulus data played a key role to address the need of the project. They summarised the core data in trends, brand, consumer behaviours and technology in order to support and guide thinking during the idea generation session.
Key Learnings	This Case Study highlighted the need for ideas to feed the pipeline had an impact on erratic behaviour within the organisation, rushing to innovate but avoiding preparation and allocation of resources.	This Case Study highlighted the lack of appreciation of effort and resources needed to generate quality ideas and the need for innovation templates to make the connection between insights and idea generation in order to seek quality ideas.	This Case Study made clear a lack of appreciation of the value and purpose of the different activities. There was a lack of understanding of the connection of the practices and methods (input-output) in order to link together to pursue quality of ideas.	This Case Study showed the benefits of clear success criteria to trigger focused ideas and proper facilitation to generate quality ideas by guiding critical thinking and defining the scope of the project.	The Case Study demonstrated the Framework could be used in multiple types of NPD projects with similar outcomes. It also demonstrated a proper analysis and decoding of quality data makes powerful stimulus data, that combined with bespoke innovation templates and group facilitation helps to improve IG.	This Case Study demonstrated the Framework was able to improve Idea Quality in FEI practices by generating 20% more feasible, novel and aligned to business objectives ideas compared to projects prior intervention.	This Case Study highlighted the appropriateness of the Framework's process, practices and tools across organisations by demonstrating its capability to drive innovation in different types of projects, organisations and complexity of problems improving the quality of the ideas generated.

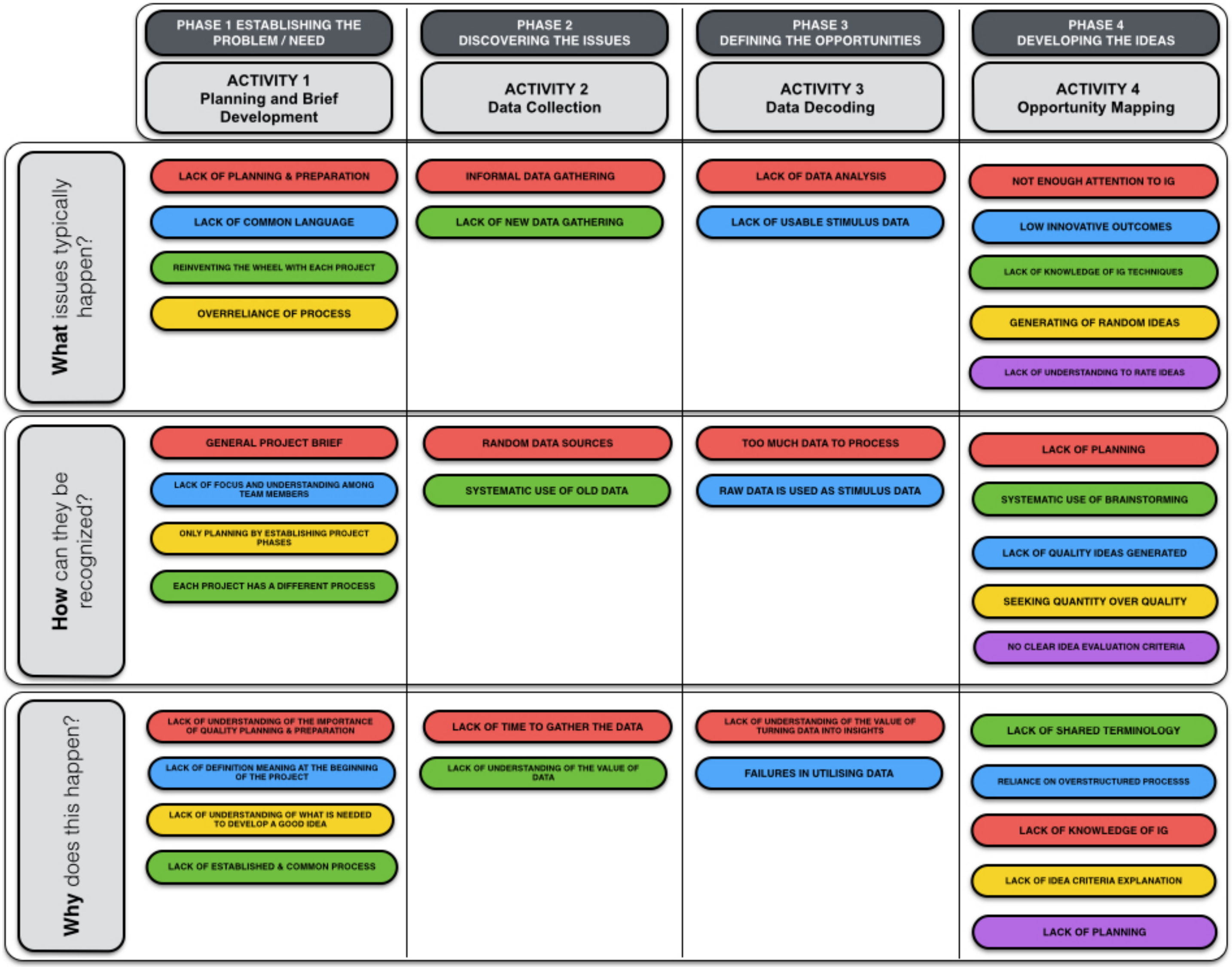
Table 67 Case Studies Review Framework

Table 67 has helped to frame the emerging issues from the Case Study sample findings and what they mean in practice. A model has been created in order to support the analysis and synthesis of these findings (see Table 68: ‘what, how and why reflections’). The responses in this table have been mapped in terms of the frequency that the issue has appeared in the different case studies.

There has been a discussion around each research question in relationship with Front End Innovation activities and the generation Synthesised Idea Generation Framework in the previous sections of this chapter. The following table (see Table 68) will tackle the emerging themes from across the process (vertical axis) perspective (i.e. the different stages of the Idea Generation Framework and their purpose) and the mapping of issues and reasons behind them in the horizontal axe. This table visualises the key issues that appear in each of the phases, how they were identified and the reasons behind them. They are all colour coded so it is easier to understand the what, how and why of each issue.

New Product Development, and more specifically Front End Innovation practices, are driven by not only the process but by the information sought, which is something that effective practice approaches have been previously highlighted. The Case Study sample has helped to demonstrate the importance of the quality of data, implying that there needs to be a thread that connects that data gathered and analysed to the ideas generated. This influences not only the Front End Innovation process and its results but it has been identified as a key reason for failure.

The overall issues discussed across the Front End Innovation practices are: (1) a lack of understanding of the constructs that are needed to develop a quality idea (planning, facilitation, data and tools), (2) a lack of common process to do so (tendency to reinventing the wheel in each new project) and (3) a lack of evaluation of outcomes (lack of evaluation criteria at each stage of the process and during idea generation sessions, which tends to lead to subjective managers’ choice). These three issues represent the most relevant findings within this research study and have enabled the identification of both success and failure factors in current practices (see page 252). This helped to identify the factors that impact on idea quality and to generate a common Idea Generation Framework to address the identified issues in the sample.



	PHASE 1 ESTABLISHING THE PROBLEM / NEED **ACTIVITY 1 Planning and Brief Development**	PHASE 2 DISCOVERING THE ISSUES **ACTIVITY 2 Data Collection**	PHASE 3 DEFINING THE OPPORTUNITIES **ACTIVITY 3 Data Decoding**	PHASE 4 DEVELOPING THE IDEAS **ACTIVITY 4 Opportunity Mapping**
What issues typically happen?	LACK OF PLANNING & PREPARATION LACK OF COMMON LANGUAGE REINVENTING THE WHEEL WITH EACH PROJECT OVERRELIANCE OF PROCESS	INFORMAL DATA GATHERING LACK OF NEW DATA GATHERING	LACK OF DATA ANALYSIS LACK OF USABLE STIMULUS DATA	NOT ENOUGH ATTENTION TO IG LOW INNOVATIVE OUTCOMES LACK OF KNOWLEDGE OF IG TECHNIQUES GENERATING OF RANDOM IDEAS LACK OF UNDERSTANDING TO RATE IDEAS
How can they be recognized?	GENERAL PROJECT BRIEF LACK OF FOCUS AND UNDERSTANDING AMONG TEAM MEMBERS ONLY PLANNING BY ESTABLISHING PROJECT PHASES EACH PROJECT HAS A DIFFERENT PROCESS	RANDOM DATA SOURCES SYSTEMATIC USE OF OLD DATA	TOO MUCH DATA TO PROCESS RAW DATA IS USED AS STIMULUS DATA	LACK OF PLANNING SYSTEMATIC USE OF BRAINSTORMING LACK OF QUALITY IDEAS GENERATED SEEKING QUANTITY OVER QUALITY NO CLEAR IDEA EVALUATION CRITERIA
Why does this happen?	LACK OF UNDERSTANDING OF THE IMPORTANCE OF QUALITY PLANNING & PREPARATION LACK OF DEFINITION MEANING AT THE BEGINNING OF THE PROJECT LACK OF UNDERSTANDING OF WHAT IS NEEDED TO DEVELOP A GOOD IDEA LACK OF ESTABLISHED & COMMON PROCESS	LACK OF TIME TO GATHER THE DATA LACK OF UNDERSTANDING OF THE VALUE OF DATA	LACK OF UNDERSTANDING OF THE VALUE OF TURNING DATA INTO INSIGHTS FAILURES IN UTILISING DATA	LACK OF SHARED TERMINOLOGY RELIANCE ON OVERSTRUCTURED PROCESSS LACK OF KNOWLEDGE OF IG LACK OF IDEA CRITERIA EXPLANATION LACK OF PLANNING

Table 68 What, How and Why reflections of key issues within Front End Innovation practices

5 Discussion

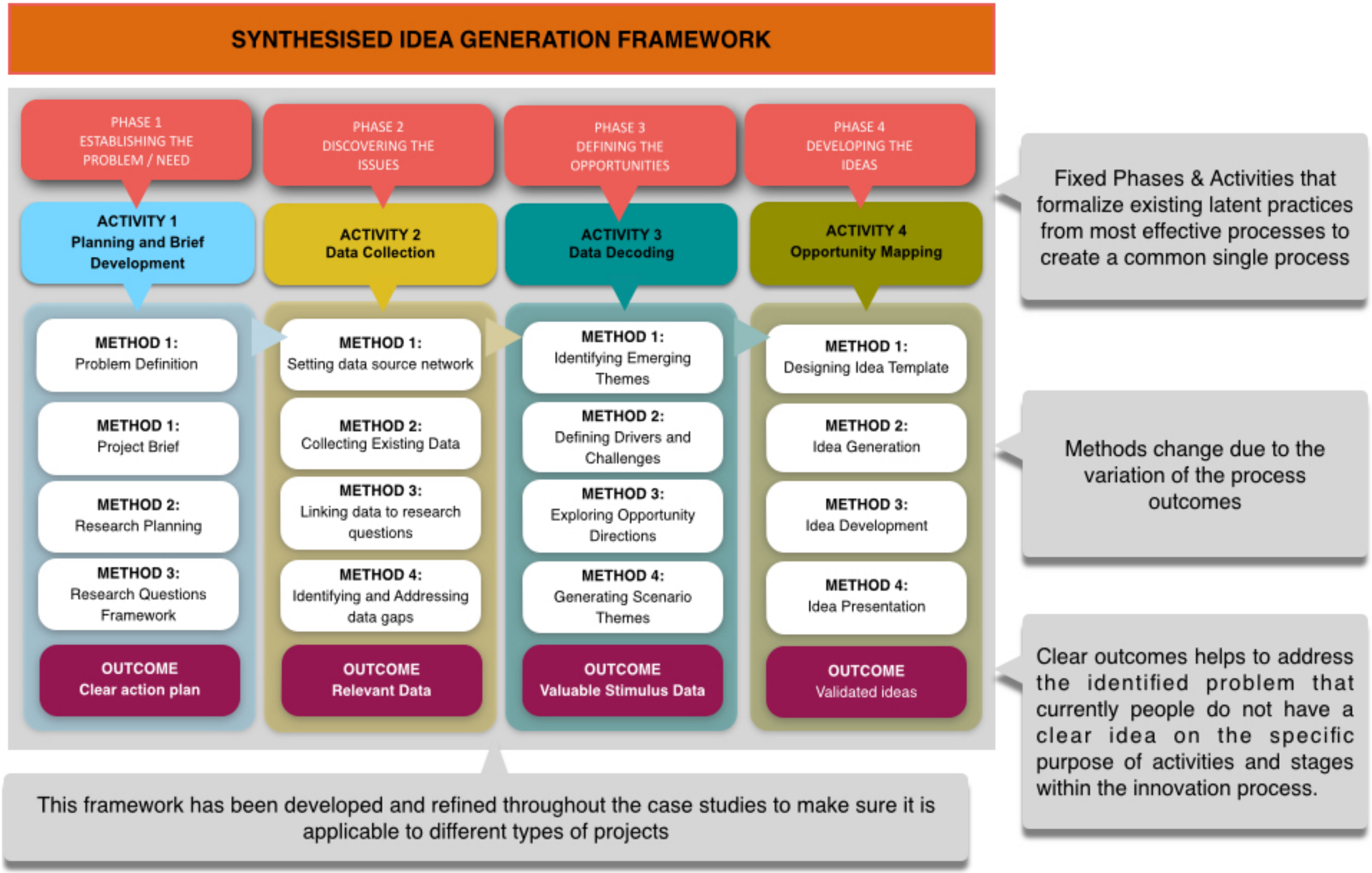
The purpose of this chapter is to discuss in more detail the emerging themes from the case studies' results and to examine their consistency with previous research studies from the literature. The discussion will suggest how the Synthesised Idea Generation Framework process, practices and tools demonstrated an improvement in FEI practices. This section discusses the core four areas this research study has focused on to answer the three research questions:

- Bringing Together Key Established Design Driven Innovation Processes and practices
- Processes and methods undertaken to Generate and Select Ideas
- Key Factors that impact on Idea Quality
- The Need for a Synthesised Idea Generation Framework

5.1.1 Bringing together Key Established Design Driven Innovation processes and practices

Both the literature and the case studies sample have demonstrated the dilemma in Design Driven Innovation processes is that there is no common single process, methods nor terminology. Nevertheless, different models and processes combine the same activities and pursue similar outcomes, which has made possible to identify common stages, activities and phases in the key processes and methods.

Figure 73 below shows the definite Framework that resulted from the seven case studies. It also shows how each of its attributes is based on a series of principles linked to literature or its use in practice.



Fixed Phases & Activities that formalize existing latent practices from most effective processes to create a common single process

Methods change due to the variation of the process outcomes

Clear outcomes helps to address the identified problem that currently people do not have a clear idea on the specific purpose of activities and stages within the innovation process.

This framework has been developed and refined throughout the case studies to make sure it is applicable to different types of projects

Figure 73 The Synthesized Idea Generation Framework

From the literature, several issues associated with current Innovation processes have being identified as being important. The most important problem this study has recognised is that there is a lack of common processes in Design Driven Innovation Practices.

Literature has shown there has been an interest in solving problems through creativity since the 1960's, however, it has shown there has been an evolution from creative problem solving (Osborn, 1963; Noller, Parnes & Blondi, 1976; Isaksen et al, 1992) to design process (Cross, 200; Design Council 2006) to design methods to design thinking (Mark Dziersk, 2006; Brown 2009; Baeck and Gremett, 2011), and demonstrated there is a lack of a common Design-driven innovation process, despite they all share similar phases and outcomes. This issue also highlights the lack of a coherent common language in design, design thinking and ideas (Koen et al, 2001). The sample companies have shown that not only in theory there is a lack of Design Driven Innovation processes but they have demonstrated that these processes are typically tailored to address specific needs according to the type of project. The Idea Generation Framework addresses this issue by bringing together well established and effective processes and models to build into a common process with common stages, activities and methods but with bespoke and tailored needs, focus and objectives in each project, leading to specific outcomes.

A second factor that has been identified in the Case Study sample, which influences this lack of common processes, is that employees do not have a clear idea of the purpose of the process and activities, therefore lacking value to a structured process whose stages link together and help to pursue the final outcome. There is an overreliance on structured New Product Development processes (Barzcak, 2009) by which employees only follow a process without considering the value from each phase and what are the desired and expected outputs. This aspect contrasts with the fact that this exploratory study has shown that although the New Product Development and Front End Innovation process is more structured (Booz, Allen and Hamilton, 1982; Cooper, 1990), idea generation practices appear to still be informal and unstructured in practice unless they are embedded in major projects (stop-start mentality in general practices). In terms of management of NPD teams, this study has demonstrated they typically tend to hold idea generation practices that do not link back to the research undertaken and often not embedded in a process but they are held as an isolated activity.

Following the thread of very structured processes, literature has shown, this type of processes has led to improve efficiency but have decreased the innovativeness of ideas (Christensen, 1997; Ahuja & Lampert, 2001). This has been confirmed by practice, as teams who generate ideas under a very structured process tend to generate ideas that are feasible and relevant to the business but do not deliver innovative solutions. On the other hand, project Company A undertook prior this research intervention showed very unstructured processes lead to more innovative ideas but they are not feasible and aligned to business strategy. This suggests the need for processes that are flexible enough to enable idea generation practices that result in innovative as well as feasible and relevant ideas for the business.

There has been a shift in NPD success factors from a focus on the process and organizational matters (Barzcak, 2009; Cooper and Edgett, 2012) to the quality of data based on a deep understanding of the target market and target customer the project is aimed at (Kenneth, 2013). This research study has built on this knowledge and has shed light on the importance of preparation for innovation and the quality of data that triggers successful idea generation sessions. Furthermore, it has been easily identified from the sample that there is a latent need for an establishing phase, which focuses on planning and preparation for the Innovation process. The case studies have shown the benefits and improvement in performance of applying an establishing phase, which is something that had been previously noticed from previous research studies. In fact, although planning has been widely advocated in the literature as a success factor for both New Product Development (Ernst, 2002) and Front End Innovation Activities (Khurana and Rosenthal, 1998) and to address uncertainty and facilitate decision-making (Herstatt et al, 2003), individuals, teams and organizations do not prepare adequately in terms of preparation, planning, time, resources and tools to innovate in practice. This study highlights the contradiction between theory and practice, reinforcing the importance of the Establishing Phase at the end of every innovation project in order to enhance the quality of ideas. This phase focuses on considering and being prepared for the unforeseen matters during the processes as well as carrying out a thorough planning to develop the project brief in order to establish the key issues of the project and to achieve the goals of the FEI activities.

Within planning, group facilitation plays a key role. The lack of appreciation and awareness of the importance of facilitating the process of generating and selecting ideas strongly influences the quality of outcomes. The facilitator helps to delimit thinking during the idea generation session, enabling a shift from divergent to convergent for idea evaluation and selection, following the idea quality criteria by ensuring alignment and fit with impact measures at all stages of the idea generation process. There are four key aspects in which the group facilitator plays a key role during Idea Generation and Selection sessions to: (1) *focus* the session on the innovation thread between the data and the ideas, (2) *avoid dispersion* by keeping the momentum going, (3) *enhance* idea generation by stimulating focused ideas and (4) to *ensure* there is a common shared terminology within the session in order to improve the understanding of methods, idea shared, objectives and focus.

Issues in Design Driven Innovation Practices (NPD and FEI)
Overreliance on structured practices
Lack of common processes, models and methods
Lack of planning and preparation for innovation
Lack of shared terminology
Shift from process driven to data driven approaches
Too structured process lower creativity and too unstructured processes lower feasibility and alignment to business objectives

Figure 74, Issues in Front End Innovation practices, Author

5.1.2 Processes and Methods undertaken to Generate and Select ideas

The importance of ideas has been a rising issue over the last ten years (Boland and Collopy, 2004, Bono, 2007; Koc and Ceylan, 2007; Barczak et al, 2009; Fraser, 2009) and it will keep gaining importance during the next decade (Barczak et al, 2009). There has been a shift from design to ideas where now ideas have a perceived value for business success that design currently lacks (Bolton and Perez, 2014). An effective and efficient idea management process will be crucial in order to generate high quality ideas under the principles of design thinking and represent the staple of a Design Driven Innovation approach.

Nevertheless, although the New Product Development and Front End Innovation process is more structured (Booz, Allen and Hamilton, 1982; Cooper, 1990), idea generation practices appear to still be informal and unstructured in practice unless they are embedded in major projects (stop-start mentality in general practices). This issue has been confirmed in both theory and practice, shedding light to the fact that organisations have not enough knowledge and understanding of idea generation practices and tend to rely on the Group Brainstorming as the key informal and unstructured idea generation technique. Furthermore, it is also very common to see participants in idea generation sessions misunderstanding and misinterpreting the meaning of key concepts, which reinforces the issue that (Koen et al, 2001) suggested fifteen years ago, there is a need to share a common language in design Driven Innovation, which is a pending issue in the area (Bolton and Perez, 2014), reinforcing the lack of clarity and understanding that exists in Idea Generation practices.

Most Idea Generation sessions have adopted the term Brainstorming as their standard definition for this practice whether or not they use such technique. It has been widely advocated as an effective idea generation technique (Osborn, 1963; Sutton and Hargadon, 1996), however, other authors such as Diehl and Stroebe (1987), Stroebe and Diehl (1994), Paulus, Brown and Ortega (1996) and Girotra et al (2010) have built upon the controversies around how brainstorming fails as a successful idea generation technique. They have highlighted group-brainstorming decreases the idea generation efficiency and lowers the capacity to differentiate good ideas from bad ones. Hence, in spite of its lack of efficiency to help to generate high quality ideas, there is still an overreliance on the systematic use of brainstorming as the primary tool that is reflected in a lack of understanding and knowledge of idea generation techniques and manifests itself in not knowing when to use them in the process. This research study builds upon this issue in order to highlight the lack of knowledge of other tools and when to use them within the process.

The criteria chosen to evaluate ideas is not a new issue, it has been explored since the 1950's when Taylor et al (1957) considered a good idea had to solve a problem, therefore when generating ideas, there was an objective to fulfil a given need. Since then, many authors have researched around its feasibility (Diehl and Stroebe, 1987), its alignment to the organization business objectives (Valacich et al, 1994) and its novelty, defined as the originality and uniqueness of the idea (Dean et al, 2006; MacCrimmon and Wagner, 1994). However, within an organisational setting, there is still a lack of understanding of what constitutes a quality idea and how to evaluate and select through the whole cycle of the idea generation process. Multinational organisations still tend to select ideas based on managers' gut feel (Murphy and Kumar, 1997) and ideas that represent the safest choice for the organisation, typically not investing on idea evaluation unless they are sure it will be worth it (Reitzig, 2011). This research study has identified this contradiction between theory and practice, while evaluation is at the core of all stages of the Idea Management process, from evaluating ideas to evaluating outcomes at the end of the FEI project (Cooper, 1988), organisations still tend to overlook this step and make decisions based on subjective opinions (Murphy and Kumar, 1997) because they do not know how to distinguish a quality idea.

Lastly, there is a common issue between Innovation practices and Idea Generation and Selection sessions, which refers to the role of the facilitator. Research has shown there is a lack of appreciation and awareness of the importance of facilitating the process of generating and selecting ideas to ensure alignment and fit with impact measures at all stages of the idea generation process.

ISSUES IN IDEA GENERATION
Informal practices
Overreliance on Brainstorming as the only Idea Generation tool
Lack of Evaluation Criteria
Lack of appreciation of Idea Generation facilitation

Figure 75 Issues in Idea Generation and Selection practices, Author

5.1.3 Key Factors that impact on Idea Quality

It has been established that the quality of new ideas is at the core of commercial market success (Goldenberg et al., 2001) however, this research study has shown it has been an undervalued factor for years (Björk and Magnusson, 2009). The following section will highlight the identified gaps in knowledge and how this exploratory research study has addressed them by determining their implementation in practice or identifying the dysfunction between theory and practice.

One of the main issues in this exploratory study has been the informal nature of issues around Idea Quality. The reason behind this is that most of organisations still do not know what a quality idea is and, as a consequence, what is needed to develop one, including a lack of preparation, allocation of time, resources, people, tools, templates and so on. Figure 76 shows the three main issues that influence Idea Quality: (1) The lack of appreciation of what is required to develop a good idea; (2) The lack of ability to evaluate outcomes; and (3) the clear underestimation of time and resources to generate quality ideas. These three issues represent the base that triggers a poor stream flow of quality ideas in organisations.

ISSUES INFLUENCING IDEA QUALITY
Lack of appreciation of what is required to develop a good idea
Lack of ability to evaluate outcomes
Underestimation of time and resources to generate quality ideas

Figure 76 Issues that influence Idea Quality, Author

The literature review has shown there have been many studies that have intended to determine quality under a single parameter, which is not effective in Idea Management. However, this study has identified the three metrics to determine quality of ideas: novelty (Dean et al, 2006; MacCrimmon and Wagner, 1994); feasibility (Diehl and Stroebe, 1987; Rietzschel et al., 2007); and alignment to business objectives (Valacich et al, 1994). They have been selected as the core ones as they are the most well-established in literature and have demonstrated its effectiveness through the case studies. However, what has represented a core identified issue in FEI practices has been the lack of a set idea evaluation criteria in the sample company, which is of crucial importance in order to stimulate a focused idea generation session.

There are several ways to quantify the quality of outcomes from the Idea Generation and Selection session but this study has followed Dennis et al. (1997) and Rening and Briggs (2006) count-of-good-ideas that meet the evaluation criteria. This quantification of results only records the total number of the considered quality ideas, getting rid of the bad ideas very quickly. The case studies have proved not only the need to understand the constructs to develop a good idea but also to determine how important is to structure the idea generation sessions and to establish key success criteria and session objectives to enhance the quality of results, which is something that the author has explored in parallel (Perez and Bresciani, 2015).

In order to generate high quality ideas, it has become clear the need to share a common terminology not only across the Front End Innovation process (Koen et al, 2001) but also during the idea generation and selection session. Establishing a language to better understand the objectives of the session, the terminology within the tools, the ideas other participants share across the session has represented a crucial factor to avoid good quality ideas to be disqualified if they are not properly explained and understood (Reitzig, 2011).

This research study has shown the importance of aligning planning not only to the process but also to the idea generation session. Since planning is considered a detailed proposal to achieve something it becomes clear its value for Idea Generation and Selection sessions, which is to generate a series of high quality ideas. Although planning is strongly advocated in literature (Khurana and Rosenthal, 1998; Ernst, 2002; PDMA, 2006) it is often an overlooked activity in practice. Therefore, this study has shed light onto the dysfunction between theory and practice regarding this matter. Undertaking good planning and preparation for Idea Generation and Selection sessions has proved a positive impact on the quality of outcomes, more specifically on the quality of the ideas generated.

Research has shown the long history dilemma between seeking quantity or quality when generating ideas in Front End Innovation practices (Osborn, 1979; Chohan 1979; Majaro, 1992; Reitzig, 2011). Furthermore, research has shown there is a shift in literature from quantity to quality as a more effective approach (Ulrich and Eppinger, 2000). However, the research study has shown the dysfunction between theory and practice in this aspect, as organisations still tend to generate a large number of ideas considering there will have more chances to generate a good one (Osborn, 1979). However, this study has focused on the importance to establish an Idea Generation Framework that promotes the generation of fewer ideas but of higher quality in order to improve business performance.

At a more cognitive level, there has been numerous studies that have pursued a clear result on Individual versus Group idea generation. These authors have undertaken research studies with very opposite results (Tung, 2005; Björk and Magnusson, 2009) but this investigation agrees with Barki (2001), Girotra et al. (2010) and Reitzig (2011) by stating the benefits of an individual idea generation followed by a collective idea development. Iterative Idea Generation Research has shown idea generation improves when there is iterative thinking in which individuals come up with ideas independently and then put them together and develop them as a group. Iterative Idea Generation is based on the concept of reflective practice, previously explored in the literature, which in this context focuses on an ongoing and conscious behaviour in which an individual builds upon existing knowledge through emotions and experiences to achieve a better understanding of a problem (Moon, 2004) and therefore is able to generate better ideas to solve it. This technique improves the quality of ideas generated, the number of ideas generated and helps people to evaluate ideas better (Girotra et al, 2010).

The literature has shown the benefits of using supporting tools for Idea Generation and Selection such as visual templates and stimulus data (Comi and Eppler, 2012; Kenneth 2013). However, it has been from the case studies that it has become very clear the crucial importance of using bespoke visual templates to enhance not only idea generation but also idea development and selection (Bresciani and Eppler, 2009). Bespoke visual templates have enabled participants to identify and isolate critical issues and opportunities in order to generate a portfolio of ideas. This research suggests the use of innovation Visual Templates improves the focus of the idea generation session impacting on the number of high quality ideas generated. Secondly, in terms of supporting data, this study strongly agrees with Howard et al, (2011) believe that stimulus data helps to enhance idea generation sessions by helping to shape and develop ideas. The combination of stimulus data became crucial to support the idea generation session. Therefore, tools and methods enable depth during the process to go beyond the generic in the ideation stage. However, to achieve this, it is very important for organisations to take the time and effort to create relevant stimulus data instead of relying on old out-of-date data (Hubbard, 2010).

In summary, this study has shed light onto the seven key factors that influence Idea Quality in Front End Innovation practices within a MNC setting: (1) Individual versus collective idea generation and selection; (2) the dilemma of quantity versus quality; (3) Preparation for innovation, which includes group facilitation; (4) Establishing an evaluation criteria; (5) The use of ad hoc visual templates; (6) The quality of data, including stimulus data; and (7) a common shared terminology.

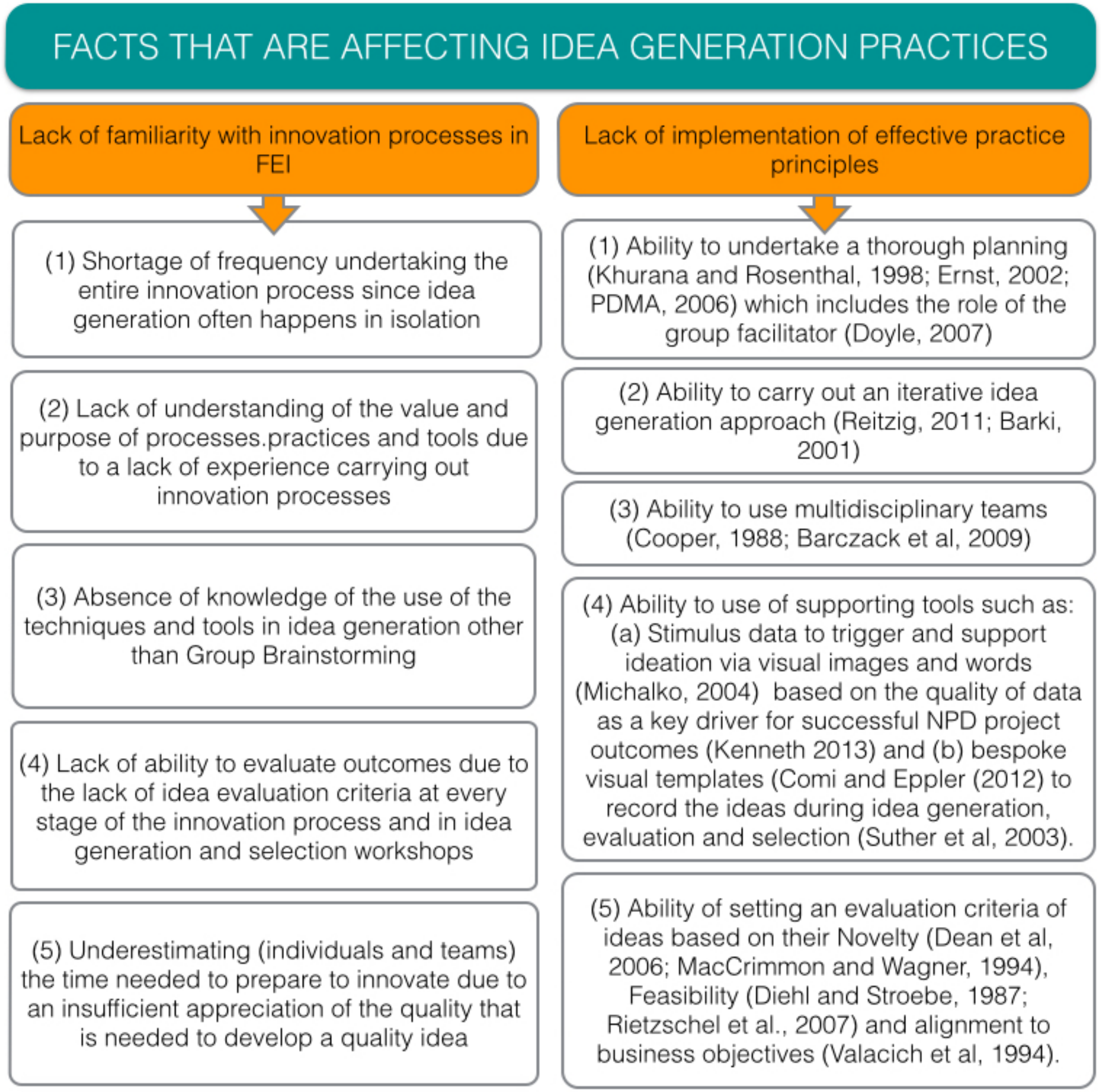
KEY FACTORS INFLUENCING IDEA QUALITY
Individual versus collective idea generation and selection
Quantity versus quality
Preparation for innovation
Idea Evaluation criteria
The use of bespoke visual templates
Quality of stimulus data
A common shared terminology

Figure 77 Factors that impact on Idea Quality in Front End Innovation practices, Author

5.1.4 The Need for a Synthesised Idea Generation Framework (SIGF)

This exploratory research study has demonstrated the need for an Idea Generation Framework that synthesizes effective practices in order to bring together the principles of Creative Problem Solving and Design Thinking Methods and Processes, which are the engine of innovation. They all follow the similar phases and stages but use a different terminology so the SIGPM aims to bring them all together. However, the overall picture that emerged in relation to these models was the selection of the ones that would represent the base for the new framework. Three models were chosen due to their adoption, robustness, establishment in literature and common phases and outcomes: (1) Ulrich and Eppinger (1995) Concept Development Stage, which focuses on the importance of idea generation and selection stage within the New Product Development process; (2) the Design Process of the Design Council (2006), which focuses on the convergent and divergent thinking approaches simplifying the process making it more accessible; and (3) the Design Thinking Process by Baeck and Gremett (2011), which focuses on determining business challenges and generating new ideas to address them. Among all the reviewed design driven innovation processes (see Table 11) these three have been chosen because they follow very similar phases and seek the same type of outcomes. The need for the Synthesised Idea Generation Framework lies on this lack of a common Design Driven Innovation process but also due to a lack of understanding and application of idea generation practices as well as idea evaluation criteria in FEI. Therefore, the Framework aims to address the dysfunction between theory and practice (Cross, 2001).

The Synthesised Idea Generation Framework has defined phases and activities while methods are flexible. The learnings from each phase and case study have informed the next one in order to address weaknesses and challenges while maintaining effective practices and advantages of the process, practices and tools. The Synthesised Idea Generation Framework addresses the two identified issues that influence Idea Generation Practices (See Figure 78): (1) the lack of familiarity with innovation process in FEI, such as (i) the lack of frequency and (ii) experience undertaking the entire process, (iii) the lack of knowledge of Idea Generation techniques, (iv) the lack of ability to evaluate outcomes and (v) the underestimation of the time needed to innovate; and (2) the lack of implementation of effective practices, such as (i) a thorough planning (Khurana and Rosenthal, 1998; Ernst, 2002; PDMA, 2006) which includes the role of the group facilitator (Doyle, 2007); Iterative idea generation approach (Reitzig, 2011; Barki, 2001); (ii) the benefits of iterative idea generation approach (Reitzig, 2011; Barki, 2001); (iii) The systematic use of multidisciplinary teams (Cooper, 1988; Barczack et al, 2009); (iv) The use of supporting tools such as: (a) Stimulus data to trigger and support ideation via visual images and words (Michalko, 2004) and (b) Visual templates to record the ideas during idea generation, development, evaluation and selection stages. (Suther et al, 2003). These two supportive tools helped to shape the discussion topic and focus on the idea generation objectives; and lastly, (v) setting the evaluation criteria of ideas based on their Novelty (Dean et al, 2006; MacCrimmon and Wagner, 1994), Feasibility (Diehl and Stroebe, 1987; Rietzschel et al., 2007) and alignment to business objectives (Valacich et al, 1994). All these constructs have been able to enhance the quality of ideas generated. The Synthesised Idea Generation Framework helps to formalise existing latent practices, combining the most effective and used practices into a single common process. These discoveries have proved an improvement in Idea Quality in Front End Innovation Practices of 20% in the Case Studies sample compared to results of similar projects prior to the intervention. The criteria to establish comparison of processes and outcomes was the same evaluation criteria of ideas used in the case study sample (feasibility, novelty and alignment of ideas). Comparing outcomes from innovation projects before the exploratory study and the results from the Case Studies, it was clear than the Synthesised Idea Generation Framework had helped to generate 20% more actionable ideas in Company A.



FACTS THAT ARE AFFECTING IDEA GENERATION PRACTICES

Lack of familiarity with innovation processes in FEI

(1) Shortage of frequency undertaking the entire innovation process since idea generation often happens in isolation

(2) Lack of understanding of the value and purpose of processes.practices and tools due to a lack of experience carrying out innovation processes

(3) Absence of knowledge of the use of the techniques and tools in idea generation other than Group Brainstorming

(4) Lack of ability to evaluate outcomes due to the lack of idea evaluation criteria at every stage of the innovation process and in idea generation and selection workshops

(5) Underestimating (individuals and teams) the time needed to prepare to innovate due to an insufficient appreciation of the quality that is needed to develop a quality idea

Lack of implementation of effective practice principles

(1) Ability to undertake a thorough planning (Khurana and Rosenthal, 1998; Ernst, 2002; PDMA, 2006) which includes the role of the group facilitator (Doyle, 2007)

(2) Ability to carry out an iterative idea generation approach (Reitzig, 2011; Barki, 2001)

(3) Ability to use multidisciplinary teams (Cooper, 1988; Barczack et al, 2009)

(4) Ability to use of supporting tools such as: (a) Stimulus data to trigger and support ideation via visual images and words (Michalko, 2004) based on the quality of data as a key driver for successful NPD project outcomes (Kenneth 2013) and (b) bespoke visual templates (Comi and Eppler (2012) to record the ideas during idea generation, evaluation and selection (Suther et al, 2003).

(5) Ability of setting an evaluation criteria of ideas based on their Novelty (Dean et al, 2006; MacCrimmon and Wagner, 1994), Feasibility (Diehl and Stroebe, 1987; Rietzschel et al., 2007) and alignment to business objectives (Valacich et al, 1994).

Figure 78 Factors that affect Idea Generation Practices, Author

6 Conclusions

This study set out three research questions (page 132). The purpose of answering them was to develop an in-depth understanding of large multinational companies Front End Idea Generation practices. The intention of the study was to build upon previous research and to contribute to new knowledge by identifying new insights in practice. This chapter will expand the conclusions this exploratory study has reached regarding the core themes:

- The need for a Synthesized Idea Generation Framework
- Design Driven Innovation processes
- Preparation for innovation
- The constructs to develop a quality idea
- Contribution to New Knowledge

6.1.1 The Synthesised Idea Generation Framework

A key objective of the study was to enhance idea quality in FEI by addressing a lack of common design driven innovation processes in FEI in order to bring together effective practices and develop a new set of processes, practices and tools that would address emerging issues in previous research studies and in the sample organisations. The Framework tested, developed and refined during this study has helped synthesised the complexity of types of projects, practices and tools, therefore becoming a Synthesised Idea Generation Framework (SIGF). The following section will demonstrate the principles behind it as well as the key factors that contribute to its success.

Principles behind the SIGF

The sample companies have aid to test and refine the Synthesised Idea Generation Framework and identify the core principles behind it. The five principles are as follows: (i) the process, stages, activities and methods are fixed while the tools on them are flexible and vary depending on the process desired outcomes; (ii) the agreement on both research and practice of the benefits of generating ideas individually and developing them in groups; (iii) the well-established benefits of using bespoke visual templates, which help to shape discussion towards the project outcomes; (iv) the importance of the quality of data put into NPD projects to achieve success; and (v) the agreement on theory and practice that indicates the importance of structuring the idea generation sessions as well as the success criteria and session objectives to enhance the quality of results.

These principles have helped to shape the Synthesised Idea Generation Framework as well as the Preparation for Innovation Template. Repeatedly, the sample has shown these findings help to improve idea generation practices in multiple settings.

Reasons for success when the Case Studies Sample use the Synthesised Idea Generation Framework (SIGF)

There are a series of factors that contribute to the Synthesised Idea Generation Framework success within a MNC setting. These factors have been derived from analysing the qualitative data gathered from its performance during the Case Studies sample. Table 69 summarises the reasons for success that have emerged from the sample:

Synthesised Idea Generation Framework Reasons for Success				
Preparation for Innovation				
Defining the problem	Developing stimulus data	Creating bespoke visual templates	Developing facilitation plan	Establishing evaluation criteria

Table 69 Synthesised Idea Generation Framework Reasons for Success

The identified key reason for success is Preparation for Innovation. The Case Studies sample has demonstrated there is awareness of planning activities, although the case studies have shown this activity was often overlooked and underestimated. However, the findings have shown the need for Preparation for Innovation, which includes the following constructs- (a) defining the brief; (b) preparation of the stimulus data and (c) the visual templates; (d) developing the facilitation and (e) establishing the evaluation of outcomes (impact criteria). The Case Studies sample has shown they did not spend enough time on planning Front End practices.

A common recurring issue associated with a lack of planning and preparation in the Case Studies sample has been the lack of attention to establishing set criteria to evaluate ideas. Consequently, if there is not enough planning for the process, there is not an evaluation criteria. Repeatedly, the sample has shown the benefits of developing the core criteria and measures to validate against, which has helped not only to improve the process but also the outcomes from the sessions.

The lack of understanding of this aspect in idea evaluation can be attributed to a lack of appropriate resources, for instance: lack of frequency undertaking these practices as well as a lack of understanding and knowledge on the activities. This has been identified as an important reason for failure within Front End innovation practices.

The Synthesised Idea Generation Framework: Conclusion

This research study has brought together effective practices and has identified what was missing. Consequently, it has established the need for the Synthesised Idea Generation Framework in order to bring together effective practices and compile them in a single design driven innovation process that can improve Idea Quality in FEI. Its objective was to identify and help to understand the factors that impact on: (1) FEI idea generation processes in large multinational organisations; (2) the processes, practices and tools typically used FEI idea generation activities and (3) the quality of the ideas generated via their idea generation processes, practices and tools.

A critical review of existing literature revealed that the most cited idea generation models all shared similar phases and outcomes. But, the review also showed that there was a lack of a consistent language and agreement of the common components within the proposed models. Furthermore, previous studies indicated that the researchers understood the generic context of idea generation activities but lacked and or failed to communicate a detailed understanding of the challenges faced in idea generation practices, particularly in FEI activities. Therefore, this study focused approach enabled it to identify a series of common issues across a robust representative range of FE idea generation scenarios. Consequently, this study has centred on understanding the FEI idea generation requirements in order to develop an in-depth SIGF capable of: (1) bring together well-established and effectives practices; and (2) providing a detailed understanding of the processes, practices and tools typically required to support the generation of Quality Ideas in Front End Innovation practices in MNCs.

The new framework has helped to address the identified factors and issues that influence idea generation practices in Front End Innovation projects in the Case Studies Sample. It comprises a series of constructs that aim to improve Idea Quality in Front End Innovation activities in a MNC setting (See Table 70). These findings helped to create the Synthesised

Idea Generation Framework as well as address previously identified weaknesses in current practices in this field.

Synthesised Idea Generation Framework				
Planning and preparation for innovation	Bespoke Supporting tools (Visual Templates and Stimulus Data)	The role of the group facilitator	Idea Quality criteria	Idea Generation and Selection tools and methods

Table 70 The Synthesised Idea Generation Framework compilation of issues

The starting point of the Synthesised Idea Generation Framework was the lack of common processes in Design Driven Innovation practices. Over the years there has been numerous models involving Creative Problem Solving, Creative Process, Design process, methods and design thinking which follow similar phases and outcomes. Consequently, the Synthesised Idea Generation Framework has resulted from the combination of well-established practices and common processes, formalizing latent practices.

Organisations typically know what an insight is but one of the most valuable assets of the Synthesised Idea Generation Framework is how it helps organisations to decode and utilize insights properly, turning data into innovation drivers that are summarized into the stimulus data. This process is based on maintaining a thread between data collection, its analysis and the ideas generated so the insight does not get lost in the process.

This exploratory research study set out to answer three key research questions (see introduction and findings chapter). The objective of answering the research questions was to develop a thorough understanding of large multinational organisations practices when dealing with Front End Innovation activities in order to: (i) identify and evaluate the critical factors that impact on idea quality in Front End of Innovation idea generation and selection activities in a large multinational company (MNCs); (ii) To examine the effectiveness and weaknesses of current methods and approaches that multidisciplinary teams in large MNCs typically deploy when generating and selecting ideas; (iii) To create, test and refine a novel set of tools that address identified weaknesses; (iv) To demonstrate and embed improved idea generation practices.

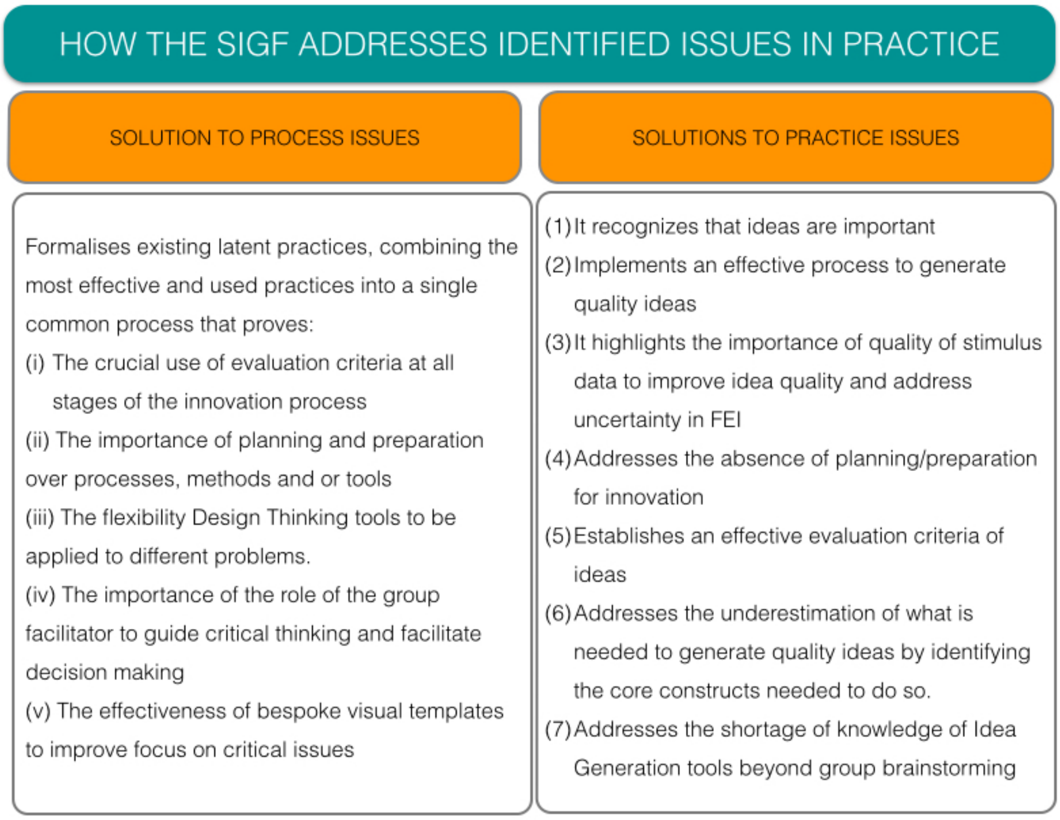
The intention of this study was to build upon previous research but also to shed light on Idea Management practices to contribute with new knowledge and help to recognise novel insights on how to improve idea generation practices by addressing the gaps in theory and practice. The Synthesised Idea Generation Framework comprises a fixed process, phases and activities, but it enables a flexible set of methods so it can be applied to a wider range of NPD projects with a different focus. The outcome from the SIGF is a set of validated ideas that can be included in the innovation pipeline of New Product Development.

Compiling the findings against previous research can conclude the validity and reliability of this study. For instance, although Idea Generation is considered the prompt for innovation success (Bono, 2007) and the quality of new ideas is at the core of commercial market success (Goldenberg et al., 2001) it has been an undervalued factor for many years (Björk and Magnusson, 2009). Nevertheless, the lack of success in management practices is typically attributed to a lack of good quality ideas (Boland and Collopy, 2004). Therefore, surprisingly still after decades, there is not still an understanding of what constitutes a good idea nor what it takes to develop one (see Table 71).

ISSUES IN THE FRONT END INNOVATION
Lack of Planning and Preparation for Innovation
A lack of understanding of what is a Quality Idea
Lack of ability to evaluate outcomes

Table 71 Identified Issues in the Front End Innovation

The findings from the multinational organisations' sample have also drawn attention to the gap between theory and practice. Figure 79 shows how the key issues identified in this exploratory study that the Synthesised Idea Generation Framework addresses. It is able to address the identified issues that currently impact on Idea Quality in Front End Idea Generation practices and it also formalises and brings together effective practices in order to create a single process.



HOW THE SIGF ADDRESSES IDENTIFIED ISSUES IN PRACTICE

SOLUTION TO PROCESS ISSUES

Formalises existing latent practices, combining the most effective and used practices into a single common process that proves:

(i) The crucial use of evaluation criteria at all stages of the innovation process

(ii) The importance of planning and preparation over processes, methods and or tools

(iii) The flexibility Design Thinking tools to be applied to different problems.

(iv) The importance of the role of the group facilitator to guide critical thinking and facilitate decision making

(v) The effectiveness of bespoke visual templates to improve focus on critical issues

SOLUTIONS TO PRACTICE ISSUES

(1) It recognizes that ideas are important

(2) Implements an effective process to generate quality ideas

(3) It highlights the importance of quality of stimulus data to improve idea quality and address uncertainty in FEI

(4) Addresses the absence of planning/preparation for innovation

(5) Establishes an effective evaluation criteria of ideas

(6) Addresses the underestimation of what is needed to generate quality ideas by identifying the core constructs needed to do so.

(7) Addresses the shortage of knowledge of Idea Generation tools beyond group brainstorming

Figure 79 Summary of Issues in Practices the Synthesised Idea Generation Framework addresses

The analysis of results showed that the two sample organisations were not adopting practices to enhance New Product Development outcomes by: (i) recognising that ideas are important (Koc and Ceylan, 2007); (ii) establishing an effective evaluation criteria of ideas (Björk and Magnusson, 2009); and (iii) implementing an effective process to generate quality ideas (Barczak et al, 2009). These principles form the basis for current effective Idea Generation and Selection practices. This emphasizes the question why are not these companies doing it then?

The Synthesised Idea Generation Framework makes a contribution to idea quality by identifying the constructs to develop a quality idea in FEI practices and establishing the key parameters to define Quality Ideas: Novelty, Feasibility and Alignment to business objectives. The process, practices and tools comprised in the SIFG are all focused to help address very diverse challenges in FEI and pursue quality outcomes. The sample organisation evaluated ideas generated from previous projects prior intervention and compared to the ideas generated using the SIGF under the set Idea Quality Criteria (Novelty, feasibility and alignment to business objectives). The sample company established the SIGF had helped generate 20% of ideas that had never been generated in the organisation, that were feasible and aligned to the business strategy, therefore demonstrating the relevancy and effectiveness of the Framework to help generate Quality Ideas in the sample company. The outcome from the final workshop led to 11 ideas, 80% of which are currently being included in the category team product development process.

6.1.2 The Design Driven Innovation Process

Firstly, the investigation set out to determine the current Innovation Processes, focusing on New Product Development processes in Large Multinational Organisations. This study has specifically spot the shift in New Product Development practices within the sample organisations, which used to rely on the process (Cooper and Edgett, 2012) but have recently experienced a shift whose focus is now the quality of the data, for instance user needs and insights (Kenneth, 2013). The reason behind this is that overreliance on the process has had a negative impact on the innovativeness of outcomes, decreasing the novelty, originality and creative thinking but have improve alignment to business objectives (Christensen, 1997). The findings have established that current over-structured New Product Development processes within the two sample companies typically lead to less advanced and original new ideas (Ahuja & Lampert, 2001).

Secondly, the study embarked on establishing common processes and models in Design Driven Innovation within both the literature and current practices in the sample organisations. The findings give evidence about the lack of agreed common processes or models in Design Driven Innovation. This is highlighted by the finding that the evolution from creative problem solving to the design process to design methods to design thinking all have similar phases but lack a common process. This insight indicates there is also a lack of coherent common language in design, design thinking and ideas (impacting on the meaning of concepts, ideas and solutions) that impacts on a lack of common language in design driven innovation practices.

6.1.3 Preparation for Innovation

Thirdly, the investigation embarked on determining the type of preparation for innovation issues the Multinational organisations sample would typically undertake during different Front End Innovation projects. When unpacking the nature of the current innovation practices, the data indicated the lack of familiarity with innovation processes in Front End of Innovation has to do with a lack of frequency, experience and knowledge carrying out this type of processes as well as the underestimation of the time and resources to prepare for innovate. These findings help to confirm that the sample organisations still lack an innovation culture that promotes and engages with effective innovation processes. This insight could also help to contribute to understand why Organisations typically struggle to generate a streaming flow of high actionable ideas and tend to place more emphasis on incremental rather than radical innovation.

6.1.4 The Constructs to Develop a Quality idea

Fourthly, this study has set out the constructs to develop a good quality idea. The findings represent a compendium of a series of elements that are needed in order to articulate an effective idea generation and selection practice. Figure 80 visualises the four core constructs to develop a good idea: the framework, the use of bespoke visual templates, the group facilitator and the idea evaluation criteria as well as the findings that support these components for effective practices. For instance, the previously discussed lack of understanding and knowledge to generate actionable ideas, as well as the lack of evaluation criteria and a common process are the key factors that impact on delivering success to large multinational organisations when it comes to generating a stream flow of quality ideas that deliver market success. These insights triggered the creation and development of a new set of tools, specifically the Synthesised Idea Generation Framework, which formalises most used and effective practices in order to help to visualise and develop the core findings of this investigation. These core findings demonstrate that the multinational organisations sample struggle to generate quality ideas when they have an over-structured process and they generate more quality ideas when the activities balance reflective and systematic practices. Consequently, this study has shed light onto the things multinational organisations need to think about when they want to develop a good quality idea. The sample has brought out the current general lack of appreciation of the constructs needed to develop a good idea (including lack of preparation and allocation of time, resources, people, tools, templates… how long does it take to innovate?). This supports other studies (such us Barczak et al, 2009) that highlight the importance of a good idea management process due to the growing importance of ideas. This finding emphasizes the need for encouraging and promoting a thorough understanding of the benefits of idea management for business success.

Fifthly, the study aimed to point out a series of factors impacting on Idea Quality that could represent a new contribution to knowledge and understanding of this specific matter in Idea Management research. These findings help to clarify the core factors influencing the quality of ideas by addressing the controversies on the benefits of (i) generating ideas individually and developing ideas collectively, which agrees with previous research that supports the way idea generation improves when there is iterative thinking in which individuals come up with ideas independently and then put them together and develop them as a group. This technique improves the quality of ideas generated; the number of ideas generated and helps people to evaluate ideas better; (ii) the paradox between quantity or quality when it comes to idea generation. This study has shown the benefits of seeking quality ideas in order to generate effective outcomes in Front End Innovation Practices over a systematic search for a large amount of ideas without a clear focus or understanding of the given problem; (iii) A thorough preparation for innovation has proved the multiple benefits this brings to innovation processes and its impact on idea quality; (iv) a structured evaluation process at all stages of the innovation process; (v) the benefits of using of ad hoc visual templates to generate quality ideas; (vi) the benefits of using quality stimulus data; and (vii) a common shared terminology.

6.1.5 Contribution to New Knowledge

This study's main contribution to new knowledge is the development of a Synthesized Idea Generation Framework that helps to improve the quality of ideas in Front End Idea Generation in MNCs organizations. To do so, it synthesizes work from the last 80 years, bringing together well established and effective practices, specifically the models from Ulrich and Eppinger (1995), the Design Council (2007) and Baeck and Gremett (2011), to improve idea quality in a wide range of idea generation scenarios in FEI in NPD, addressing gaps in theory and practice.

There are also a series of sub-contributions that derive from the study (see following subchapters):
- A common Design Driven Innovation process with a common language (establish the objective, discover issues, define opportunities, develop ideas as well as planning and brief development, data collection, data decoding and opportunity mapping).

- The building blocks to Prepare for Innovation: defining the problem, establishing an evaluation criteria, developing a facilitation plan, developing stimulus data and creating bespoke visual templates.
- The Constructs to develop a quality idea: iterative IG, pursuing quality over quantity, preparing for innovation (including group facilitator), structured evaluation criteria, ad hoc visual templates, quality stimulus data and shared terminology.

The contribution this study has made has two dimensions:

a. It is useful in the academic sense because it brings a greater understanding of Idea Generation practices in NPD. This study provides evidence that indicates that idea generation processes are operated in an often unsuitable, inappropriate and non-optimal way. It clarifies the nature of the problems and how these might be addressed.
b. There is a contribution for practitioners, because this ground is presented with an operational actionable framework they can employ in FE idea generation practices in NPD.

The new framework has the potential to become an innovation tool for multinational organisations. The core focus would be to help multinational corporations recognise the emphasis they need to make in idea generation practices in order to establish new knowledge, expertise and understanding to reinforce Front End Innovation activities so they can improve the quality of ideas. It could also assist them in understanding and addressing the key factors that impact on idea quality when undertaking Front End Innovation activities within NPD.

THE COMPONENTS OF EFFECTIVE IDEA GENERATION PRACTICES

1. THE FRAMEWORK

It formalizes existing effective processes to create a common single process with flexible methods and tools that change due to the variation of the process so it is applicable to different types of projects.

It brings together effective practices and has been able to identify what was missing in the process, practices and tools.

Promotes the benefits of planning and preparation for innovation, which is a key success factor in FEI (Khurana and Rosenthal, 1998; Ernst, 2002; PDMA, 2006) in order to generate quality ideas.

2. BESPOKE VISUAL TEMPLATES

Tailoring visual templates facilitates the identification and isolation of critical issues and opportunities, helping participants to group and develop the best ideas (Comi and Eppler, 2012)

Enables idea generation, idea development and idea refinement, which enhances the quality of outcomes (Bresciani and Eppler, 2009)

Bespoke visual templates allow the visualisation of ideas in order to share an understanding of thinking (Holloway, 2009; Williams, 2010) to achieve focused results (Al-Kassab et al, 2014)

3. THE EVALUATION CRITERIA

Determines if the generation of ideas is focused on quantity or quality of outcomes (Osborn, 1979; Chohan, 1979; Majaro, 1992; Reitzig, 2011)

Enables participants to focus on the core issues to judge ideas against. In this study the criteria were feasibility (Rietzschel et al, 2007), novelty (Dean et al, 2006) and alignment to business objectives (Valacich et al, 1994)

A set evaluation criteria helps organizations to generate a stream flow of actionable ideas (Levitt, 1963; Koc and Ceylon, 2007; Ahuja & Lampert, 2001)

An objective selection of the best ideas out of those proposed instead of being selected by someone's opinion (Desouza et al., 2009).

4. THE GROUP FACILITATOR

Maintains a clear focus in Idea Generation session due to a thorough preparation avoiding going off topic

Is able to keep the momentum going in sessions, avoiding dispersion of participants

Enhances idea generation by going beyond generic ideas and turns it into purposeful practices

Promotes a common shared language – aligning the terminology within the group to improve understanding of methods, idea sharing and focus.

Helps to delimit thinking during the idea generation session, enabling a shift from divergent to convergent for idea evaluation and selection, following the idea quality criteria.

Figure 80 The Components of Effective Idea Generation Practices

6.1.6 Limitations

This study adopted a case study method. According to Robson (2011) one of the core disadvantages of the case study method typically involves dragging the length of the study creating a tension that promotes a personal understanding of the sample by *'going native'*, but he also implies researchers need to be ready to modify and develop their interpretation of the issues in order to get an insider perspective by combining both observation and participation to uncover sought behaviours. The exploratory nature of this research study could also be influenced by the sample size, which combined data from two sample organisations.

Factors that impact on this study's findings: (i) replication and (ii) validity. Guba and Lincoln (1994) state the way to evaluate validity in qualitative studies lies in its application to other scenarios. This investigation has been translated to a more general context in a different organization. Lecompte and Goets (1982) suggest ethnographic studies tend to have difficulties in terms of replication since they often occur in a natural setting, which is quite unique; therefore, there is a difficulty to reconstruct the scenario in order to achieve similar results. This research study has overcome this issue by undertaking the second validation study in a different industry organization whose objectives, challenges and process differed widely from company A, which has also addressed the replication issue demonstrating the findings can extrapolate to other scenarios.

It could be suggested that a limitation of this investigation is that it generalises insights. However, by developing such a focused study, based on a deep ethnographic approach and underpinned by a triangulation strategy, it has triggered a series of findings that are both transferable and applicable to similar multinational contexts. In summary, this investigation has broadened indicative not definitive results that contribute to the recognition of factors that influence in Idea Quality in Front End Innovation activities in multinational organisations.

6.1.7 Future Research

On completion of this study, it was possible to recognise the seven key factors impacting on idea quality in Front End Innovation practices: (1) individual versus collective idea generation; (2) seeking quality over quantity; (3) preparation for innovation; (4) a clear idea evaluation criteria; (5) the use of ad hoc visual templates; (6) the quality of stimulus data and (7) a common terminology.

The current study has identified three factors important to helping large multinational organisations to improve their idea generation and selection activities performance. These issues could represent the base for future further research and to help multinational organisations to better: (1) understanding what is involved in the generation of quality ideas (2) to better evaluate ideas and (3) to follow a common process in Design-Driven Innovation practices. These three factors have the potential to help to orientate Front End Innovation practices within the NPD process into the four core activities: (a) Establishing the problem; (2) discovering the issues; (3) defining the opportunities; and (4) developing the ideas.

The emphasis of the Synthesised Idea Generation Framework is placed on helping multinational organisations to understand the quality of resources and preparation that is needed in order to develop a quality idea. Their understanding of the quality needed to pursue better innovation performance influences the choices that large multinational organisations make during their Front End Innovation activities.

The objective of the Synthesised Idea Generation Framework is to help multinational organisations move away from over structured processes and embrace an establishing phase as well as evaluation criteria at all stages of their Front End Activities. This first exploratory framework brings to life the points raise above and aims to be further expanded and broaden to SMEs and a wider range of industries.

To conclude, this study has successfully answered the three research questions. In the process of investigating these questions this study has shed light onto numerous important factors that help to fill gaps in knowledge (i.e. things organisations need in order to generate high quality ideas) but also contributes to throwing light on the reasons behind these issues (i.e. key learnings from the findings).

REFERENCES

Ahuja, G., and Lampert, C. (2001). Entrepreneurship in the large corporation: A longitudinal study of how established firms create breakthrough inventions. *Strategic Management Journal*, vol. 22, pp. 521–543.

Alexander, C. (1971). Notes on the synthesis of form. Cambridge: Harvard University Press.

Alexander, E., Bresciani, S. and Eppler, M. (2014). How Visual Restrictiveness Affects Group Communication Effectiveness: Experimental Evidence. Proceedings of the International Conference on Communication, Media, Technology and Design (ICCMTD), 24-26 April 2014, Istanbul, Turkey.

Amabile, T. (1988). A model of creativity and innovation in organizations. *Research in organizational behaviour*. Vol *10*, pp. 123-167.

Amabile, T. (1993). Motivational synergy: Toward new conceptualizations of intrinsic and extrinsic motivation in the workplace. *Human resource management review*. Vol. *3*, pp. 185-201.

Amabile, T. (1996). Creativity in Context. Westview Press.

Amabile, T., & Conti, R. (1999). Changes in the work environment for creativity during downsizing. Academy of Management Journal. Vol 42, pp. 630–641.

Ancona D. and Caldwell D. (1992). Bridging the boundary: external activity and performance in organizational teams. Administrative Science Quarterly. Vol 37, pp. 634–665.

Anderson, L. (2006). Building confidence in creativity: MBA students. *Marketing Education Review*. Vol. *16*, pp. 91-96.

Anon. (2008). Using ‘‘Crowds’’ to Select Ideas: Auctioning concepts, Strategic Direction. Vol. 24, pp. 32-34.

Argyris, C. and Schön, D. (1978). Organization learning: A theory of Action perspective, Reading, Mass: Addison Wesley.

Avolio, B. J., Avey, J. B., Quisenberry, D., 2010. Estimating return on leadership development investment. *The leadership quarterly*. Vol 21 pp. 633-44.

Baeck A. and Gremett P. (2011), Design Thinking. The UX best practices- How to achieve more impact with user experience, eds. H. Degen and X. Yuan. New York: McGraw-Hill Osborne Media.

Baer, M., (2007), The implementation of radical ideas in organizations. Paper presented at the annual meeting of the Academy of Management, Philadelphia.

Baer, M. (2012). *Putting Creativity to work: the implementation of creative ideas in organizations*, Academy of Management Journal. Vol. 55, pp. 1102–1119.

Barczak, G. (1995). New product strategy, structure, process, and performance in the telecommunications industry. Journal of Product Innovation Management, Vol 12, 224–234.

Barczak, G., Griffin, A., and Kahn, K.B., (2009), Perspective: trends and drivers of success in NPD practices: results of the 2003 PDMA best practices study. *Journal of Product Innovation Management*, vol. 26, pp. 3-23.

Barki, H., & Pinsonneault, A. 2001. Small group brainstorming and idea quality: Is electronic brainstorming the most affective approach? Small Group Research, 32(2), 158-205.

Bens, I. (2012). Facilitation: Your pocket guide to facilitation (3rd Edition). Salmen, NH.

Björk, J., and Magnusson, M., (2009), "Where do good innovation ideas come from? Exploring the influence of network connectivity on innovation idea quality", *Journal of Product Innovation Management*, vol. 26, pp. 662-670.

Boeddrich, H. (2004). Ideas in the workplace: a new approach towards organizing the fuzzy front end of the innovation process. *Creativity and innovation management*. Vol.*13*, pp. 274-285.

Boehm, B., Gruenbacher, P., & Briggs, R. (2001). Developing groupware for requirements negotiation: Lessons learned. *IEEE Computer*, Vol 18 pp. 46-55.

Boland, R., and Collopy, F. (2004). Design matters for management. In R. Boland, R. and F. Collopy (Eds.), Managing as designing (pp. 3-18). Stanford, CA: Stanford University Press.

Bolton, G., (2010). *Reflective Practice, Writing and Professional Development* (3rd edition), SAGE publications, California

Bolton, 2011. Decoding Visual Thinking. Presentation given at ESDI/UERJ, Rio de Janeiro, Brazil, in 18 Apr 2011), available at http://issuu.com/gpbr/docs/decodingvisualthinking (accessed 18 October 2013).

Borja de Mozota, B. (2011), Design strategic value revisited: a dynamic theory for design as organizational function, chapter 18, The handbook of Design Management. Editors Rachel Cooper, Sabine Junginger, Thomas Lockwood. Berg publishers.

Bottom, V., Ladha, K., & Miller, J. (2002). Propagation of individual bias through group decision making: error in the treatment of asymmetrically infomlative signals. Journal of Risk and Uncertainty. Vol 25, pp. 147-163

Boud D, Keogh R and Walker D (1985) Reflection, Turning Experience into Learning, Routledge.

Boudreau, K., Lacetera, N. and Lakhani, K. (2011) Incentives and Problem Uncertainty in Innovation Contests: An Empirical Analysis; MANAGEMENT SCIENCE, pp. 1–21

Bresciani S., and Eppler M. (2009) The Benefits of Synchronous Collaborative Information Visualization: Evidence from an Experimental Evaluation. IEEE Transactions on Visualization and Computer Graphic. Vol. 15.

Briggs, O. and Reinig, B. (2008). On the relationship between idea quantity and idea quality during ideation. Group Decision and Negotiation. Pp. 403-420.

Brown, T. (2008). Design thinking. Harvard Business Review, pp. 84-92.

Brown, T. (2009) Change by Design: How Design Thinking Creates New Alternatives for Business and Society, New York: HarperCollins.

Brown, T. and Wyatt, (2010). *Design Thinking for Social Innovation*. Stanford Social Innovation Review.

Buchanan, 1992. Wicked Problems in Design Thinking. Design Issues, Vol. 8, pp. 5-21

Chandler, S. (2011). *Restore staffer's creative confidence*, Communication Briefings.

Chandler, S. (2011). *100 Ways To Motivate Yourself: Change Your Life Forever*, Career Press.

Charness, G., Karni, E., & Levin, D. (2007). Individual and group decision making under risk: An experimental study of Bayesian updating and violations of first-order stochastic dominance. *Journal of Risk and uncertainty*. Vol. *35*, pp. 129-148.

Chapman, C. and Ward, S. (2002). Managing Project Risk and Uncertainty: A constructively Simple Approach to Decision Making, Wiley, UK.

Chesbrough. H. (2003). *The Era of Open Innovation*, MIT Sloan Management Review. Vol 127, pp. 34-41.

Chidambaram, L., and Tung, L. (2005). Is out of sight, out of mind? An empirical study of social loafing in technology-supported groups. Information Systems Research. Vol 16, pp. 149–168.

Chohan, S. (1979), Product Cost, Performance and Technological Innovation, Proceedings, ASME, Management Division, Winter Annual Meeting, New York, December 2-7.

Chong, E. and Ma, X. (2010), *The Influence of Individual Factors, Supervision and Work Environment on Creative Self-Efficacy*, Creativity & Innovation Management. Vol. 19, pp. 233–247.

Clark and Smith (2008). Unleashing the Power of Design Thinking. Design Management Review. Vol 9 n. 3.

Collopy, F. (2009) Thinking about design thinking. Fast Company blog.

http://www.fastcompany.com/blog/fred-collopy/manage-designing/thinking-about-designthinking, (accessed 26th March 2014)

Comi, A., & Eppler, M. (2012) Visual Artefacts in Inter-Organizational Teamwork: Exploring the Duality between Designed and Emergent Use. EGOS sub-theme 56:

Practices of Inter-Organizational Collaboration: Designed or Emerging?, July 5-7th, Helsinki, Finland.

Cooper, R. (1988), Predevelopment activities determine new product success. Industrial Marketing Management. Vol 17 pp. 237-47.

Cooper, R. (1990). Stage-gate systems: A new tool for managing new products. Business Horizons, Vol 33, pp. 44–55.

Cooper, R. and Kleinschmidt, E. (1988), Resource Allocation in the New Product Process. Industrial Marketing Management. Vol 17, pp.249-62.

Cooper, R. and Kleinschmidt, E. (1995). Benchmarking the firm's critical success factors in new product development. *Journal of Product Innovation Management*. Vol 12, pp. 374–391.

Cooper, R, and Edgett, S., (2007). Generating new product ideas: feeding the innovation funnel, Product Development Institute.

Cooper R., and Edgett, S. (2008), Maximizing productivity in product innovation, in: Research Technology Management.

Cooper, R., Edgett, S. (2012). Best Practices in the Idea-to-Launch Process and Its Governance. Research-Technology Management. Vol 55, pp. 43–54.

Cox, C. (2005). Cox review of creativity in business: Building on the UK's strengths, HM Treasury

Cross, N. (2006) Designerly ways of knowing. Berlin: Springer.

Csikszentmihalyi, M. (1988). The flow experience and its significance for human psychology.

Cummings, A., and Oldham, G. (1997). Enhancing creativity: Managing work contexts for the high potential employee. *California management review*. Vol. *40*, pp. 22-38.

Currie, L. (2009) Design thinking. Red Jotter blog. http://redjotter.wordpress.com/category/design-thinking/ (accessed 27th March 2014)

Dahl, D., and Moreau, P., (2002). The influence and value of analogical thinking during new product ideation", *Journal of Marketing Research*. Vol. 39, pp. 47-60.

Dean, J., and Sharfman, M. (1996). Does decision process matter: A study of strategic decision making effectiveness. Academy of Management Journal. Vol 39, pp. 368–396.

Dean, D., Hender, J., Rodgers, T., and Santanen, E. (2006). Identifying Quality, Novel, and Creative Ideas: Constructs and Scales for Idea Evaluation. Journal of the Association for Information Systems. Vol 7, pp. 646-699.

De Bono, E. (1973). *Po: Beyond Yes and No.* Penguin Books Ltd.

De Bono, E. (1990). Lateral Thinking: A textbook of creativity, (3rd ed.), Penguin, London.

De Bono. E. (2007). How to Have Creative Ideas: 62 Exercises to Develop the Mind. Ed. Book- Vermilion, London.

Chohan, S. (1979). Product Cost, Performance and Technological Innovation, Proceedings, ASME, Management Division, Winter Annual Meeting, New York.

Dennis, A., Valacich, J., Carte, T., Garfield, M., Haley, B., and Aronson, J. (1997). Research report: The effectiveness of multiple dialogues in electronic brainstorming. *Information Systems Research*, Vol 8, pp. 203-211.

Dewett, T. (2006). Exploring the role of risk in employee creativity. Journal of Creative Behavior, Vol. 40, pp. 27–45.

Diehl, M. and Stroebe, W. (1987). Productivity Loss in Brainstorming Groups: Toward the Solution of a Riddle. *Journal of Personality and Social Psychology.* Vol 53, pp 497–509.

Diehl, M., and Stroebe, W. (1991). Productivity loss in idea-generating groups: Tracking down the blocking effect. *Journal of Personality and Social Psychology*, Vol 61, pp. 392-403.

Doyle, M. (2007), Facilitator's Guide to Participatory Decision-Making: Foreword. (Author Sam Kaner et al). p. xiii

Driscoll, J. (2007) Practising Clinical Supervision: A Reflective Approach for Healthcare Professionals. 2nd ed. Edinburgh: Bailliere Tindall Elsevier.

Dunne, D., & Martin, R. (2006). Design thinking and how it will change management education: An interview and discussion. Academy of Management Learning & Education. Vol. 5, pp. 512–523.

Dwyer, L. and Mellor, R. (1991). New product process activities and project outcomes. *R&D Management*, Vol 21, pp 31–42.

Dziersk, M. (2007), Visual Thinking: A Leadership Strategy. Design Management Review. Vol 18, pp 42–49.

Dziersk, M. (2010). *Visual Thinking: A leadership Strategy*. Design Management Review.

Eberle, B. (1996), SCAMPER: Creative Games and Activities for Imagination Development, Prufrock Press, Waco, TX, US.

Eppinger, S., and Ulrich, K. (1995). Product design and development. McGraw-Hill Education.

Eppler, M., and Platts, K. (2009). Visual Strategizing: The Systematic Use of Visualization in the Strategic-Planning Process. Long range planning. Vol 42, pp. 42-74.

Eppler, M., Bresciani, S. Tan, M. and Chang, K. (2011). Expanding the Boundaries of LSP Research: Using Intercultural Experiments to Examine the Role of Visual Representations in Text Comprehension and Retention. In: Petersen, M. and Engberg, J. (eds.), Current Trends in LSP Research. Aims and Methods. Bern, etc.: Peter Lang.

Erlandson, D, Harris, E, Skipper, B., Allen, S., (1993). Doing naturalistic inquiry: a guide to methods. Sage, Newbury Park.

Ernst, H., (2002). Success factors of new product development - a review of the empirical literature. International Journal of Management Reviews. Vol 4, pp 1-40.

Fields, J. (2011). Uncertainty: Turning Fera and Doubt into Fuel for Brilliance, Penguin US.

Finlay, L. (2008). Reflecting on the Reflective Practice. A discussion paper prepared for PBPL CETL, January 2008. Paper 52.

Fisher, R., Maltz, E. and Jaworski, B. (1997). Enhancing Communication between Marketing and Engineering: Moderating Role of Relative Functional Identification. Journal of Marketing, Vol 61, pp. 54–70.

Fisher, E. and Gallagher, D., (2011). Know Thyself: Coaching for Leadership using Kolb's Experiential Learning Theory. *The Coaching Psychologist.* Vol 7, pp. 5.

Fleming, L. (2001). Recombinant uncertainty in technological search. Management Sci. Vol 47, pp. 117–132.

Ford, C. (1995), Creativity is a mystery: clues from the investigators' notebooks.

Ford, C. (1996). A theory of individual creative action in multiple social domains. *Academy of Management review*. Vol. *21*, pp. 1112-1142.

Ford, C. and Gioia, D. (Eds). (1995). Creative Action in Organizations: Ivory Tower Visions & Real World Voices, Sage, London, pp. 12-52.

Franke, N. and Piller, F. (2004) Value Creation by Toolkits for User Innovation and Design: The Case of the Watch Market. The journal of product innovation management. Vol 21, pp. 401–415

Freese, A. (1999). The role of reflection on preservice teachers' development in the context of a professional development school. *Teaching and teacher education*. Vol 15, pp. 895-909.

Furnham, A., & Yazdanpanahi, T. (1995). Personality differences and group versus individual brainstorming. Personality and Individual Differences. Vol 19, pp. 73-80.

Gänshirt, C. (2007). Tools for Ideas. An Introduction to Architectural Design, Basel, Boston, Berlin: Birkhäuser.

Geschka, H. (1983). Creativity Techniques in Product Planning and Development: A view from West Germany. *R&D Management*, Vol. 13, pp. 169-183.

Ghaye, T. (2000). Into the reflective mode: bridging the stagnant moat. *Reflectice Practice*. Vol 1, pp. 5-9.

Gibbs, G. (1988). *Learning by Doing: A Guide to Teaching and Learning Methods*, London: Further Education Unit.

Girotra, K., Terwiesch, C. and Ulrich, K. (2010). Idea Generation and the Quality of the Best Idea. Journal of Management Science. Vol 56, pp. 591-605

Goldenberg, J., Mazursky, D., and Solomon, S., (1999), "Toward identifying the inventive templates of new products: a channeled ideation approach", *Journal of Marketing Research*, vol. 36, no. 2, pp. 200-210.

Gong, M., Baron, J., & Kunreuther, H. (2009). Group cooperation under uncertainty. *Journal of Risk and Uncertainty*. Vol *39*, pp. 251-270.

Gordon, S., Tarafdar, M., Cook, R., Maksimoski, R., and Rogowitz, B. (2008). Improving the front end of innovation with information technology. *Research-Technology Management*. Vol *51*, pp. 50-58.

Griffin A. (1993). Metrics for measuring product development cycle time. Journal of Product Innovation Management. Vol. 10, pp. 112–25.

Guba, E. G., & Lincoln, Y. S. (2005). "Paradigmatic controversies, contradictions, and emerging influences" In N. K. Denzin & Y. S. Lincoln (Eds.), The Sage Handbook of Qualitative Research (3rd ed.), pp. 191-215. Thousand Oaks, CA: Sage.

Gumble. W. (2003). *What's the Big Idea [Business Idea Development],* Management Services. Pp. 22-23.

Hatchuel, A. (2001) Towards design theory and expandable rationality: The unfinished programme of Herbert Simon. Journal of Management and Governance. Vol. 5, pp. 260-273.

Helsing, D., Howell, A., Kegan, R., Lahey, Laskow, L. (2008). Putting the 'development' in professional development: understanding and overturning educational leaders' immunities to change. Harvard Educational Review. Vol 78, pp. 437–465.

Herbert, S. (1969). The Science of the Artificial. Cambridge: MIT Press.

Herstatt. C. and Verworn B., and Nagahira A. (2004). Reducing project related uncertainty in the "fuzzy front end" of innovation – A comparison of German and

Japanese product innovation projects. Int. J. of Product Development, 2004 Vol.1, pp.43–65.

Heslin, P. (2009). Better than brainstorming? Potential contextual boundary conditions to brainwriting for idea generation in organizations. Journal of Occupational and Organizational Psychology. Vol 82, pp. 129–145.

Howard, T., Dekoninck, E., & Culley, S. (2010). The use of creative stimuli at early stages of industrial product innovation. *Research in Engineering Design*, Vol. *21*, pp. 263-274.

Howard, T., Culley, S., & Dekoninck, E. (2011). Reuse of ideas and concepts for creative stimuli in engineering design. *Journal of Engineering Design*. Vol. *22*, pp. 565-581.

Hughes, S. (1999). Getting beyond Conflict: The Art of Problem Solving. *Momentum*. Vol. *30*, pp. 27-29.

Isaksen, S., Puccio, G., & Treffinger, D. (1992). An ecological approach to creativity research: Profiling for creative problem solving. *Journal of Creative Behavior*. Vol. *27*, pp. 149-149.

Hudson, B. (2007). Pessimism and optimism in inter-professional working: the Sedgefield integrated team. Journal of Interprofessional Care. Vol 21, pp. 3-15.

Jelinek, M., Romme, G., and Boland, R. (2008). Introduction to the special issue: Organization studies as a science for design: Creating collaborative artifacts and research. Organization Studies. Vol. 29, pp. 317-329.

Johnson, E. (2002). *Contextual teaching and learning: What it is and why it's here to stay*. Corwin Press.

Johns, C. (1995). Framing learning through reflection within Carper's fundamental ways of knowing in nursing". Journal of advanced nursing. Vol 22, pp. 226–34.

Jung, J., Schneider, C., and Valacich, J.S. (2005). The influence of real-time indentifiability and evaluability performance feedback on group electronic brainstorming performance, *Proceedings of the 38th Hawaii International Conference on System Sciences.*

Kachelmeier, S. J., & Williamson, M. G. (2010). Attracting creativity: The initial and aggregate effects of contract selection on creativity-weighted productivity. *The Accounting Review*. Vol. *85*, pp. 1669-1691.

Kaner, S. (2007). Facilitator's Guide to Participatory Decision-Making. John Wiley & Sons.

Kao, J. (1996), JAMMING: The art and discipline of business creativity. New York: Harper.

Katila, R. (2002). New product search over time: Past ideas in their prime. Acad. Management, Vol. 45, pp. 995–1010.

Kaufmann, G. (2004). Two kinds of creativity–but which ones? Creativity and innovation Management. Vol 13, pp. 154-165.

Kelley, T. (2001). The art of innovation. London: Profile.

Kelly, T. and Kelly, D. (2012). *Reclaim your confidence*, Communication Briefings.

Kenneth, K. (2013). The PDMA handbook of new product development (Third edition ed.). Hoboken, New Jersey: John Wiley & Sons Inc. p. 21.

Kerr, L., MacCoun, R., & Kramer, G. (1996). Bias in judgment: comparing individuals and groups. Psychological Review. Vol. 103, pp. 687-719.

Khurana, A. and Rosenthal, S.R. (1998). Towards Holistic "Front Ends" in New Product Development. *Journal of Product Innovation Management* 15 (1): 57–75.

Kijkuit, B. and Ende, J. V. (2007). The Organizational Life of an Idea: Integrating Social Network, Creativity and Decision-Making Perspectives, Journal of Management Studies. Vol 44, pp. 863–882.

Kim, J., and Wilemon, D. (2002). Accelerating the Front End Phase in New Product DevelopmentStrategic Issues in Managing Innovation’s Fuzzy Front-End. Vol 5, pp. 27-39.

Kim, J. and Wilemon, D. (2007) Sources and assessment of complexity in NPD projects. R&D Management. Vol. 33, pp. 16-30.

Kimbell, (2009). Beyond design thinking: Design-as-practice and designs-in-practice. CRESC Conference, Manchester.

Kirton, M. (1976). Adaptors and innovators: A description and measure. *Journal of applied psychology*. Vol. *61*, pp. 622.

Kirton, M. (1994). *Adaptors and innovators. Styles of creativity and problem solving*. London: Routledge.

Kijkuit, B., & Van Den Ende, J. (2007). The Organizational Life of an Idea: Integrating Social Network, Creativity and Decision‐Making Perspectives. *Journal of Management Studies*. Vol. *44*, pp. 863-882.

Koen et al (2001), Providing clarity and a common language to the 'fuzzy front end'. Research Technology Management. Vol. 44, pp.46-55

Koen, P. (2004), "The Fuzzy Front End for Incremental, Platform, and Breakthrough Products", PDMA Handbook of New Product Development, 2nd Ed. pp 81–91

Koen, P. (2004). The fuzzy front end for incremental, platform and breakthrough products and services. *PDMA Handbook*, pp. 81-91.

Krippendorff, K. (2005). *The semantic turn: A new foundation for design*. crc Press.

Land, G., and Jarman, B. (1992). Moving beyond breakpoint. *The New Paradigm in Business: Emerging Strategies for Leadership and Organizational Change*. Pp. 250-266.

Levitt, T. (1963). Creativity is not enough. *Harvard Business Review*. Vol *41*, pp. 72-83.

Linsey, J. and Becker, B. (2011). Effectiveness of Brainwriting Techniques: Comparing Nominal Groups to Real Terms in Design Creativity. London: Springer London, pp.166.

Liu, D., Liao, H., & Loi, R. (2012). The dark side of leadership: A three-level investigation of the cascading effect of abusive supervision on employee creativity. *Academy of Management Journal*. Vol *55*, pp. 1187-1212.

López-Mesa, B., and Thompson, G. (2006). On the significance of cognitive style and the selection of appropriate design methods. *Journal of Engineering Design*, Vol *17*, pp. 371-386.

Lopez-Mesa, B., Mulet, E., Vidal, R., and Thompson, G. (2011). Effects of additional stimuli on idea-finding in design teams. *Journal of Engineering Design*, Vol *22*, pp. 31-54.

Loughran, J. (2002). Effective reflective practice in search of meaning in learning about teaching. *Journal of teacher education*. Vol *53*, pp. 33-43.

McBrien, B. (2007). Learning from practice–reflections on a critical incident. Accident and emergency nursing. Vol 15, pp. 128-133.

Michalko, M. (1993). Thinkertoys: A Handbook Of Creative Thinking Techniuqes. Berkeley, CA: Ten Speed Press.

Michalko M. (1994). Thinkpak, Berkeley, California, Ten Speed Press.

Michalko, M. (1998). Cracking creativity: the secrets of creative genius. Berkeley, CA, Ten Speed Press.

Michalko, M. (2003). From Bright Ideas to right ideas. The futurist, Vol. 37, pp. 52

MacKinnon, D. (1978). *In search of human effectiveness*. Creative Education Foundation.

Madhavan R, Grover R. (1998). From embedded to embodied knowledge: new product development as knowledge management. Journal of Marketing. Vol. 62, pp. 1–12.

Martin, R. (2009) The Design of Business: Why Design Thinking is the Next Competitive Advantage, Boston: Harvard Business School Press.

Miles, M. and Huberman, M. (1994), *Qualitative Data Analysis: An Expanded Sourcebook*, 2nd edition, SAGE, California, USA.

Miranda, S. and Bostrom, R. (1999). Meeting facilitation: process versus content interventions. *Journal of Management Information Systems*. Vol. *15*, pp. 89-114.

Moon, J., (2004). A handbook of reflective and experimental learning. Theory and practice. London: Routledge.

Mott, F. (1942). Trends in Newspaper Content. Annals of the American Academy of Political and Social Science. Vol 219, pp. 60–65.

Mullen, B., Johnson, C. and Salas, E. (1991). Productivity loss in brainstorming groups: A meta-analytic integration. Basic and Applied Psychology. Vol. 12, pp. 2-23

Mumford, M., Schultz, R., & Osburn, H. (2002). Planning in organizations: Performance as a multi-level phenomenon. In: F. J. Yammario & F. Dansereau (Eds), Research in multi-level issues: The many faces of multi-level issues (Vol. 1, pp. 3–35). Oxford, UK: Elsevier.

Mumford, M., Bedell-Avers, K., & Hunter, S. (2008). Planning for innovation: A multi-level perspective. Research in multi-level issues. Vol 7, pp. 107-154.

Muñoz-Doyague, M., González-Álvarez, N., & Nieto, M. (2008). An examination of individual factors and employees' creativity: The case of Spain. *Creativity Research Journal*. Vol. *20*, pp. 21-33.

Murphy, S. and Kumar, V. (1997), The Front End of New Product Development: a Canadian Survey. R&D Management. Vol 27 pp. 5-15.

Nardi, B. (1992). The use of scenarios in design. SIGCHI Bull. Vol 24, pp. 13-14.

Nelson, B., Wilson, J., Rosen, D., & Yen, J. (2009). Refined metrics for measuring ideation effectiveness. *Design Studies*. Vol 30, pp. 737-743.

Nevalainen, M., Mantyranta, T. and Pitkala, K. (2010). Facing uncertainty as a medical student—A qualitative study of their reflective learning diaries and writings on specific themes during the first clinical year. *Patient Education and Counselling*. Vol 78 pp. 218–223.

Nussbaum, B. (2009) Latest Trends in Design and Innovation--And Why The Debate Over Design Thinking is Moot, Business Week blog. http://www.businessweek.com/innovate/NussbaumOnDesign/archives/2009/07/latest_trends_i.html (accessed 26th March 2014)

Olson E., Walker O., Ruekert R. (1995). Organizing for effective new product development: the moderating role of product innovativeness. Journal of Marketing. Vol. 59, pp. 48–62.

Osborn, A. (1953, 1957, 1963, 1967). *Applied imagination: Principles and procedures of creative thinking. New York: Scribners*.

Osterwalder, A., and Pigneur, Y. (2010). Business Model Generation: A Handbook For Visionaries, Game Changers, And Challengers Author: Alexander Osterwalder, Yves. pp. 288. Wiley.

Parnes, S. (1967). *Creative behavior guidebook*. New York: Scribner.

Parnes, S, Noller, R. and Biondi, (1977). Guide to creative action. New York: Scribners.

Paterson, C. and Chapman, J. (2013). Enhancing skills of critical reflection to evidence learning in professional practice. *Physical Therapy in Sport*. Vol.14, pp.133-138.

Paulus, P., Brown, V. and Ortega, A. (1996). "Group creativity." In R.E Purser and A Montuori (eds. I, Social Creativity in Organizations. Cresskill. NJ: Hampton Press (In press).

Paulus, P. and Yang, H. (2000). Idea generation in groups: A basis for creativity in organizations. *Organizational behaviour and human decision processes*. Vol *82*, pp.76-87.

Perry, M. (2011). Fortune 500 Firms in 1955 vs 2011: 87% are gone. Carpe Diem: Professor Mark J. Perry's Blog for Economics and Finance http://mjperry.blogspot.com/2011/11/fortune-500-firms-in-1955-vs-2011-87.html [accessed June 2014]

Piotrowski, C. (2011). Problem Solving and Critical Thinking for Designers, Wiley, New Jersey.

Poincaré, H. (1913) The Foundations of Science: Science and Hypothesis, the Value of Science, Science and Method, The Science Press, NYC.

Posselt, T. and Forst, K. (2013) Success factors in new service development a literature review. Lecture Notes in Business Information Processing. Vol 167, pp 122-136.

Reinig, B., & Briggs, R. (2006). Measuring the quality of ideation technology and techniques. In *Proceedings of the 39th Annual Hawaii International Conference on System Sciences (HICSS'06)*. Vol. 1, pp. 20-20. IEEE.

Reinig, B. and Briggs, O. (2007). Bounded Ideation Theory: A New Model of the Relationship Between Idea quantity and Idea-quality during Ideation. Proceedings of the 40th Hawaii International Conference on System Sciences.

Reitzig, M. (2011). Is Your Company Choosing the Best Innovation Ideas? MIT Sloan Management Review. Vol 52 pp. 47-52.

Reitzig, M. (2011). Is Your Company Choosing the Best Innovation Ideas? MIT Sloan Management Review. Vol 52 pp. 47-52.

Ritchey, T. (1998). General morphological analysis. In *16th euro conference on operational analysis*.

Ritchey, T. (2005). Futures studies using morphological analysis. *Adapted from an article for the UN University Millennium Project: Futures Research Methodology Series.*

Robson, C. (2011). Real world research: a resource for users of social research methods in applied settings. Wiley, London.

Rohrbach, B. (1968). Creative by rules - Method 635, a new technique for solving problems. Absatzwirtschaft. Vol. 19, pp. 73-75.

Ross, D. (2002). Cooperating teachers facilitating reflective practice for student teachers in a professional development school. *Education*. Vol 122 pp. 682-688.

Schmalen, H. and Wiedemann, C. (1999). Erfolgsdeterminanten von Neuprodukten deutscher Hochtechnologieunternehmen. Zeitschrift fu¨ r Betriebswirtschaft. Vol. 1, pp. 69–89.

Schon, D. (1983). The reflective practitioner: How professionals think in action. New York: Basic Books. Pp. 102-104.

Shah, J., Vargas-Hernandez, N. and Smith, S. (2002) Metrics for measuring ideation effectiveness, Design Studies. Vol 24, pp. 111-134.

Simon, H. (1996). The sciences of the artificial (3rd ed.). Cambridge, MA: MIT Press.

Smith, P. and Reinertsen, D. (1991) Developing products in half the time, Van Nostrand Reinhold, New York.

Sommer, S. and Loch, C. (2004). Selectionism and learning in projects with complexity and unforeseeable uncertainty. Management Sci. Vol 50, pp. 1334–1347.

Song, X. and Parry, M. (1997). A cross-national comparative study of new product development processes: Japan and the United States. *Journal of Marketing*. Vol 61, pp. 1–18.

Song, X., Montoya-Weiss, M. and Schmidt, J. (1997). Antecedents and consequences of crossfunctional cooperation: a comparison of R&D, manufacturing, and marketing perspectives. Journal of Product Innovation Management. Vol 14, pp. 35–47.

Souder, W. and Moenaert, R. (1992). Integrating marketing and R&D project personnel within innovation projects: an information uncertainty model. *Journal of Management Studies*. Vol. *29*, pp. 485-512.

Sowrey, T. (1990). Idea Generation: Identifying the Most Useful Techniques. Table VII, page 8. European Journal of Marketing. Vol. 24, pp. 20–29.

Stevens, G. and Burley, J., (1997), "3,000 raw ideas equal 1 commercial success!", *Research Technology Management*. Vol. 40, pp. 16-27.

De Stobbeleir, K., Ashford, S. and Buyens, D. (2011). Self-regulation of creativity at work: The role of feedback-seeking behaviour in creative performance. *Academy of Management Journal*. Vol *54*, pp. 811-831.

Stockstrom, C., and Herstatt, C. (2008). Planning and uncertainty in new product development. *R&d Management*, Vol. *38*, pp. 480-490.

Stroebe, W. and Diehl, M. (1994). Why groups are less effective than their members: On productivity loss In idea generating groups. In Wolfgang Stroebe and Miles Hewstone leds.), European Review of Social Psychology. Vol. 5, pp. 271- 304. Chichester: Wiley.

Suchman, L. (1987) Plans and situated actions. Cambridge: Cambridge University Press.

Suri, J. and Marsh, M. (2000). Scenario building as an ergonomics method in consumer product design, Applied Ergonomics. Vol 31, pp. 151-157

Sutton, R. and Hargadon, A. (1996) Brainstorming Groups in Context: Effectiveness in a Product Design Firm. Administrative Science Quarterly. Vol. 41, pp. 685-718.

Sutton, R. (2002), *Weird Ideas that Spark Innovation*, MIT Sloan Management Review. Vol. 43, pp. 83-87.

Taggar, S. (2002). Individual Creativity and Group Ability to Utilize Individual Creative Resources: A Multilevel Model. *The Academy of Management Journal*. Vol. 45, pp. 315-330

Tahira, P., Stewart, S., Gruys, M., and Tierney, B. (2007). *Productivity, counterproductivity and creativity: The ups and downs of job insecurity*, Journal of Occupational and Organizational Psychology. Vol. 80, pp. 479–497.

Tauber, E. (1972). HIT: Heuristic ideation technique - a systematic procedure for new product search, Journal of marketing. Vol 36, pp 58-61.

Taylor, A. and Greve, H. (2006). Superman or the Fantastic Four? Knowledge combination and experience in innovative teams. Acad. Management Journal. Vol. 49, pp. 723–740.

Taylor, D.W., Berry, P.C., & Block, C.H. (1958). Does group participation when using brainstorming facilitate or inhibit creative thinking? *Administrative Science Quarterly*, Vol 3 pp. 23-57.

Tharp, T. (2006)*, The Creative Habit*, Personal Excellence.

Thamhain, H.J. (1990). Managing technologically innovative team efforts toward new product success. Journal of Product Innovation Management. Vol. 7, pp. 5–18.

Treffinger, D. J. (2000). Understanding the history of CPS. In S. G. Isaksen (Ed.), *Facilitative leadership: Making a difference with CPS* (pp.35-53). Dubuque, IA: Kendall/Hunt.

Tschimmel, K. (2012). Design Thinking as an Effective Toolkit for Innovation. In: *Proceedings of the XXIII ISPIM Conference: Action for Innovation: Innovating from Experience*. Barcelona.

Ulrich, K. and Eppinger, S. (1995), Product Design and Development. Irwin/McGraw-Hill, Boston, MA.

Valacich, J., Dennis, A., and Connolly, T. (1994). Idea generation in computer-based groups: A new ending to an old story. *Organizational Behaviour and Human Decision Processes*, Vol. 57, pp. 448-467**.**

Vanes, M. and Deacon, D. (1995). Think outside the box, Career Press; USA

Vandenbosch, B., Saatcioglu, A., and Fay, S., (2006), "Idea management: a systemic view", *Journal of Management Studies*. Vol. 43, pp. 259-288.

Van der Schaaf, M., Baartman, L., Prins, F., Oosterbaan, A., Schaap, H., (2013). Feedback Dialogues That Stimulate Students' Reflective Thinking. *Scandinavian Journal of Educational Research.* Vol 57, pp. 227-245.

Van Gundy, A. (1988). Techniques of structured problem Solving. Ed 2nd edition. Van Nostrand Reinhold.

Verganti, R. (2008). Design, meanings, and radical innovation: A metamodel and a research agenda. *Journal of product innovation management*. Vol. *25*, pp. 436-456.

Vihma, S. (2012). Design as Language–a Misconception?. *FORMakademisk*, Vol. *5*.

Wallas, G. (1926), The art of thought. Solis Press.

Welker, K., Sanders, E., Couch, J, (1997). Design scenarios to understand the user. Innovation Quart. J. Ind. Des. Soc. Am. pp. 24-27.

Weisberg, R .(1999). Creativity and knowledge: A challenge to theories.in R.J. Sternberg (Ed.), Handbook of creativity: pp. 226-250. New York: Cambridge University Press.

Wong, V. (2009). How Business Is Adopting Design Thinking, *Business Week* blog. http://www.businessweek.com/stories/2009-11-03/how-business-is-adopting-design-thinkingbusinessweek-business-news-stock-market-and-financial-advice. (Accessed on 1st April 2014)

Wood. (2003), *Managing Employees' Ideas: From Where Do Ideas Come?*, Journal for Quality and Participation.

Woodman, R., Sawyer, J.., & Griffin, R. (1993). Toward a theory of organizational creativity. Academy of management review Vol 18, pp. 293-321.

Zimmermann (1999) An application-oriented view of modelling uncertainty; European Journal of Operational Research. Vol. 122, pp. 190-198.

Zwicky, F. and Wilson A. (eds.) (1967). *New Methods of Thought and Procedure: Contributions to the Symposium on Methodologies*. Berlin: Springer

APPENDIX

A.1 Research Questionnaire Exploratory Interviews

Birmingham City University
Design Business Innovation Research Lab
Birmingham Institute of Art and Design

Research Questionnaire for Structured Interviews

IMPROVING IDEA QUALITY IN MULTIDISCIPLINARY TEAMS

Design driven Innovation: Enhancing Idea Quality in Front End Idea Generation Practices in Large Multinational Companies.

SECTION 0: PARTICIPANT INFORMATION

0.1. Background Information:

Name: ____

Contact details (email and phone): ____

Organisation: ____

Size of the organization: ____

Role: ____

How long have you been working in this organization? _________________________

What is your key area of expertise? ____

What is the core team with which you engage? _______________________________

SECTION 1: IDEAS

1.1. How important are ideas to **business success**?

Scale: 1 = very important, 3 = neither important or unimportant, 5 = not at all important

1 2 3 4 5

1.1.1. Why? Can you expand?

SECTION 2: NATURE OF THE PROCESS USED TO GENERATE IDEAS

2.1. How would you describe your typical **New Product Development** process?

2.1.1.	Formal		
2.1.2.	Informal		
2.1.3.	Structured		
2.1.4.	Unstructured		

2.3. How **frequently** do you typically undertake the following Idea Generation activities?

Scale: 1= very frequently, 3 = sometimes, 5 = never

(a) Activation of future Idea Pipelines	1	2	3	4	5
(b) Fulfilling specific NPD projects	1	2	3	4	5
(c) Determining new consumer needs	1	2	3	4	5
(d) Exploring new technology opportunities	1	2	3	4	5

2.4. How **important** is idea generation to the following Idea Generation activities?

Scale: 1 = very important, 3 = neither important or unimportant, 5 = not at all important

(a) Activation of future Idea Pipelines 1 2 3 4 5
(b) Fulfilling specific NPD projects 1 2 3 4 5
(c) Determining new consumer needs 1 2 3 4 5
(d) Exploring new technology opportunities 1 2 3 4 5

2.5. How **effective** is your Idea Generation process in relation to the following Idea Generation activities?

Scale: 1 = very effective, 3 = neither effective or ineffective, 5 = not at all effective

(a) Activation of future Idea Pipelines 1 2 3 4 5
(b) Fulfilling specific NPD projects 1 2 3 4 5
(c) Determining new consumer needs 1 2 3 4 5
(d) Exploring new technology opportunities 1 2 3 4 5

2.6. What is the **nature of the process** of the following Idea Generation activities?

I Scale A: 1= formal; 2= informal I **Scale B:** 3 = Structured; 4= Unstructured I

	Formal	Informal		Structured	Unstructured
Activation of future Idea Pipelines					
Fulfilling specific NPD projects					
Determining new consumer needs					
Exploring new technology opportunities					

2.7. What is the average **duration** of an idea generation session in relation to the following activities?

Scale: 1 = more than one day; 2= a full day; 3 =half a day, 4 = an hour; 5= less than half an hour

(a) To activate future Idea Pipelines	1	2	3	4	5
(b) To fulfill specific NPD projects	1	2	3	4	5
(c) To determine new consumer needs	1	2	3	4	5
(d) To explore new technology opportunities	1	2	3	4	5

SECTION 3: QUALITY OF IDEAS

3.1. Please describe the nature of your **evaluation process when selecting outcomes** of Idea Generation Sessions?

3.1.1.	Formal		
3.1.2.	Informal		
3.1.3.	Structured		
3.1.4.	Unstructured		

3.2. On completion of an Idea Generation Session how do you **judge success**?

Scale: 1= always , 3 = sometimes, 5 = never

(a) Quantity of ideas generated	1	2	3	4	5
(b) Quality of ideas generated	1	2	3	4	5
(b) Other	1	2	3	4	5

3.2.1. Why?

3.3. What factors do you typically use to define the **quality of ideas**?

Scale: 1 = very important, 3 = neither important or unimportant, 5 = not at all important

(a) Aligned to business objectives/strategy	1	2	3	4	5
(b) Addresses user needs/ insights	1	2	3	4	5
(c) It is novel	1	2	3	4	5
(d) It is feasible	1	2	3	4	5
(e) It solves a problem	1	2	3	4	5
(f) It is highly creative	1	2	3	4	5
(g) Other	1	2	3	4	5

3.3.1. What is the most important characteristic of idea quality? Why?

3.5. **Who typically selects** ideas from idea generation sessions?

Scale: 1= always, 3 = sometimes, 5 = never

(a) Project Manager	1	2	3	4	5
(b) Project team	1	2	3	4	5
(c) Idea Generation Participants	1	2	3	4	5
(d) Other	1	2	3	4	5

3.5.1. Why?

3.6. What impact do the following factors typically have on the **effectiveness** of generating quality ideas?

Scale: 1 = very important, 3 = neither important nor unimportant, 5 = not important at all

(a) Aligned to business objectives/strategy	1	2	3	4	5
(b) Addresses user needs/ insights	1	2	3	4	5
(c) It is novel	1	2	3	4	5
(d) It is feasible	1	2	3	4	5
(e) It solves a problem	1	2	3	4	5
(f) It is highly creative	1	2	3	4	5
(g) Other	1	2	3	4	5

SECTION 4: PEOPLE INVOLVED IN THE PROCESS

4.1. Who are **typically involved** in the Idea Generation session?

Scale: 1= always , 3 = sometimes, 5 = never

(a) Senior Managers	1	2	3	4	5
(b) Manager	1	2	3	4	5
(c) Junior	1	2	3	4	5
(d) External	1	2	3	4	5

4.1.1. Why?

4.2. **How frequently** do you work in multidisciplinary teams to generate ideas?

Scale: 1= always, 3 = sometimes, 5 = never

1 2 3 4 5

6.2.1. Why?

4.3. How **important** are multidisciplinary teams in generating ideas to achieve the following Idea Generation activities?

Scale: 1 = very important, 3 = neither important or unimportant, 5 = not at all important

(a) Activation of future Idea Pipelines	1	2	3	4	5
(b) Fulfilling specific NPD projects	1	2	3	4	5
(c) Determining new consumer needs	1	2	3	4	5
(d) Exploring new technology opportunities	1	2	3	4	5

4.3.1. Why?

4.4. How **effective** would you rate the performance of multidisciplinary teams in generating ideas?

Scale: 1= very effective, 3 = neither effective or ineffective, 5 = not at all effective

(a) Generating a high Quantity of ideas	1	2	3	4	5
(b) Generating low quantity of Quality of ideas	1	2	3	4	5

4.4.1. Why?

4.5. Which **functions** are typically involved within your multidisciplinary teams?

Scale: 1= always, 3 = sometimes, 5 = never

(a) R&D	1	2	3	4	5
(b) Marketing	1	2	3	4	5
(c) Designers	1	2	3	4	5
(d) Production	1	2	3	4	5
(e) External	1	2	3	4	5

4.5.1. Why?

4.6. Who are typically the most **effective** functions in generating quality ideas?

Scale: 1= very effective, 3 = neither effective or ineffective, 5 = not at all effective

(a) R&D	1	2	3	4	5
(b) Marketing	1	2	3	4	5
(c) Designers	1	2	3	4	5
(d) Production	1	2	3	4	5
(e) External	1	2	3	4	5

SECTION 5: TOOLS ISSUES

5.1. How **important** are tools that support Idea generation sessions?

Scale: 1 = very important, 3 = neither important or unimportant, 5 = not at all important

1 2 3 4 5

5.1.1. Why?

5.3. How **frequently** do you use the following tools for Idea Generation sessions?

Scale: 1= very frequently, 3 = sometimes, 5 = never

(a) Brainstorming	1	2	3	4	5
(b) Random Stimuli	1	2	3	4	5
(c) 5WH	1	2	3	4	5
(d) 6 Thinking Hats	1	2	3	4	5
(e) The Lotus Blossom	1	2	3	4	5
(f) 6-3-5 Brainwriting	1	2	3	4	5
(g) Scenario Building	1	2	3	4	5
(h) Scamper	1	2	3	4	5
(i) Morphological Analysis	1	2	3	4	5

(j) HIT	1	2	3	4	5
(k) Concept Fan	1	2	3	4	5
(l) TRIZ	1	2	3	4	5
(m) Other	1	2	3	4	5

5.4. How **effective** do you consider these tools are to generate the following results?

Scale: 1= very effective, 3 = neither effective or ineffective, 5 = not at all effective

	QUALITY					QUANTITY				
(a) Brainstorming	1	2	3	4	5	1	2	3	4	5
(b) Random Stimuli	1	2	3	4	5	1	2	3	4	5
(c) 5WH	1	2	3	4	5	1	2	3	4	5
(d) 6 Thinking Hats	1	2	3	4	5	1	2	3	4	5
(e) The Lotus Blossom	1	2	3	4	5	1	2	3	4	5
(f) 6-3-5 Brainwriting	1	2	3	4	5	1	2	3	4	5
(g) Scenario Building	1	2	3	4	5	1	2	3	4	5
(h) Scamper	1	2	3	4	5	1	2	3	4	5
(i) Morphological Analysis	1	2	3	4	5	1	2	3	4	5
(j) HIT	1	2	3	4	5	1	2	3	4	5
(k) Concept Fan	1	2	3	4	5	1	2	3	4	5
(l) TRIZ	1	2	3	4	5	1	2	3	4	5
(m) Other	1	2	3	4	5	1	2	3	4	5

INTERVIEW RESPONDENT A 9th May 2014

PILOT STUDY

Q1. How important are ideas to business success?

Scale: 1 = very important, 3 = neither important or unimportant, 5 = not at all important

[✓ 1] 2 3 4 5

Why? Can you expand?

It is a difficult question to answer because of the context. All businesses are about a successful idea. Even if it is part of a strategy, it is still about an idea.

Q2. How would you describe your typical New Product Development process? (formal/ informal and structured/unstructured)

It is both (formal and informal) because it could start informally if someone has an idea then that could starts the process or it could be formal by somebody, one of the directors, identifying they want a new product in a specific area so it really depends. There are steps one goes through which is different to a process.

I would say it was unstructured.

Q3. How frequently do you undertake the following idea generation activities?

Scale: 1= very frequently, 3 = sometimes, 5 = never

(a) Activation of future Idea Pipelines [✓ 1] 2 3 4 5
(b) Fulfilling specific NPD projects [✓ 1] 2 3 4 5
(c) Determining new consumer needs [✓ 1] 2 3 4 5
(d) Exploring new technology opportunities [✓ 1] 2 3 4 5

Activating future idea pipelines: very frequently because that was my role.
Fulfilling specific NPD projects: very frequently because it was my job as well.
Identifying new Consumer needs/insights: it is quite interesting, because again, you could not do product development without the consumer needs so again very frequently.
Exploring new technologies: very frequently, again part of my job.

Q4. How important is idea generation to the following activities? Scale: 1 = very important, 3 = neither important or unimportant, 5 = not at all important

(a) Activation of future Idea Pipelines [✓ 1] 2 3 4 5
(b) Fulfilling specific NPD projects 1 2 [✓ 3] 4 5
(c) Determining new consumer needs [✓ 1] 2 3 4 5

(d) Exploring new technology opportunities [✓ 1] 2 3 4 5

Activating future idea pipelines: very important.

Fulfilling specific NPD projects: Less important because it is more about a process, so you want few ideas in a process so probably around 3 (neither important nor unimportant)

Identifying new Consumer needs/insights: Very important.

Exploring new technologies: Again, it was very important, because often the technology came with what we saw because sometimes technology just comes with nothing.

Q5. How effective is idea generation to the following activities? Scale: 1= very effective, 3 = neither effective nor ineffective, 5= not at all effective

(a) Activation of future Idea Pipelines [✓ 1] 2 3 4 5

(b) Fulfilling specific NPD projects 1 2 [✓ 3] 4 5

(c) Determining new consumer needs 1 [✓ 2] 3 4 5

(d) Exploring new technology opportunities [✓ 1] 2 3 4 5

Q6. What is the nature of the process of the following idea generation activities?

Scale A: 1= formal; 2= informal I **Scale B:** 3 = Structured; 4= Unstructured I

	Formal	nformal	Structured	Unstructured
Activation of future Idea Pipelines	X			X
Fulfilling specific NPD projects	X		X	
Determining new consumer needs		X		X
Exploring new technology opportunities	X			X

Activating future idea pipelines: It did not exist before we started. Should I say formal because we formalised? In that case yes, it is formal. We tried to make it structured so I guess it was unstructured.

Fulfilling specific NPD projects: that one is structured at Sky and also formal because you need buy-in and resources to fulfil any NPD project.

Identifying new Consumer needs/insights: Informal and unstructured.

Exploring new technologies: formal but unstructured.

Q7. What is the average duration of an Idea Generation session in relation to the following activities?

Scale: 1 = more than one day; 2= a full day; 3 =half a day, 4 = an hour; 5= less than half an hour

(a) Activation of future Idea Pipelines [✓ 1] 2 3 4 5
(b) Fulfilling specific NPD projects [✓ 1] 2 3 4 5
(c) Determining new consumer needs 1 [✓ 2] 3 4 5
(d) Exploring new technology opportunities [✓ 1] 2 3 4 5

Identifying new Consumer needs/insights: this could be just an idea of a spotted unmet need on or if we had to think about it then it would be a day, if it was something you came across then it would be less.

3.1. Please describe the nature of your evaluation process when selecting outcomes of Idea Generation Sessions?

3.1.1.	Formal		
3.1.2.	Informal	X	I would say it was informal and unstructured although that was improved. The outcomes would vary depending on what the project was. It was not consistent in terms of "we need to have 3 ideas at the end of the session", sometimes one session would be three, sometimes ten, sometimes zero so there was never an overall target or definition of what good looked like.
[redacted]	[redacted]	[redacted]	[redacted]
3.1.3.	Structured		
3.1.4.	Unstructured	X	And it was unstructured because everyone was made up on the spot, so even though if we were working with yourself trying to formalise it, it was still difficult because every question was slightly different. The tools and techniques you would have to use and deploy would be different, they would be modified, even if it was the same template, it was still modified. You would have the basics of some components that were consistent but the reality was that the process for evaluation was different for each session.

Q9. On a completion of an idea generation session, how do you judge success?

Scale: 1= always , 3 = sometimes, 5 = never

(a) Quantity of ideas generated	1	2	[✓ 3]	4	5
(b) Quality of ideas generated	1	[✓ 2]	3	4	5
(b) Other: Feasibility	[✓ 1]	2	3	4	5

Quantity of ideas generated: depends, this would be sometimes. You would need to have quantity but does not necessarily mean quality.

Quality of ideas generated: Very often (2)

Other: Feasibility of ideas generated. It would be a good idea, and have many of them but they could be undeliverable. Therefore, feasibility was always a success criteria. And this would be always (1)

Q10. What factors do you typically use to define the Quality of Ideas? Scale: 1 = very important, 3 = neither important or unimportant, 5 = not at all important

(a) Aligned to business objectives/strategy	[✓ 1]	2	3	4	5
(b) Addresses user needs/ insights	1	[✓ 2]	3	4	5
(c) It is novel	1	2	3	[✓ 4]	5
(d) It is feasible	[✓ 1]	2	3	4	5
(e) It solves a problem	[✓ 1]	2	3	4	5
(f) It is highly creative	1	2	3	[✓ 4]	5
(g) Other N/A	1	2	3	4	5

Q11. What is the top factor to define idea quality?

I would say it has be E: It solves a problem. But that is not the only thing, you also need it to be aligned to business objectives and it needs to be feasible, so it should be a combination of the three. However, it has to start by solving a problem.

Q12. Who typically selects ideas from Idea Generation sessions?

Scale: 1= always , 3 = sometimes, 5 = never

(a) Project Manager 1 2 [✓ 3] 4 5

(b) Project team	1 [✓ 2] 3 4 5
(c) Idea Generation Participants	[✓ 1] 2 3 4 5
(d) Other - Internal Director	[✓ 1] 2 3 4 5

Why?

The internal director is the ultimate stakeholder so if they don't buy into it, it is never going to happen, no matter how good it is. They need to believe in it as they are the ultimate stakeholder.

Q13. What impact do the following factors typically have on the effectiveness of generating quality ideas?

Scale: 1 = very important, 3 = neither important nor unimportant, 5 = not important at all

(a) Aligned to business objectives/strategy	[✓ 1] 2 3 4 5
(b) Addresses user needs/ insights	1 [✓ 2] 3 4 5
(c) It is novel	1 2 3 [✓ 4] 5
(d) It is feasible	[✓ 1] 2 3 4 5
(e) It solves a problem	[✓ 1] 2 3 4 5
(f) It is highly creative	1 2 3 [✓ 4] 5
(g) Other N/A	1 2 3 4 5

Q14. Who are typically involved in Idea Generation sessions?

Scale: 1= always , 3 = sometimes, 5 = never

(a) Senior	[✓ 1] 2 3 4 5
(b) Manager	1 [✓ 2] 3 4 5
(c) Junior	1 [✓ 2] 3 4 5
(d) Other-External	1 2 [✓ 3] 4 5

Why?

Because we quite like to have external input but it was less frequent.

Senior managers - you want them buying into the whole process and the outcomes, to feel a sense of ownership because they would need to be involved in the delivery of it in the future. if you focus on juniors only then there is less ability to deliver. It is not less important, it is just you have to go further to get buy-in to deliver.

Q15. How often do you work in multidisciplinary teams for idea generation? Scale: 1= always, 3 = sometimes, 5 = never

[✓ 1] 2 3 4 5

Always. It is important to have perspective from different people and when it comes to the question of feasibility you need the expertise of people in the room, the same with quality you also need those perspectives to be sure it makes sense. However, for quantity you do not need multidisciplinary teams. Multi-disciplinary teams matter when it comes to quality and feasibility.

Q16. How important are multidisciplinary teams in generating ideas to achieve the following activities?

Scale: 1 = very important, 3 = neither important or unimportant, 5 = not at all important

(a) Activation of future Idea Pipelines [✓ 1] 2 3 4 5
(b) Fulfilling specific NPD projects [✓ 1] 2 3 4 5
(c) Determining new consumer needs 1 [✓ 2] 3 4 5
(d) Exploring new technology opportunities [✓ 1] 2 3 4 5

Fulfilling specific NPD projects: very important (1) because that is the way it works in Sky.

Exploring new technologies: very important (1) you do not need to have all the teams involved, but it still needs to be multidisciplinary.

Q17. How effective would you rate the performance of multidisciplinary teams in generating ideas.

Scale: 1= very effective, 3 = neither effective or ineffective, 5 = not at all effective

(a) Generating a high Quantity of ideas 1 [✓ 2] 3 4 5
(b) Generating low quantity of Quality of ideas 1 [✓ 2] 3 4 5

High quality ideas: 2 cause I do not know how effective would it be in terms of effective or very effective. Not everybody is going to come up with great ideas even if it is a multidisciplinary team, but it will be effective.

Q18. Which functions are typically involved within your multidisciplinary teams?

Scale: 1= always, 3 = sometimes, 5 = never

(a) R&D –product research group	1	[✓ 2]	3	4	5
(b) Marketing	1	[✓ 2]	3	4	5
(c) Designers	1	2	[✓ 3]	4	5
(d) Production - technology developers	[✓ 1]	2	3	4	5
(e) External	1	2	3	[✓ 4]	5

Q19. Who are typically the most effective functions in generating quality ideas?

Scale: 1= very effective, 3= neither effective or ineffective, 5= not at all effective

(a) R&D	1	[✓ 2]	3	4	5
(b) Marketing	1	[✓ 2]	3	4	5
(c) Designers	1	2	[✓ 3]	4	5
(d) Production	[✓ 1]	2	3	4	5
(e) External	1	2	3	[✓ 4]	5

Why?

It is not about the functions, but the individuals. It is very difficult to make a judgment call based on the functions, I cannot say all our R&D are effective in coming up with generating quality ideas because that is not true. There are a few people that are fantastic, but not all of them and the same with marketing so to be honest with you I cannot answer that question, because this is about people not just functions.

You would hope marketing and designers to be the most creative but that is not necessarily true. The assumption is that being in a creative sector you are able to generate ideas, quality ideas is another thing, but just generate ideas. Whereas somebody in R&D might struggle with coming up with lots of ideas but when they come up with one, it is really a very good one so there is a quality over quantity. t is unfair lump people in there as people are different. We spent most of our time thinking about a multidisciplinary team but in them there were few people you would actually approach who could -really help.,Not everybody could.

Q20. How important are tools that support Idea generation sessions?

Scale: 1 = very important, 3 = neither important or unimportant, 5 = not at all important

[✓ 1] 2 3 4 5

Why?

They are very important but they have to be adaptable. They need to be consistent in framework but high level enough to be applied to different contests. We struggled getting an idea generation proforma that was the same each time and that as because the questions were different. However, measurements can be consistently applied and techniques can be consistenly applied.

Q21. How frequently do you use the following tools for Idea Generation sessions?

Scale: 1= very frequently, 3 = sometimes, 5 = never

(a) Brainstorming	1	[✓ 2]	3	4	5
(b) Random Stimuli	1	2	3	[✓ 4]	5
(c) 5WH	1	[✓ 2]	3	4	5
(d) 6 Thinking Hats	1	2	3	4	[✓ 5]
(e) The Lotus Blossom	1	2	3	4	[✓ 5]
(f) 6-3-5 Brainwriting	1	2	3	4	[✓ 5]
(g) Scenario Building	1	[✓ 2]	3	4	5
(h) Scamper	1	2	[✓ 3]	4	5
(i) Morphological Analysis	1	2	3	4	[✓ 5]
(j) HIT	1	2	[✓ 3]	4	5
(k) Concept Fan	1	2	3	4	[✓ 5]
(l) TRIZ	1	2	3	4	[✓ 5]

(m) Other - PRE PREPARED STIMULUS: sector specific, applications specific, to stimulate related ideas used in a random manner, pick them randomly but they have been preselected

1 [✓ 2] 3 4 5

Q.22. How effective do you consider these tools are to generate the following results?

Scale:1= very effective, 3= neither effective or ineffective, 5= not at all effective

Orange= N/A

Q	QUALITY					QUANTITY				
(a) Brainstorming	1	2	[✓ 3]	4	5	[✓ 1]	2	3	4	5

(b) Random Stimuli	1	2	3	4	5	1	2	3	4	5
(c) 5WH	1	[✓ 2]	3	4	5	1	2	[✓ 3]	4	5
(d) 6 Thinking Hats	1	2	3	4	5	1	2	3	4	5
(e) The Lotus Blossom	1	2	3	4	5	1	2	3	4	5
(f) 6-3-5 Brainwriting	1	2	3	4	5	1	2	3	4	5
(g) Scenario Building	1	[✓ 2]	3	4	5	1	2	[✓ 3]	4	5
(h) Scamper	1	[✓ 2]	3	4	5	1	[✓ 2]	3	4	5
(i) Morphological Analysis	1	2	3	4	5	1	2	3	4	5
(j) HIT	1	2	3	4	5	1	2	3	4	5
(k) Concept Fan	1	2	3	4	5	1	2	3	4	5
(l) TRIZ	1	2	3	4	5	1	2	3	4	5
(m) Other - preselected stimuli	1	[✓ 2]	3	4	5	1	[✓ 2]	3	4	5

Additional Notes:

Tools are really effective to generate quality ideas but they need to be adaptable. You might ask the questions slightly differently but it is still the same thing.

The capturing, we really tried to standardise the capturing of the session and that is where we succeeded the most. What really helped was the feedback questionnaire. It was most standardised element and aws useful to evaluate the performance of each project/session-

Idea generation is conflicting. it is about creativity, not about ticking boxes therefore it conflicts the notions of processes and standardisation. -

INTERVIEW RESPONDENT B

12nd May 2014

PILOT STUDY

Q1. How important are ideas to business success?

Scale: 1 = very important, 3 = neither important or unimportant, 5 = not at all important

1 [✓ 2] 3 4 5

Why? Can you expand?

Because if an idea is going to make Sky earn a lot of money then it is very important, if it is an incremental game, even if it is a great idea but it is not going to create a large revenue is not as important as improving our existing products. We have to make sure the idea is going to make lots of money before investing in it rather than enhancing our existing portfolio to make sure we do not become less innovative.

It is important to know the revenue before investing in an idea.

Q2. How would you describe your typical New Product Development process? (Formal/Informal Structured/Unstructured)

Informal, there is no specific process of coming up with new ideas. When to use the research team has not been particularly clarified. With regards how we deliver and build the product that is still about the process changing, and it changes so much that is very informal. As much as people prepare presentations on how we are going to develop things, it all changes two months later.

As a whole in Sky it is structured, in terms of how the teams split up: research group and delivery group. But there is informality on who does what even now, in the delivery side we are expected to take time out and come up with ideas, which is very hard when you have to build something.

Q3. How frequently do you typically undertake the following Idea Generation activities?

Scale: 1= very frequently, 3 = sometimes, 5 = never

(a) Activation of future Idea Pipelines	[✓ 1]	2	3	4	5
(b) Fulfilling specific NPD projects	[✓ 1]	2	3	4	5
(c) Determining new consumer needs	1	[✓ 2]	3	4	5
(d) Exploring new technology opportunities	1	2	[✓ 3]	4	5

Q4. How important is idea generation to the following Idea Generation activities?

Scale: 1 = very important, 3 = neither important or unimportant, 5 = not at all important

(a) Activation of future Idea Pipelines	[✓ 1]	2	3	4	5
(b) Fulfilling specific NPD projects	1	[✓ 2]	3	4	5
(c) Determining new consumer needs	1	2	[✓ 3]	4	5
(d) Exploring new technology opportunities	1	[✓ 2]	3	4	5

Q5. How effective is your Idea Generation process in relation to the following Idea Generation activities?

Scale: 1 = very effective, 3 = neither effective or ineffective, 5 = not at all effective

(a) Activation of future Idea Pipelines [✓ 1] 2 3 4 5
(b) Fulfilling specific NPD projects 1 [✓ 2] 3 4 5
(c) Determining new consumer needs 1 2 3 [✓ 4] 5
(d) Exploring new technology opportunities 1 2 3 [✓ 4] 5

Q6. What is the nature of the process of the following Idea Generation activities?

Scale A: 1= formal; 2= informal I **Scale B:** 3 = Structured; 4= Unstructured I

	Formal	Informal		Structured	Unstructured
Activation of future Idea Pipelines	X			X	
Fulfilling specific NPD projects	X			X	
Determining new consumer needs		X		X	
Exploring new technology opportunities		X			X

Q7. What is the average duration of an idea generation session in relation to the following activities?

Scale: 1 = more than one day; 2= a full day; 3 =half a day, 4 = an hour; 5= less than half an hour

(a) To activate future Idea Pipelines [✓ 1] 2 3 4 5
(b) To fulfill specific NPD projects [✓ 1] 2 3 4 5
(c) To determine new consumer needs 1 2 [✓ 3] 4 5
(d) To explore new technology opportunities 1 2 3 [✓ 4] 5

SECTION 3: QUALITY OF IDEAS

3.1. Please describe the nature of your **evaluation process when selecting outcomes** of Idea Generation Sessions?

3.1.1.	Formal		
3.1.2.	Informal	X	The evaluation would be more discussion and casual chat, normally would be discussed at first and then turns into a structured approach to move it to the next stage.

3.1.3.	Structured	X	We have to write things up on what came up from the session and later to select the next step.
3.1.4.	Unstructured		

3.2. On completion of an Idea Generation Session how do you **judge success**?

Scale: 1= always , 3 = sometimes, 5 = never

(a) Quantity of ideas generated 1 [✓ 2] 3 4 5

(b) Quality of ideas generated [✓ 1] 2 3 4 5

(b) Other: Feasibility [✓ 1] 2 3 4 5

3.2.1. Why?

How we do it and when we do it, if it something easy for us to build and the implementation of the ideas. Easy achievement, low hanging fruit tends to be easier than a heavy investment to move forward and make stakeholders buy the idea. This is a private company so technology, cost, revenue, etc. is something that is taken into account from a very early stage.

Feasibility is always looked at because we are a large company so the blue sky is ripped off very quickly.

When a session is about quantity and nothing comes up from the session it feels like failure. Of course having a wide choice of 20 ideas to choose from always feels successful, as long as at the end of the day you can prioritize the ones that are more feasible and high quality and we believe our users have a demand for it, then it will feel as a successful session.

3.3. What factors do you typically use to define the **quality of ideas**?

Scale: 1 = very important, 3 = neither important or unimportant, 5 = not at all important

(a) Aligned to business objectives/strategy [✓ 1] 2 3 4 5

(b) Addresses user needs/ insights [✓ 1] 2 3 4 5

(c) It is novel	1	2	[✓ 3]	4	5
(d) It is feasible	[✓ 1]	2	3	4	5
(e) It solves a problem	1	[✓ 2]	3	4	5
(f) It is highly creative	1	2	3	[✓ 4]	5
(g) Other: **N/A**	1	2	3	4	5

3.3.1. What is the most important characteristic of idea quality? Why?

TOP factor: User needs/ insights because addresses the demand and includes what the user might need and will end up being novel and it often solves a problem so I think that one can include others.

3.5. **Who typically selects** ideas from idea generation sessions?

Scale: 1= always, 3 = sometimes, 5 = never

(a) Project Manager	1	[✓ 2]	3	4	5
(b) Project team	1	[✓ 2]	3	4	5
(c) Idea Generation Participants	1	[✓ 2]	3	4	5
(d) Other: Strategy Group/ Management	1	2	[✓ 3]	4	5

3.5.1. Why?

Feedback form management and then a chat with the team on what ideas to pursue. It works bottom down, not bottom up. Above project management there are executives, directors that need to back up the idea; the technology teams that need to be asked opinion in terms of feasibility, as well as marketing because they hold the money, if the idea is not going to sell then the idea wont move forward.

3.6. What impact do the following factors typically have on the **effectiveness** of generating quality ideas?

Scale: 1 = very important, 3 = neither important nor unimportant, 5 = not important at all

(a) Aligned to business objectives/strategy	1	[✓ 2]	3	4	5
(b) Addresses user needs/ insights	[✓ 1]	2	3	4	5
(c) It is novel	1	[✓ 2]	3	4	5

(d) It is feasible	1	2	3	[✓ 4]	5
(e) It solves a problem	[✓ 1]	2	3	4	5
(f) It is highly creative	1	[✓ 2]	3	4	5
(g) Other	1	2	3	4	5

SECTION 4: PEOPLE INVOLVED IN THE PROCESS

4.1. Who are **typically involved** in the Idea Generation session?

Scale: 1= always , 3 = sometimes, 5 = never

(a) Senior Managers	1	[✓ 2]	3	4	5
(b) Manager	[✓ 1]	2	3	4	5
(c) Junior	[✓ 1]	2	3	4	5
(d) External	1	[✓ 2]	3	4	5

4.1.1. Why?

Senior managers are very good but they do not have that much time.

Managers they would get carried to move the ideas forward

Juniors because they have lots of time

External because we use a lot of external help to generate ideas

---

4.2. **How frequently** do you work in multidisciplinary teams to generate ideas?

Scale: 1= always, 3 = sometimes, 5 = never

[✓ 1] 2 3 4 5

6.2.1. Why?

To get feedback.

To understand the implications of an idea across the whole company

To have different juices flowing, everyone comes from a different background, expertise and sources or knowledge.

4.3. How **important** are multidisciplinary teams in generating ideas to achieve the following Idea Generation activities?

Scale: 1 = very important, 3 = neither important or unimportant, 5 = not at all important

(a) Activation of future Idea Pipelines [✓ 1] 2 3 4 5
(b) Fulfilling specific NPD projects [✓ 1] 2 3 4 5
(c) Determining new consumer needs 1 2 3 [✓ 4] 5
(d) Exploring new technology opportunities 1 2 3 [✓ 4] 5

4.3.1. Why?

A) it brings different backgrounds, knowledge, skillsets to identify different problems

4.4. How **effective** would you rate the performance of multidisciplinary teams in generating ideas?

Scale: 1= very effective, 3 = neither effective or ineffective, 5 = not at all effective

(a) Generating a high Quantity of ideas [✓ 1] 2 3 4 5
(b) Generating low quantity of Quality of ideas [✓ 1] 2 3 4 5

4.4.1. Why?

When you work in a multidisciplinary team a lot of different ideas tend to come up due to the very different backgrounds. Because quality at Sky usually is aligned to business objectives, if you have a very different range of people in the room you are more likely to align with the business and to come up and develop and idea that meets the strategy and business objectives of the company across departments. Therefore the quality is more likely to be high.

4.5. Which **functions** are typically involved within your multidisciplinary teams?

Scale: 1= always, 3 = sometimes, 5 = never

(a) R&D [✓ 1] 2 3 4 5
(b) Marketing [✓ 1] 2 3 4 5
(c) Designers [✓ 1] 2 3 4 5
(d) Production/delivery 1 2 3 [✓ 4] 5
(e) External 1 [✓ 2] 3 4 5

4.5.1. Why?

Concept development because they are the ones to take the idea forward and includes consumer insights.

Marketing because the plan in advance so it is good to involve them at early stages and they are close to what consumers want.

Designers because they tend to be more creative and generate more ideas (quanity), their approach to thinking is very different from marketing people and it is good to have a balance.

4.6. Who are typically the most **effective** functions in generating quality ideas?

Scale: 1= very effective, 3 = neither effective or ineffective, 5 = not at all effective

(a) R&D [✓ 1] 2 3 4 5
(b) Marketing [✓ 1] 2 3 4 5
(c) Designers 1 2 [✓ 3] [✓ 4] 5
(d) Production / Delivery 1 2 [✓ 3] 4 5
(e) External [✓ 1] 2 3 4 5

SECTION 5: TOOLS ISSUES

5.1. How **important** are tools that support Idea generation sessions?

Scale: 1 = very important, 3 = neither important or unimportant, 5 = not at all important

[✓ 1] 2 3 4 5

5.1.1. Why?

IIt helps people get moving, ice breaking, stimulating a thinking and problem solving from different angles making the session more structured.

Sessions with no tools feel more unstructured and time wasting.

5.3. How **frequently** do you use the following tools for Idea Generation sessions?

Scale: 1= very frequently, 3 = sometimes, 5 = never

(a) Brainstorming	[✓ 1] 2 3 4 5
(b) Random Stimuli	1 2 3 4 [✓ 5]
(c) 5WH	1 2 [✓ 3] 4 5
(d) 6 Thinking Hats	1 2 3 4 [✓ 5]
(e) The Lotus Blossom	1 2 3 4 [✓ 5]
(f) 6-3-5 Brainwriting	1 2 [✓ 3] 4 5
(g) Scenario Building	1 2 [✓ 3] 4 5
(h) Scamper	1 2 3 4 [✓ 5]
(i) Morphological Analysis	1 2 3 4 [✓ 5]
(j) HIT	1 2 3 4 [✓ 5]
(k) Concept Fan	1 2 3 4 [✓ 5]
(l) TRIZ	1 2 3 4 [✓ 5]
(m) Other: build/break/rebuild	1 [✓ 2] 3 4 5
templates	[✓ 1] 2 3 4 5

5.4. How **effective** do you consider these tools are to generate the following results?

Scale: 1= very effective, 3 = neither effective or ineffective, 5 = not at all effective

Orange: N/A

	QUALITY	QUANTITY
(a) Brainstorming	[✓ 1] 2 3 4 5	[✓ 1] 2 3 4 5
(b) Random Stimuli	1 2 3 4 5	1 2 3 4 5
(c) 5WH	[✓ 1] 2 3 4 5	1 [✓ 2] 3 4 5
(d) 6 Thinking Hats	1 2 3 4 5	1 2 3 4 5
(e) The Lotus Blossom	1 2 3 4 5	1 2 3 4 5
(f) 6-3-5 Brainwriting	1 [✓ 2] 3 4 5	[✓ 1] 2 3 4 5

(g) Scenario Building	[✓ 1]	2	3	4	5	1	[✓ 2]	3	4	5
(h) Scamper	1	2	3	4	5	1	2	3	4	5
(i) Morphological Analysis	1	2	3	4	5	1	2	3	4	5
(j) HIT	1	2	3	4	5	1	2	3	4	5
(k) Concept Fan	1	2	3	4	5	1	2	3	4	5
(l) TRIZ	1	2	3	4	5	1	2	3	4	5
(m) Other	1	2	3	4	5	1	2	3	4	5

INTERVIEW RESPONDENT C 12nd May 2014

PILOT STUDY

Q1. How important are ideas to business success?

Scale: 1 = very important, 3 = neither important or unimportant, 5 = not at all important

[✓ 1] 2 3 4 5

Why? Can you expand?

Because businesses have to evolve and they face challenges so they have to respond. They need ideas, they do not have to be innovative, but they definitely need ideas.

Q2. How would you describe your typical New Product Development process? Scale A: 1= formal; 2= informal l **Scale B:** 3 = Structured; 4= Unstructured l

Informal: it was conversational with other parts of the business, their needs, understanding trends,

Unstructured: when I joined there was no structured process, however that is due to the nature of this organization.

Usually there is a formal process.

Q3. How frequently do you typically undertake the following Idea Generation activities?

Scale: 1= very frequently, 3 = sometimes, 5 = never

(a) Activation of future Idea Pipelines	1	2	[✓ 3]	4	5
(b) Fulfilling specific NPD projects	1	[✓ 2]	3	4	5
(c) Determining new consumer needs	[✓ 1]	2	3	4	5
(d) Exploring new technology opportunities	[✓ 1]	2	3	4	5

Q4. How important is idea generation to the following Idea Generation activities?

Scale: 1 = very important, 3 = neither important or unimportant, 5 = not at all important

(a) Activation of future Idea Pipelines [✓ 1] 2 3 4 5
(b) Fulfilling specific NPD projects [✓ 1] 2 3 4 5
(c) Determining new consumer needs 1 2 [✓ 3] 4 5
(d) Exploring new technology opportunities 1 [✓ 2] 3 4 5

You don't need idea generation for Consumer needs, can be something you read.

Q5. How effective is your Idea Generation process in relation to the following Idea Generation activities?

Scale: 1 = very effective, 3 = neither effective or ineffective, 5 = not at all effective

(a) Activation of future Idea Pipelines [✓ 1] 2 3 4 5
(b) Fulfilling specific NPD projects 1 [✓ 2] 3 4 5
(c) Determining new consumer needs 1 2 3 [✓ 4] 5
(d) Exploring new technology opportunities 1 2 [✓ 3] 4 5

Q6. What is the nature of the process of the following Idea Generation activities?

Scale A: 1= formal; 2= informal I **Scale B:** 3 = Structured; 4= Unstructured I

	Formal	Informal		Structured	Unstructured
Activation of future Idea Pipelines		X			X
Fulfilling specific NPD projects	X			X	
Determining new consumer needs		X			X
Exploring new technology opportunities		X		X	

Q7. What is the average duration of an idea generation session in relation to the following activities?

Scale: 1 = more than one day; 2= a full day; 3 =half a day, 4 = an hour; 5= less than half an hour

(a) To activate future Idea Pipelines 1 2 [✓ 3] 4 5
(b) To fulfill specific NPD projects 1 2 [✓ 3] 4 5
(c) To determine new consumer needs 1 2 3 [✓ 4] 5
(d) To explore new technology opportunities 1 2 [✓ 3] 4 5

SECTION 3: QUALITY OF IDEAS

3.1. Please describe the nature of your **evaluation process when selecting outcomes** of Idea Generation Sessions?

3.1.1.	Formal		
3.1.2.	Informal	X	It was not necessary formal, it was run by the person leading the session. It was about getting people together to rate ideas.
[redacted]			
3.1.3.	Structured	X	There was a criteria to evaluate ideas to follow
3.1.4.	Unstructured		

3.2. On completion of an Idea Generation Session how do you **judge success**?

Scale: 1= always , 3 = sometimes, 5 = never

(a) Quantity of ideas generated 1 2 [✓ 3] 4 5
(b) Quality of ideas generated 1 2 [✓ 3] 4 5
(b) Other: Relevancy to the problem you try to solve 1 2 [✓ 3] 4 5

3.2.1. Why?

It depends, sometimes you look for a few good ideas, sometimes you look for lots of ideas because you need to filter down and sometime you need ideas that are very focused on a problem.

3.3. What factors do you typically use to define the **quality of ideas**?

Scale: 1 = very important, 3 = neither important or unimportant, 5 = not at all important

(a) Aligned to business objectives/strategy	[✓ 1]	2	3	4	5
(b) Addresses user needs/ insights	[✓ 1]	2	3	4	5
(c) It is novel	1	[✓ 2]	3	4	5
(d) It is feasible	1	[✓ 2]	3	4	5
(e) It solves a problem	[✓ 1]	2	3	4	5
(f) It is highly creative	1	2	[✓ 3]	4	5
(g) Other N/A	1	2	3	4	5

3.3.1. What is the most important characteristic of idea quality? Why?

Address user needs and solve a problem

3.5. **Who typically selects** ideas from idea generation sessions?

Scale: 1= always, 3 = sometimes, 5 = never

(a) Project Manager	1	[✓ 2]	3	4	5
(b) Project team	[✓ 1]	2	3	4	5
(c) Idea Generation Participants	1	2	[✓ 3]	4	5
(d) Other Senior Management	1	2	[✓ 3]	4	5

3.5.1. Why?

It depends how the team structured and how the decision making process of the company works. It depends on the hierarchy.

Senior managers (growth pipeline was a committee) have the second filter of ideas to move forward.

3.6. What impact do the following factors typically have on the **effectiveness** of generating quality ideas?

Scale: 1 = very important, 3 = neither important nor unimportant, 5 = not important at all

(a) Aligned to business objectives/strategy	1	[✓ 2]	3	4	5
(b) Addresses user needs/ insights	[✓ 1]	2	3	4	5

(c) It is novel	1	2	[✓ 3]	4	5
(d) It is feasible	1	[✓ 2]	3	4	5
(e) It solves a problem	[✓ 1]	2	3	4	5
(f) It is highly creative	1	2	[✓ 3]	4	5
(g) Other N/A	1	2	3	4	5

SECTION 4: PEOPLE INVOLVED IN THE PROCESS

4.1. Who are **typically involved** in the Idea Generation session?

Scale: 1= always , 3 = sometimes, 5 = never

(a) Senior Managers	1	2	[✓ 3]	4	5
(b) Manager	[✓ 1]	2	3	4	5
(c) Junior	1	2	[✓ 3]	4	5
(d) External	1	[✓ 2]	3	4	5

4.1.1. Why?

Managers (product managers) are in charge of coming up with ideas and defining the solution, it belongs to their role tasks.

4.2. **How frequently** do you work in multidisciplinary teams to generate ideas?

Scale: 1= always, 3 = sometimes, 5 = never

[✓ 1] 2 3 4 5

6.2.1. Why?

Diverse points of view and you usually have experts in different areas that you bring together.

4.3. How **important** are multidisciplinary teams in generating ideas to achieve the following Idea Generation activities?

Scale: 1 = very important, 3 = neither important or unimportant, 5 = not at all important

(a) Activation of future Idea Pipelines	1	[✓ 2]	3	4	5
(b) Fulfilling specific NPD projects	1	[✓ 2]	3	4	5
(c) Determining new consumer needs	1	2	[✓ 3]	4	5
(d) Exploring new technology opportunities	1	2	3	[✓ 4]	5

4.3.1. Why?

A and B you need more perspectives to tick all those boxes: feasibility, technology, marketing, strategy….

4.4. How **effective** would you rate the performance of multidisciplinary teams in generating ideas?

Scale: 1= very effective, 3 = neither effective or ineffective, 5 = not at all effective

(a) Generating a high Quantity of ideas	1	[✓ 2]	3	4	5
(b) Generating low quantity of Quality of ideas	1	2	[✓ 3]	4	5

4.4.1. Why?

It is not just about disciplinary teams, you need a good structure of session, a good set of people.

It is more important that the session is structured to success.

You need to have a good range of people, from different departments for communication and discussion, if you only have creative people they will generate lots of ideas but they might not end up moving forward.

4.5. Which **functions** are typically involved within your multidisciplinary teams?

Scale: 1= always, 3 = sometimes, 5 = never

(a) R&D	[✓ 1]	2	3	4	5
(b) Marketing	1	2	[✓ 3]	4	5
(c) Designers	1	2	[✓ 3]	4	5
(d) Production	1	2	[✓ 3]	4	5
(e) External	1	[✓ 2]	3	4	5

4.5.1. Why?

Marketing people were in charge with create the whole proposition later on. They are more interested in a full set product that they can sell in the market, they are more related to sales so they need the idea well formed to judge.

Designers depend on the stage, they are very useful when you need someone very creative/disruptive as they can shape the idea better.

4.6. Who are typically the most **effective** functions in generating quality ideas?

Scale: 1= very effective, 3 = neither effective or ineffective, 5 = not at all effective

(a) R&D	[✓ 1]	2	3	4	5
(b) Marketing	1	2	[✓ 3]	4	5
(c) Designers	1	[✓ 2]	3	4	5
(d) Production	1	2	[✓ 3]	4	5
(e) External	1	[✓ 2]	3	4	5

SECTION 5: TOOLS ISSUES

5.1. How **important** are tools that support Idea generation sessions?

Scale: 1 = very important, 3 = neither important or unimportant, 5 = not at all important

[✓ 1] 2 3 4 5

5.1.1. Why?

Framing and inspiring with stimulus and develop conversations on objectives, areas to explore and the feasibility (So people are focused on where to start from)

5.3. How **frequently** do you use the following tools for Idea Generation sessions?

Scale: 1= very frequently, 3 = sometimes, 5 = never

Orange: N/A

(a) Brainstorming	[✓ 1]	2	3	4	5
(b) Random Stimuli	[✓ 1]	2	3	4	5
(c) 5WH	[✓ 1]	2	3	4	5
(d) 6 Thinking Hats	1	[✓ 2]	3	4	5
(e) The Lotus Blossom	1	2	3	4	5
(f) 6-3-5 Brainwriting	1	2	3	4	5
(g) Scenario Building	1	[✓ 2]	3	4	5
(h) Scamper	1	[✓ 2]	3	4	5
(i) Morphological Analysis	1	2	3	[✓ 4]	5
(j) HIT	1	2	3	4	5
(k) Concept Fan	1	[✓ 2]	3	4	5
(l) TRIZ	1	2	3	4	5
(m) Other	1	2	3	4	5

5.4. How **effective** do you consider these tools are to generate the following results?

Scale: 1= very effective, 3 = neither effective or ineffective, 5 = not at all effective

Orange: N/A

	QUALITY					QUANTITY				
(a) Brainstorming	1	2	[✓ 3]	4	5	[✓ 1]	2	3	4	5
(b) Random Stimuli	1	2	[✓ 3]	4	5	[✓ 1]	2	3	4	5

(c) 5WH	1	[✓ 2]	3	4	5	1	[✓ 2]	3	4	5
(d) 6 Thinking Hats	1	[✓ 2]	3	4	5	1	2	[✓ 3]	4	5
(e) The Lotus Blossom	1	2	3	4	5	1	2	3	4	5
(f) 6-3-5 Brainwriting	1	2	3	4	5	1	2	3	4	5
(g) Scenario Building	1	[✓ 2]	3	4	5	1	2	3	[✓ 4]	5
(h) Scamper	1	[✓ 2]	3	4	5	1	[✓ 2]	3	4	5
(i) Morphological Analysis	1	[✓ 2]	3	4	5	1	2	3	[✓ 4]	5
(j) HIT	1	2	3	4	5	1	2	3	4	5
(k) Concept Fan	1	2	[✓ 3]	4	5	1	[✓ 2]	3	4	5
(l) TRIZ	1	2	3	4	5	1	2	3	4	5
(m) Other	1	2	3	4	5	1	2	3	4	5

A.2 Preliminary Discussion and Conclusions Mapping

DISCUSSION		
NPD PROCESS	IDEA GENERATION	IDEA QUALITY
1.1. Type and nature of the current practices	2.1. Processes and Methods	3.1. Type and nature of issues
- Overreliance on structured practices (Booz, Allen and Hamilton, 1982; Cooper, 1990)	- Lack of knowledge on tools for idea generation and when to use them	- Lack of appreciation of what is required to develop a good idea
- Too structured processes lower creativity and innovativeness (Christensen, 1997; Ahuja & Lampert, 2001). while very unstructured processes lower feasibility and alignment to business strategy	- Lack of appreciation for idea generation facilitation	- Lack of ability to evaluate outcomes
- There has been a shift from NPD process focus (Barzcak, 2009; Cooper and Edgett, 2012) to the quality of data used (Kenneth, 2013)	-Systematic use of Brainstorming as the main technique for idea generation spite of the lack of efficiency suggested in the literature (Diehl and Stroebe (1987), Stroebe and Diehl (1994), Paulus, Brown and Ortega (1996) and Girotra et al (2010)	- Underestimate time needed to generate quality ideas
- Multidisciplinary teams have proved better performance and are considered a success factor	2.2. Issues	3.2. Success Factors
Although planning is considered a success factor for NPD (Ernst, 2002) and FEI (Khurana and Rosenthal, 1998), individuals, teams and organizations do not prepare adequately to innovate in practice.	- Very unstructured practices	- Preparation for innovation (planning & establishing phase)
1.2. Success and failure	- Lack of idea evaluation criteria	- Idea Generation and selection facilitation
- Planning (preparation for innovation) (Ernst, 2002)	- Generating ideas as a group impacts on Creative Confidence	- Setting Idea evaluation criteria
- Need and importance of a establishing phase	- Seeking quantity over quality	- Seeking quality over quantity
- Common shared terminology	- Lack of frequency of IG practices	- Ad hoc visual templates
- Lack of success measures: Evaluation of outcomes at all stages of the process	- Lack of experience carrying out IG and IS practices	- Generating ideas individually and developing them collectively
- Question driven rather than process driven	- Use of general templates	- Common terminology
- Need for flexible activities and methods but fixed stages	2.3. Success	- Quality of stimulus data
	- Importance of facilitation to keep: Focus/ Momentum/ Purposeful practice/ Shared language/terminology	
	- Quality of tools and data: Appropriate idea generation techniques/ Ad hoc visual templates/ Stimulus data	
	- The use of multidisciplinary teams	
The PhD Synthesised Process Model has fixed stages and activities while methods are flexible. Different types of projects have base similarities, enabling the use on core tools that are 'adapted - utilises previous learnings, successes, failures - impacts on decision making, speed of preparation and use (enhancing CREATIVE CONFIDENCE)		

CONCLUSIONS

PREPARATION FOR INNOVATION	THE INNOVATION PROCESS	WHAT IS NEEDED TO GENERATE GOOD QUALITY IDEAS
Overreliance on structured New Product Development processes (Barzcak, 2009) has led to improve efficiency but has **decreased the innovativeness of ideas** (Christensen, 1997; Ahuja & Lampert, 2001).	WHY THE NEED TO SYNTHESISE THE MODEL? 1. TO FORMALISE AND COMBINE LATENT, MOST EFFECTIVE AND USED PRACTICES INTO A COMMON PROCESS. 2. Need for an Innovation process that has fixed stages but flexible activities and methods to allow both structure and guidance but also innovativeness of ideas 2. General lack of **appreciation of the quality that is needed to develop a good idea**. (including lack of preparation and allocation of time, resources, people, tools, templates… how long does it take to innovate?)	**Key factors influencing idea quality:** - Individual versus collective idea generation and selection (generating ideas individually and developing ideas collectively) - Seeking quantity instead of quality - Preparation for innovation (including facilitation) - Evaluation criteria (feasibility, alignment to business objectives anc novelty) It is crucial to use **the evaluation criteria for idea quality at all stages of the innovation process** - The use of ad hoc visual templates versus general visual templates - Quality of data (stimulus data) - A shared terminology
There has been a shift in NPD success factors from a focus on the process and organizational matters (Barzcak, 2009; Cooper and Edgett, 2012) to the **quality of data** based on a deep understanding of the target market and target customer the project is aimed at (Kenneth, 2013). WHY? The reason behind this (PhD BUILDS ON THIS, preparation for innovation)	The lack of familiarity with innovation processes in Front End of Innovation has to do with four issues: 1. Lack of **frequency of undertaking the process** (idea generation often happens in isolation) 2. There is a **lack of experience** carrying out this kind of processes and going through the stages and activities 3. **Knowledge of the use** of the methods and tools 4. Ability to evaluate outcomes 5. Individuals and teams **underestimate the time needed to prepare to innovate**	
Importance of asking the right question over processes, methods and tools		**FLEXIBILITY OF DESIGN THINKING TOOLS – SAME ACTIVITY CAN BE APPLIED TO DIFFERENT PROBLEMS (as case studies have proved)**

CONTRIBUTION TO NEW KNOWLEDGE:

1. There is recognition that ideas are important, even more than design, but organisations do not usually know what is a good quality idea, how to generate quality ideas o what is needed to develop them.
2. Organisations typically lack an impact criteria to evaluate ideas and outcomes at all stages of the innovation process.
3. There is no common process or systematic approach to generate quality ideas.

THE PHD FOMALISES LATENT PRACTICES AND HAS COMBINED MOST EFFECTIVE AND MOST USED PRACTICES AND COMMON PROCESSES TO DEVELOP A SYNTHESISED IDEA GENERATION PROCESS MODEL THAT HAS PROVED AN IMPROVEMENT IN IDEA QUALITY IN FRONT END INNOVAITON PRACTICES.

PHD ULTIMATE CONCLUSION:

The contribution to new knowledge of this research study has been the identification and development of the constructs of developing a quality idea.
This exploratory research study has shed light onto the things multinational organisations need to think about when they want to develop a good quality idea.

A.3 Mapping core issues in PhD on a page

TITLE	Design Driven Innovation: Improving Business Performance in Front End Idea Generation Practices in Large Multinational Companies.
CONTEXT	Research is telling us Idea generation and idea quality are the main route to accelerate innovation capabilities in large organisations (Koc and Ceylan, 2007; de Bono, 2007), however, many organisations struggle to generate a stream flow of quality ideas (Christensen, 1997; Ahuja & Lampert, 2001; Levitt, 1963; Staw, 1990) and a design researcher and practitioner for the past four years (working with corporations such as P&G, Nokia, Reebok and Sky), I have observed these issues and the negative impacts of uncertainty of outcomes (the existence of more than one possibility [Hubbard, 2010]) and complexity of problems (dealing simultaneously with a sizable number of factors that are interrelated into an organic whole [Weaver, 1948]) on idea generation practices.
RESEARCH QUESTION	• How can front-end idea generation practices in large MNCs be enhanced in order to improve (a) the quality of ideas created, and (b) alignment of ideas to business objectives (and thus competitive positioning) at an organizational level?
AIMS OF THE STUDY	• To identify and evaluate the critical factors that impact on idea quality in Front End of Innovation idea generation and selection activities in large multinational companies (MNCs). • To examine the effectiveness and weaknesses of current methods and approaches that multidisciplinary teams in large MNCs typically deploy when generating and selecting ideas. • To create, test and refine a novel set of tools that address identified weaknesses. To demonstrate and embed improved idea generation practices at both individual and team level

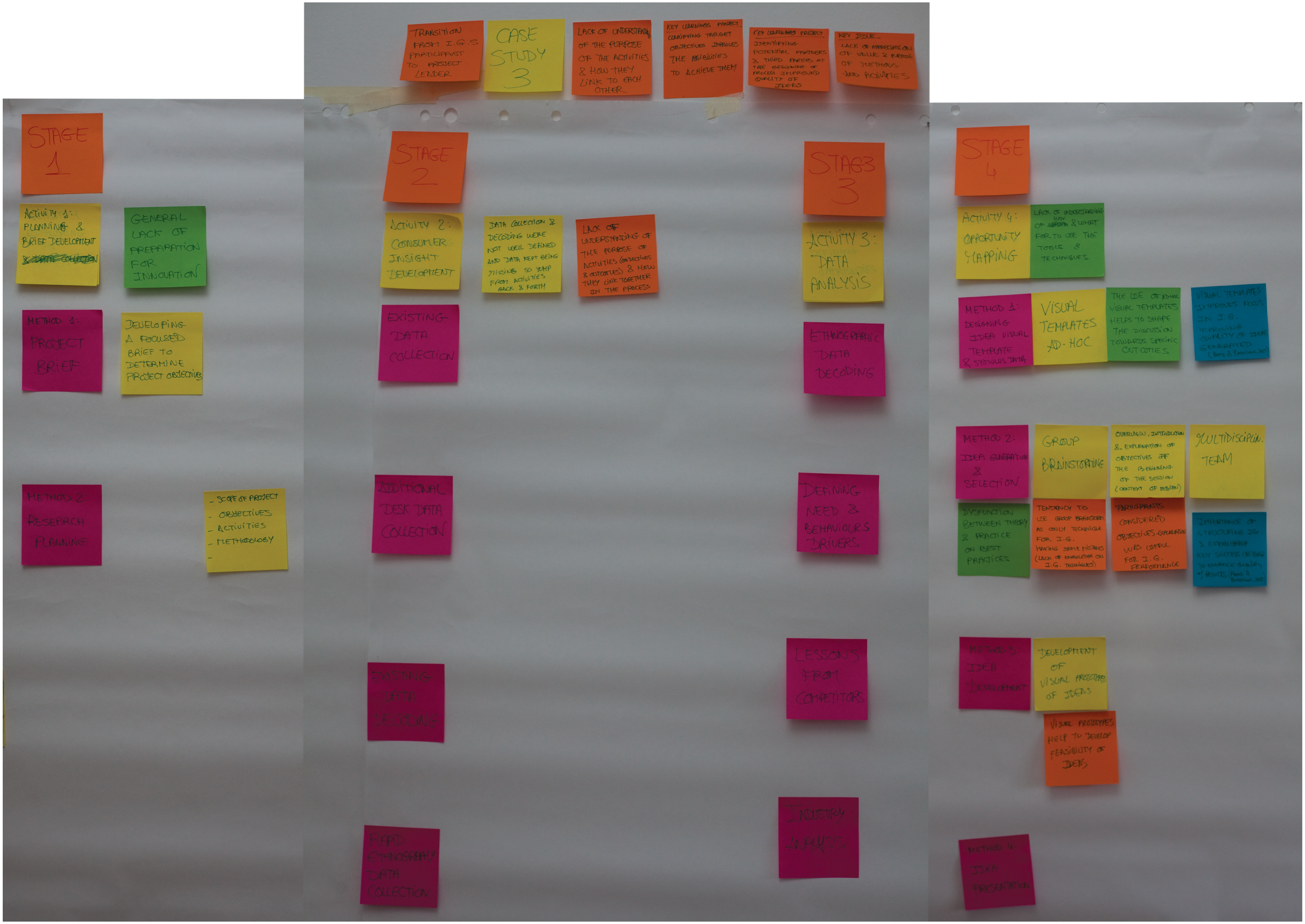
	THEORETICAL STUDY		EMPIRICAL STUDY			DISCUSSION	CONCLUSION
	CONTEXT	LITERATURE REVIEW	PILOT STUDY	MAIN STUDY	VALIDATION STUDY		
METHODOLOGY	Deep Ethnographic study in the main organisation to understand the context, process and innovation culture in Front End Innovation activities Contrasting with 2 other organisations to find similarities and differences.	The literature reviewed internationally 3/4/5 star journals using three databases: Scopus, EBSCO, and Web of Knowledge. A thematic coding analysis (Robson, 2011) was used as well as by keyword search strings.	2 Case Studies in 2 idea generation sessions in 2 different organisations and industries. Non Participatory Observation	4 Case Studies comparison among multiple idea generation scenarios in the same organisation Non Participatory Observation Two Qualitative + Quantitative Interviews	2 Case Studies comparing the performance and results in 2 different multinational organisations from different industries Non Participatory Observation Two Qualitative + Quantitative Interviews (LS and RT)	Synthesis and Analysis of main areas of research based on the literature review and empirical study	Summary and Contribution to Knowledge from this study.
THEMES	As a practitioner I have observed the difficulty large organisations face to develop a roadmap of ideas for future innovations.	Design Thinking/ The importance of ideas for business success/ Factors impacting in New Product Development/ Factors influencing Idea Generation Practices/ Decision Making in Front End Innovation/ Tools and practices in Idea Generation Amabile (1988)/ Barczak (2009) / Kelly and Kelly (2012)/ Koc and Ceylan (2007)	- Quality VS quantity of ideas - Fuzzy quality idea criteria - Unstructured VS structured methods - Internal VS external sources	- Tools and methods in IG Integration/ usage/ success & failure factors	- Success Factors - Tool- Usage/ complexity - Reduced Uncertainty - Quality of ideas (improvement) - Individual and group value (from the process)	- Reduce Uncertainty during IG - Generate ideas aligned to business objectives - Tool integration - Improvement of Performance in FEI - Enhancement of Team performance in Idea Generation - Lack of knowledge on IG tools	Tool Adoption Impact on business performance Idea Quality Improvement
CONCEPTS/ THEORIES	KEY PAPER: Factors impacting the innovative capacity in large-scale companies (Koc and Ceylan (2007) Innovation drivers in large organisations. Results highlight the focus on: technology strategy, idea quality, idea generation, technology acquisition and exploitation as the route to accelerate innovative capabilities.	- **Idea Generation Practices (methods, tools)** - New Product Development (phases, challenges) - Fuzzy Front End (challenges, definition) - Decision Making (when, how, why) - Reflective practices (definition/success/failure factors) - Systematic practices (definition/success/failure factors)	- **Uncertainty (when developing ideas, lack of information)** - High idea volume (focus on generating large amount of ideas) - Fuzzy idea criteria (not set quality criteria) - Idea selection (lack of criteria)	- **Use of tools and templates in FEI** - Frequency/effectiveness/importance - Reasons for non-completed projects	- **Tools to Facilitate Decision Making** - Groups taking lower risks than individuals (uncertainty, blame)	- **Blending Systematic and Reflective practices** **- Iterative processes** **- Question & Objective driven Innovation Framework** **- Rotation in IG and ID practices** **- Who should vote for ideas** **- Systematic use of brainstorming as only known tool/method for IG**	- Individual/collective idea generation integration - **Iterative approach**
BEST PRACTICES	• As a practitioner I have seen the difference that tools, people and processes make in successful outcomes and realised an only process does not fit every organisation.	- **Formal and structured process** **- Clear focus on project** **- Multidisciplinary Teams** **- Success criteria with process** **- Effective success measurement of projects**	- Internal and external stimuli/ information/ data - Innovation culture (promotion) - Close communication between departments (innovation culture)	- Formal process (clear stage gates) - Clear project objective (planning) - Effective project leader - Stimuli engagement - Formal and informal mixed practices	- Upfront objective setting - Intuitive use of tool - Iterative idea generation/ development	- Facilitate decision making by iterative idea development (taking more risks) - Systematic process but allowing reflective practice (to address problem of low creative ideas) - What are the best tools in IG?	- Tool: What/ When/ How - Maximise reflective practice in a systematic way Team dynamics facilitator
ISSUES	• Lack of confidence • Complex issues One process does not fit all	- Lack of creativity under systematic practices - Dealing with uncertainty - Individual VS collective - Internal VS external data (stimulus) - Success & Failure Factors in NPD - Success & Failure Factors in IG	- Confidentiality (accessing the info) - Innovation culture (lack of) - Unstructured practices with no focus - Pursue of Quantity, not quality	- Finding a common starting point - Communication within organisation - Knowledge Management - Ad hoc templates	- Stimuli (some useful some negative) - Expertise/knowledge - Lack of information on relevance of results	- Size of templates (big ones effective and creative outcomes) - Tool/methodology that can be used by novice and experts - Relevancy of stimulus (some people suggests an idea that was already in their mind, no matter the stimulus)	- Iterative practice - In-house stimuli - Idea quality oriented/ - Improving idea selection
EMERGING ISSUES		- Creative Confidence (several perspectives to it) - Idea Quality Criteria (there is no standard) - Uncertainty is a key factor in FEI - Importance of Quality over quantity (shift) - The value of ideas (they are considered the trigger for innovation)	- Session objectives and formal process effectiveness - Language (concept or ideas)	- Templates constraint (not creative) - Falling in Love with own idea -Trouble in Idea Selection (managers back up ideas)	- Generating Ideas Individually and developing collectively (avoiding low risk decisions)	- Role of Idea Manager in FEI practices - Methodology/ Tool aligned to business objectives - Generating individually but developing collectively - Rotation to avoid idea selection biased decisions	Idea Quality to boost impact performance
INSIGHTS	• Shy people that don't speak up • People that pushes ideas forward • People falling in love with their own idea • Lack of innovation processes Lack of idea generation practices beyond brainstorming	Need for a balance between systematic and reflective practices/ reduce uncertainty/ stimulate creativity but focusing on business objectives/ tools that build creative confidence	- Lack of idea Quality Criteria - Setting up objectives - Planning & preparation	- Project habits (disorganised, time management, people engagement) - Priority of projects change for organisation (feasibility,target market) - Lack of communication between departments	- Building Creative Confidence - Change in Ideation Habits - Successful result but negative feedback from participants	- Difficulty of replication of methodology/ tool usage - Value appreciation but difficult in logistics (large organisation)	Rapid Idea Canvas- Ideas aligned to business objectives IMPROVED IDEA QUALITY
KEY LEARNINGS		- Tools discussed in LR definition but not WHEN, WHY AND HOW				- A question/objective driven **Innovation Framework** works best than a new process (in multinational setting) - **IG tool**: iterative IG/ Rotation to facilitate DM/ individual IG & collective ID/ Big Size Template	

Key Research Questions	1. How can Front End Idea Generation practices in MNCs be handed to improve (a) the quality of ideas generated and their (b) alignment to business objectives?	2. What are the effectiveness and weaknesses of current methods and approaches in Idea Generation and Selection practices?	3. What are the critical factors that impact on Idea Quality?
Objectives of the study	1. Create, test and refine a novel set of tools to address those weaknesses	2. Demonstrate its effectiveness and embed the framework into Idea Generation Practices	
Literature Review	1. The importance of ideas 2. Factors impacting on NPD 3. Factors influencing Idea generation 4. Decision Making in FEI 5. Tools and Practices in Idea Generation		
Methodology	1. Interpretivist (working with existing actions and building knowledge on the topic) 2. Inductive research (based on observations and data)	Case Based Reasoning (7 case studies) Exploratory and systematic ethnography study	Non participatory observation Field notes Interviews
Case studies	PILOT STUDY 1 CASE STUDY	MAIN STUDY 4 CASE STUDIES	VALIDATION STUDY 2 CASE STUDIES
Findings	1. Level of Involvement in Front End Innovation Practices 2. Level of Involvement in Idea Generation and Selection activities 3. Idea Quality in Front End practices 4. The Synthesised Idea Generation Framework in MNCs		
Discussion	4.1. The importance of ideas has been a rising issue and it will keep gaining importance during the next decade over design. 4.2. Lack of common process and methods to generate quality ideas	4.3. Organisations do not prepare for innovation 4.4. Evaluation at the core of all stages of the Idea Management process (idea quality)	4.5. Lack of understanding and knowledge on idea generation tools beyond brainstorming 4.6. Preparation for Innovation involves the entire process: planning, data collection, data decoding and idea generation
Conclusions	1. There is recognition that ideas are important, even more than design, but organisations do not usually know what is a good quality idea, how to generate quality ideas or what is needed to develop them. 2. Organisations typically lack an impact criteria to evaluate ideas and outcomes at all stages of the innovation process. 3. There is no common process or systematic approach to generate quality ideas.		

A.4 Mapping Case Studies and literature

A.5 Mapping Case Studies to analyse the SIGF


DETERMINE THE POTENTIAL OF A GIVEN TECHN. FOR COMPANY A.
STAGES OF THE PROCESS WERE CLEAR BUT ACTIVITIES & METHODS WEREN'T
CASE STUDY 2
SINCE THERE IS NOT A SINGLE DESIGN-DRIVEN INNOVATION PROCESS THERE IS ALWAYS A NEED TO TAILOR IT
LACK OF AGREED COMMON PROCESSES & MODELS IN DESIGN DRIVEN INNOVATION
KEY LEARNING PROCESS NEED OF A PROPER ALLOCATION OF RESOURCES (LACK OF APPRECIATION OF RESOURCES TO GENERATE QUALITY IDEAS)
KEY LEARNING PROCESS IF THERE IS A NOT A CLEAR BUSINESS OPPORTUNITY IT IS BETTER TO PUT THE PROJECT ON HOLD
STAGE 1
ACTIVITY 1: PLANNING & BRIEF DEVELOPMENT & DATA COLLECTION
METHOD 1: PROJECT BRIEF
DEVELOPING A FOCUSED BRIEF TO DETERMINE PROJECT OBJECTIVES
METHOD 2: RESEARCH PLANNING
CORE TEAM & I.G. PARTICIP. ALL MULTIDISCIPLINARY
- SCOPE OF PROJECT - OBJECTIVES - ACTIVITIES - METHODOLOGY -
NOT VERY THROUGH RESEARCH PLANNING
LACK OF APPRECIATION OF THE QUALITY THAT IS NEEDED TO DEVELOP A GOOD IDEA.
GENERAL LACK OF ~~APPR.~~ PREPARATION & PLANNING FOR INNOVATION. NEED OF A ESTABLISHING PHASE
EXISTING DATA COLLECTION
ADDITIONAL DATA COLLECTION
STAGE 2
ACTIVITY 2: SOCIAL TRENDS & SCENARIOS
IMPORTANCE OF THE QUALITY OF DATA IN NPD (Kenneth, 2013) (customer needs & wants)
TREND DATA MAPPING
PERSONA CREATION
SCENARIO DEVELOPMENT
OPPORTUNITY MAPPING
STAGE 3
ACTIVITY 3: DEVELOPING FUNCTIONAL CAPABILITIES
FUNCTIONALITY MAPPING
LINKING FUNCTIONALITY TO SCENARIOS
CONTENT ANALYSIS
TECHNOLOGY TRENDS
STAGE 4
ACTIVITY 4: OPPORTUNITY MAPPING
OVERRELIANCE ON FORMAL PROCESSES HAS LED TO LOW INNOVATIVE OUTCOMES (Barczak et al., 2009)
OPPORTUNITY MAPPING
METHOD 2: IDEA GENERATION & SELECTION
NOMINAL BRAINSTORMING
VISUAL TEMPLATES AD-HOC
ONLY 3 PARTICIPANTS NEED MORE INPUT
I.G. session WASN'T PROPERLY PLANNED & DIDN'T TAKE ADVANTAGE OF CONSUMER INSIGHTS & DATA ANALYSIS
IMPORTANCE OF DECODED DATA, CONSUMER INSIGHTS & STIMULUS DATA IN I.G.
LACK OF EVALUATION CRITERIA OF IDEAS. WHAT IS QUALITY?
METHOD 3: IDEA DEVELOPMENT
METHOD 4: IDEA PRESENTATION



TRANSITION FROM I.G.S PARTICIPANT TO PROJECT LEADER

CASE STUDY 3

LACK OF UNDERSTANDING OF THE PURPOSE OF THE ACTIVITIES & HOW THEY LINK TO EACH OTHER

KEY LEARNINGS PROJECT
CLARIFYING TARGET OBJECTIVES IMPROVES THE POSIBILITIES TO ACHIEVE THEM

KEY LEARNINGS PROJECT
IDENTIFYING POTENTIAL PARTNERS & THIRD PARTIES AT THE BEGINNING OF PROCESS IMPROVED QUALITY OF IDEAS

KEY ISSUE
LACK OF APPRECIATION OF VALUE & PURPOSE OF METHODS AND ACTIVITIES

STAGE 1

ACTIVITY 1: PLANNING & BRIEF DEVELOPMENT ~~& DATA COLLECTION~~

GENERAL LACK OF PREPARATION FOR INNOVATION

METHOD 1: PROJECT BRIEF

DEVELOPING A FOCUSED BRIEF TO DETERMINE PROJECT OBJECTIVES

METHOD 2: RESEARCH PLANNING

- SCOPE OF PROJECT
- OBJECTIVES
- ACTIVITIES
- METHODOLOGY
-

STAGE 2

ACTIVITY 2: CONSUMER INSIGHT DEVELOPMENT

DATA COLLECTION & DECODING WERE NOT WELL DEFINED AND DATA KEPT BEING MISSING SO JUMP FROM ACTIVITIES BACK & FORTH

LACK OF UNDERSTANDING OF THE PURPOSE OF ACTIVITIES (OBJECTIVES & OUTCOMES) & HOW THEY LINK TOGETHER IN THE PROCESS

EXISTING DATA COLLECTION

ADDITIONAL DESK DATA COLLECTION

EXISTING DATA DECODING

RAPID ETHNOGRAPHY DATA COLLECTION

STAGE 3

ACTIVITY 3: DATA ANALYSIS

ETHNOGRAPHIC DATA DECODING

DEFINING NEED & BEHAVIOURS DRIVERS

LESSONS FROM COMPETITORS

INDUSTRY ANALYSIS

STAGE 4

ACTIVITY 4: OPPORTUNITY MAPPING

LACK OF UNDERSTANDING OF HOW & WHAT FOR TO USE THE TOOLS & TECHNIQUES.

METHOD 1: DESIGNING IDEA VISUAL TEMPLATE & STIMULUS DATA

VISUAL TEMPLATES AD-HOC

THE USE OF AD-HOC VISUAL TEMPLATES HELPS TO SHAPE THE DISCUSSION TOWARDS SPECIFIC OUTCOMES

VISUAL TEMPLATES IMPROVES FOCUS IN I.G. IMPROVING QUALITY OF IDEAS GENERATED (Perez & Bresciani, 2015)

METHOD 2: IDEA GENERATION & SELECTION

GROUP BRAINSTORMING

OVERVIEW, INTRODUCTION & EXPLANATION OF OBJECTIVES AT THE BEGINNING OF THE SESSION (CONTEXT OF SESSION)

MULTIDISCIPLIN. TEAM

DYSFUNCTION BETWEEN THEORY & PRACTICE ON BEST PRACTICES

TENDENCY TO USE GROUP BRAINSTORM. AS ONLY TECHNIQUE FOR I.G. MAKING SAME MISTAKES (LACK OF KNOWLEDGE ON I.G. TECHNIQUES)

PARTICIPANTS CONSIDERED OBJECTIVES EXPLANATION WAS USEFUL FOR I.G. PERFORMANCE

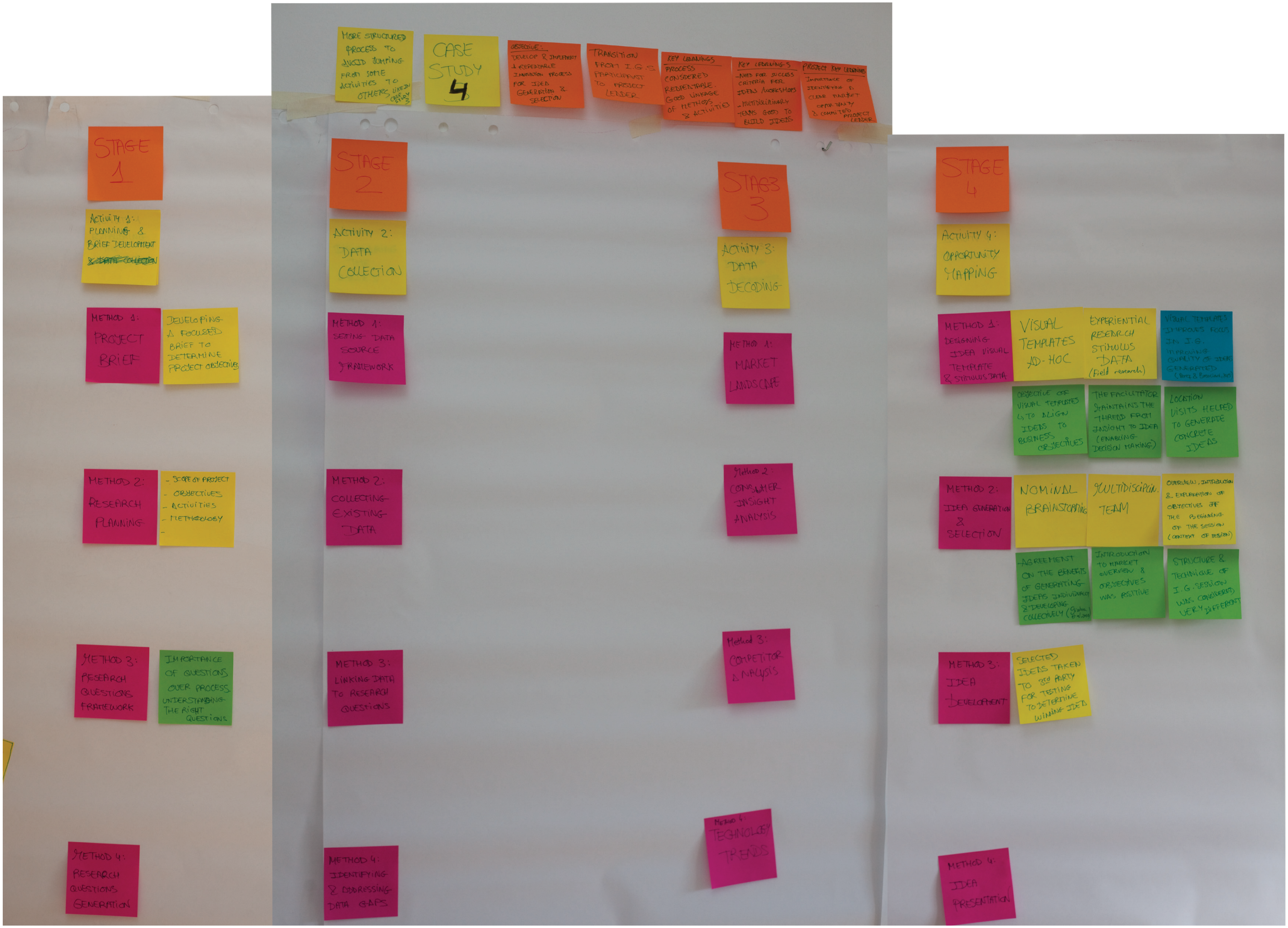
IMPORTANCE OF STRUCTURING I.G. & ESTABLISHING KEY SUCCESS CRITERIA TO ENHANCE QUALITY OF RESULTS (Perez & Bresciani, 2015)

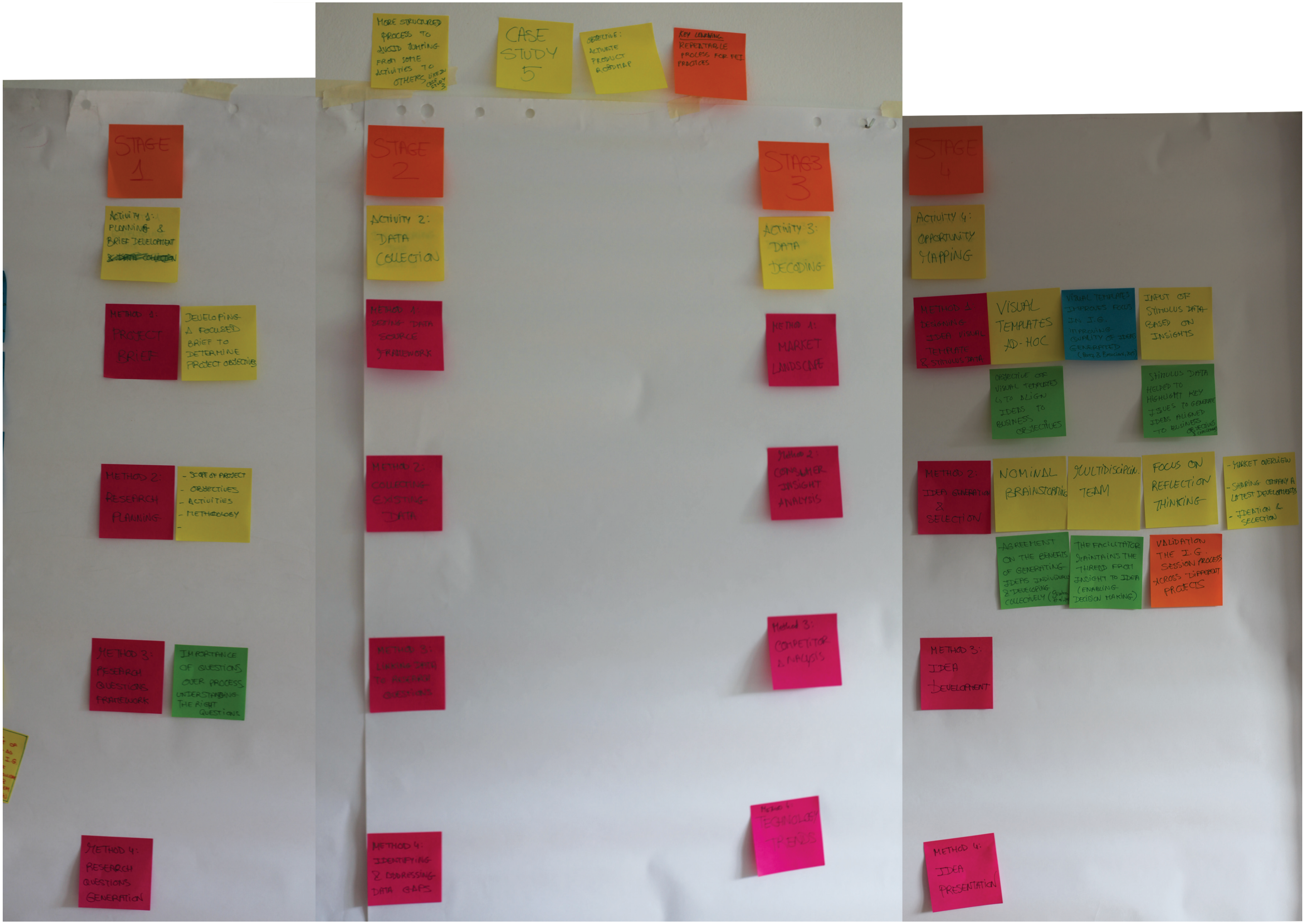
METHOD 3: IDEA DEVELOPMENT

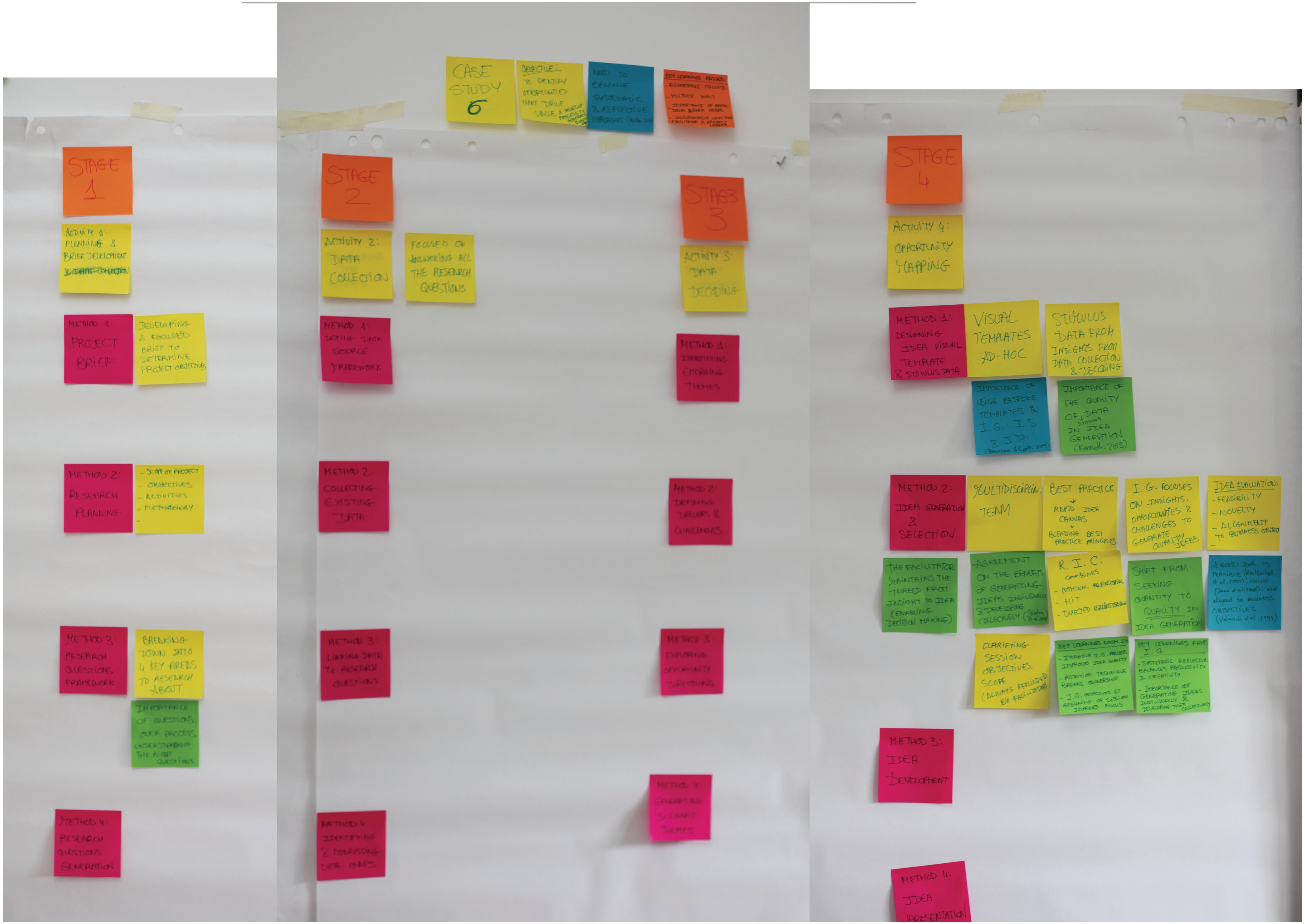
DEVELOPMENT OF VISUAL PROTOTYPES OF IDEAS

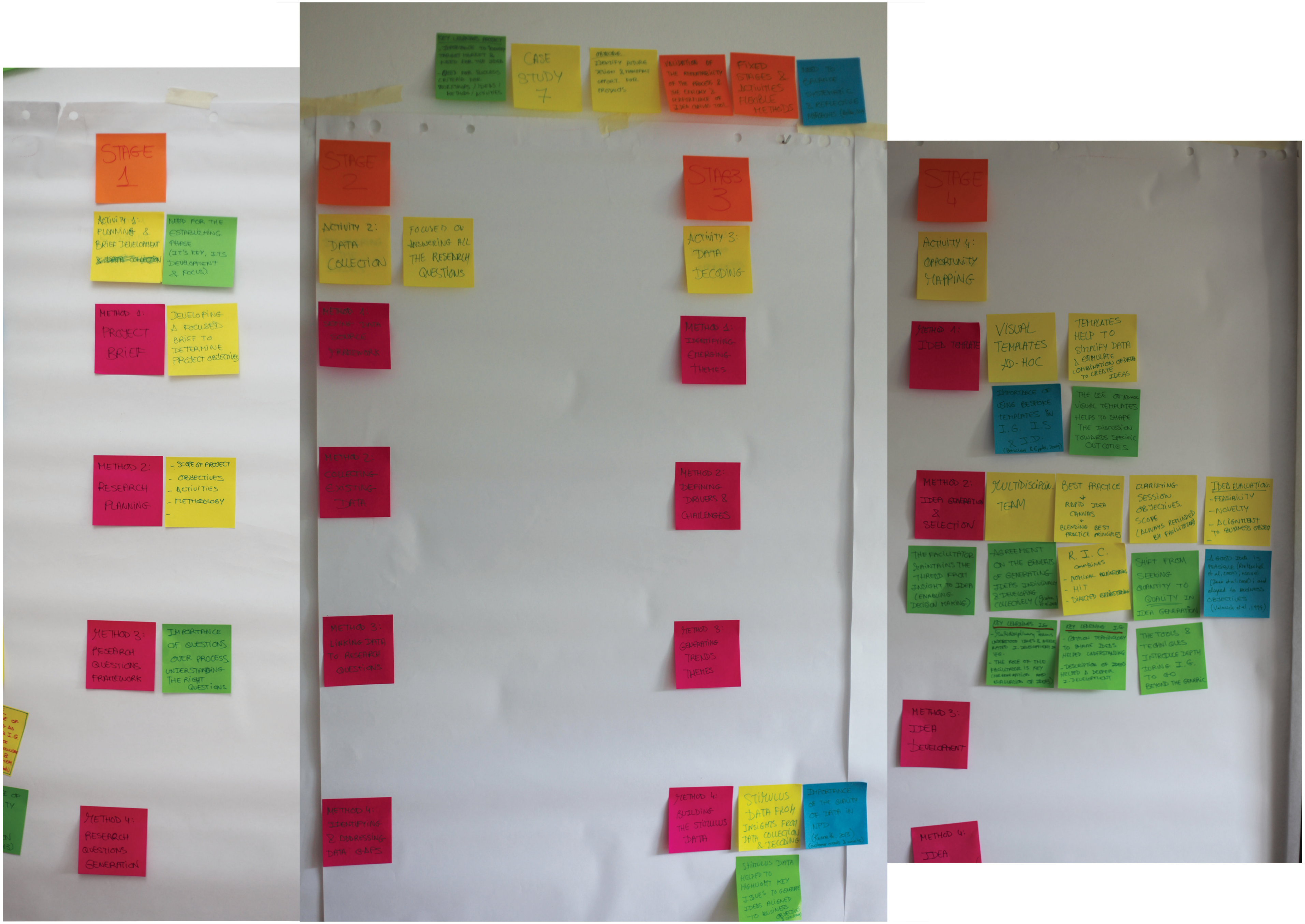
VISUAL PROTOTYPES HELP TO DEVELOP FEASIBILITY OF IDEAS

METHOD 4: IDEA PRESENTATION


MORE STRUCTURED PROCESS TO AVOID JUMPING FROM SOME ACTIVITIES TO OTHERS LIKE IN CASE STUDY 3
CASE STUDY 4
OBJECTIVE: DEVELOP & IMPLEMENT A REPEATABLE INNOVATION PROCESS FOR IDEA GENERATION & SELECTION
TRANSITION FROM I.G.S. PARTICIPANT TO PROJECT LEADER
KEY LEARNINGS PROCESS CONSIDERED REPEATABLE. GOOD LINKAGE OF METHODS & ACTIVITIES
KEY LEARNINGS -NEED FOR SUCCESS CRITERIA FOR IDEAS /WORKSHOPS -MULTIDISCIPLINARY TEAMS GOOD TO BUILD IDEAS
PROJECT KEY LEARNINGS IMPORTANCE OF IDENTIFYING A CLEAR MARKET OPPORTUNITY & COMMITED PROJECT LEADER
STAGE 1
ACTIVITY 1: PLANNING & BRIEF DEVELOPMENT ~~& DATA COLLECTION~~
METHOD 1: PROJECT BRIEF
DEVELOPING A FOCUSED BRIEF TO DETERMINE PROJECT OBJECTIVES
METHOD 2: RESEARCH PLANNING
- SCOPE OF PROJECT - OBJECTIVES - ACTIVITIES - METHODOLOGY -
METHOD 3: RESEARCH QUESTIONS FRAMEWORK
IMPORTANCE OF QUESTIONS OVER PROCESS. UNDERSTANDING THE RIGHT QUESTIONS
METHOD 4: RESEARCH QUESTIONS GENERATION
STAGE 2
ACTIVITY 2: DATA COLLECTION
METHOD 1: SETTING DATA SOURCE FRAMEWORK
METHOD 2: COLLECTING EXISTING DATA
METHOD 3: LINKING DATA TO RESEARCH QUESTIONS
METHOD 4: IDENTIFYING & ADDRESSING DATA GAPS
STAGE 3
ACTIVITY 3: DATA DECODING
METHOD 1: MARKET LANDSCAPE
Method 2: CONSUMER INSIGHT ANALYSIS
Method 3: COMPETITOR ANALYSIS
METHOD 4: TECHNOLOGY TRENDS
STAGE 4
ACTIVITY 4: OPPORTUNITY MAPPING
METHOD 1: DESIGNING IDEA VISUAL TEMPLATE & STIMULUS DATA
VISUAL TEMPLATES AD-HOC
EXPERIENTIAL RESEARCH STIMULUS DATA (Field research)
VISUAL TEMPLATES IMPROVES FOCUS IN I.G. IMPROVING QUALITY OF IDEAS GENERATED (Perez & Bresciani, 2015)
OBJECTIVE OF VISUAL TEMPLATES ↳ TO ALIGN IDEAS TO BUSINESS OBJECTIVES
THE FACILITATOR MAINTAINS THE THREAD FROM INSIGHT TO IDEA (ENABLING DECISION MAKING)
LOCATION VISITS HELPED TO GENERATE CONCRETE IDEAS
METHOD 2: IDEA GENERATION & SELECTION
NOMINAL BRAINSTORMING
MULTIDISCIPLIN. TEAM
OVERVIEW, INTRODUCTION & EXPLANATION OF OBJECTIVES AT THE BEGINNING OF THE SESSION (CONTEXT OF SESSION)
AGREEMENT ON THE BENEFITS OF GENERATING IDEAS INDIVIDUALLY & DEVELOPING COLLECTIVELY (Girotra et al, 2010)
INTRODUCTION TO MARKET OVERVIEW & OBJECTIVES WAS POSITIVE
STRUCTURE & TECHNIQUE OF I.G. SESSION WAS CONSIDERED VERY DIFFERENT
METHOD 3: IDEA DEVELOPMENT
SELECTED IDEAS TAKEN TO 3rd PARTY FOR TESTING TO DETERMINE WINNING IDEA
METHOD 4: IDEA PRESENTATION


MORE STRUCTURED PROCESS TO AVOID JUMPING FROM SOME ACTIVITIES TO OTHERS LIKE IN CASE STUDY 3
CASE STUDY 5
OBJECTIVE: ACTIVATE PRODUCT ROADMAP
KEY LEARNING: REPEATABLE PROCESS FOR FEI PRACTICES
STAGE 1
ACTIVITY 1: PLANNING & BRIEF DEVELOPMENT ~~& DATA COLLECTION~~
METHOD 1: PROJECT BRIEF
DEVELOPING A FOCUSED BRIEF TO DETERMINE PROJECT OBJECTIVES
METHOD 2: RESEARCH PLANNING
- SCOPE OF PROJECT
- OBJECTIVES
- ACTIVITIES
- METHODOLOGY
-
METHOD 3: RESEARCH QUESTIONS FRAMEWORK
IMPORTANCE OF QUESTIONS OVER PROCESS. UNDERSTANDING THE RIGHT QUESTIONS
METHOD 4: RESEARCH QUESTIONS GENERATION
STAGE 2
ACTIVITY 2: DATA COLLECTION
METHOD 1: SETTING DATA SOURCE FRAMEWORK
METHOD 2: COLLECTING EXISTING DATA
METHOD 3: LINKING DATA TO RESEARCH QUESTIONS
METHOD 4: IDENTIFYING & ADDRESSING DATA GAPS
STAGE 3
ACTIVITY 3: DATA DECODING
METHOD 1: MARKET LANDSCAPE
METHOD 2: CONSUMER INSIGHT ANALYSIS
Method 3: COMPETITOR ANALYSIS
Method 4: TECHNOLOGY TRENDS
STAGE 4
ACTIVITY 4: OPPORTUNITY MAPPING
METHOD 1: DESIGNING IDEA VISUAL TEMPLATE & STIMULUS DATA
VISUAL TEMPLATES AD-HOC
VISUAL TEMPLATES IMPROVES FOCUS IN I.G. IMPROVING QUALITY OF IDEAS GENERATED (Perez & Bresciani, 2015)
INPUT OF STIMULUS DATA BASED ON INSIGHTS
OBJECTIVE OF VISUAL TEMPLATES ↳ TO ALIGN IDEAS TO BUSINESS OBJECTIVES
STIMULUS DATA HELPED TO HIGHLIGHT KEY ISSUES TO GENERATE IDEAS ALIGNED TO BUSINESS OBJECTIVES & CHALLENGES
METHOD 2: IDEA GENERATION & SELECTION
NOMINAL BRAINSTORMING
MULTIDISCIPLIN. TEAM
FOCUS ON REFLECTION THINKING
- MARKET OVERVIEW
- SHARING COMPANY A LATEST DEVELOPMENTS
- IDEATION & SELECTION
AGREEMENT ON THE BENEFITS OF GENERATING IDEAS INDIVIDUALLY & DEVELOPING COLLECTIVELY (Girotra et al., 20[illegible])
THE FACILITATOR MAINTAINS THE THREAD FROM INSIGHT TO IDEA (ENABLING DECISION MAKING)
VALIDATION THE I.G. SESSION PROCESS ACROSS DIFFERENT PROJECTS
METHOD 3: IDEA DEVELOPMENT
METHOD 4: IDEA PRESENTATION


CASE STUDY 6
OBJECTIVE: TO IDENTIFY OPPORTUNITIES THAT DRIVE VALUE & DEVELOP PROCESSES TO GENERATE QUALITY
NEED TO BALANCE SYSTEMATIC & REFLECTIVE APPROACHES
KEY LEARNINGS PROCESS - REPEATABLE PROCESS - MULTIDISC. INPUT - IMPORTANCE OF BREAK DOWN BRIEF NEEDS - INDISPENSABLE COMMITTED FACILITATOR & PROJECT LEADER
STAGE 1
ACTIVITY 1: PLANNING & BRIEF DEVELOPMENT ~~& DATA COLLECTION~~
METHOD 1: PROJECT BRIEF
DEVELOPING A FOCUSED BRIEF TO DETERMINE PROJECT OBJECTIVES
METHOD 2: RESEARCH PLANNING
- SCOPE OF PROJECT - OBJECTIVES - ACTIVITIES - METHODOLOGY -
METHOD 3: RESEARCH QUESTIONS FRAMEWORK
BREAKING DOWN INTO 4 KEY AREAS TO RESEARCH ABOUT
IMPORTANCE OF QUESTIONS OVER PROCESS UNDERSTANDING THE RIGHT QUESTIONS
METHOD 4: RESEARCH QUESTIONS GENERATION
STAGE 2
ACTIVITY 2: DATA COLLECTION
FOCUSED ON ANSWERING ALL THE RESEARCH QUESTIONS
METHOD 1: SETTING DATA SOURCE FRAMEWORK
METHOD 2: COLLECTING EXISTING DATA
METHOD 3: LINKING DATA TO RESEARCH QUESTIONS
METHOD 4: IDENTIFYING & ADDRESSING DATA GAPS
STAGE 3
ACTIVITY 3: DATA DECODING
METHOD 1: IDENTIFYING EMERGING THEMES
METHOD 2: DEFINING DRIVERS & CHALLENGES
METHOD 3: EXPLORING OPPORTUNITY DIRECTIONS
METHOD 4: GENERATING SCENARIO THEMES
STAGE 4
ACTIVITY 4: OPPORTUNITY MAPPING
METHOD 1: DESIGNING IDEA VISUAL TEMPLATE & STIMULUS DATA
VISUAL TEMPLATES AD-HOC
STIMULUS DATA FROM INSIGHTS FROM DATA COLLECTION & DECODING
IMPORTANCE OF USING BESPOKE TEMPLATES IN I.G. I.S & I.D. (Bresciani & Eppler, 2009)
IMPORTANCE OF THE QUALITY OF DATA STIMULUS IN IDEA GENERATION (Kenneth, 2013)
METHOD 2: IDEA GENERATION & SELECTION
MULTIDISCIPLIN. TEAM
BEST PRACTICE → RAPID IDEA CANVAS → BLENDING BEST PRACTICE PRINCIPLES
I. G. FOCUSES ON INSIGHTS, OPPORTUNITIES & CHALLENGES TO GENERATE QUALITY IDEAS
IDEA EVALUATION: - FEASIBILITY - NOVELTY - ALIGNMENT TO BUSINESS OBJECT. -
THE FACILITATOR MAINTAINS THE THREAD FROM INSIGHT TO IDEA (ENABLING DECISION MAKING)
AGREEMENT ON THE BENEFITS OF GENERATING IDEAS INDIVIDUALLY & DEVELOPING COLLECTIVELY (Graham et al, 2010)
R. I. C. COMBINES - NOMINAL BRAINSTORMING - HIT - DIRECTED BRAINSTORMING
SHIFT FROM SEEKING QUANTITY TO QUALITY IN IDEA GENERATION
A GOOD IDEA IS FEASIBLE (Rietzschel et al, 2007); novel (Dean et al, 2006); and aligned to BUSINESS OBJECTIVES (Valacich et al, 1994)
CLARIFYING SESSION OBJECTIVES. SCOPE (ALWAYS REMINDED BY FACILITATOR)
KEY LEARNINGS FROM IG - ITERATIVE I.G. PROCESS IMPROVES IDEA QUALITY - ROTATION TECHNIQUE BREAKS OWNERSHIP - I.G. OBJECTIVES AT BEGINNING OF SESSION IMPROVES FOCUS
KEY LEARNINGS FROM I.G - SYSTEMATIC REFLECTION BALANCES PRODUCTIVITY & CREATIVITY - IMPORTANCE OF GENERATING IDEAS INDIVIDUALLY & DEVELOPING THEM COLLECTIVELY
METHOD 3: IDEA DEVELOPMENT
METHOD 4: IDEA PRESENTATION


CASE STUDY 7
FIXED STAGES & ACTIVITIES FLEXIBLE METHODS
STAGE 1
ACTIVITY 1: PLANNING & BRIEF DEVELOPMENT ~~& DATA COLLECTION~~
NEED FOR THE ESTABLISHING PHASE (IT'S KEY, ITS DEVELOPMENT & FOCUS).
METHOD 1: PROJECT BRIEF
DEVELOPING A FOCUSED BRIEF TO DETERMINE PROJECT OBJECTIVES
METHOD 2: RESEARCH PLANNING
- SCOPE OF PROJECT
- OBJECTIVES
- ACTIVITIES
- METHODOLOGY
METHOD 3: RESEARCH QUESTIONS FRAMEWORK
IMPORTANCE OF QUESTIONS OVER PROCESS UNDERSTANDING THE RIGHT QUESTIONS
METHOD 4: RESEARCH QUESTIONS GENERATION
STAGE 2
ACTIVITY 2: DATA COLLECTION
FOCUSED ON ANSWERING ALL THE RESEARCH QUESTIONS
METHOD 2: COLLECTING EXISTING DATA
METHOD 3: LINKING DATA TO RESEARCH QUESTIONS
METHOD 4: IDENTIFYING & ADDRESSING DATA GAPS
STAGE 3
ACTIVITY 3: DATA DECODING
METHOD 1: IDENTIFYING EMERGING THEMES
METHOD 2: DEFINING DRIVERS & CHALLENGES
METHOD 3: GENERATING TRENDS THEMES
METHOD 4: BUILDING THE STIMULUS DATA
STIMULUS DATA FROM INSIGHTS FROM DATA COLLECTION & DECODING
IMPORTANCE OF THE QUALITY OF DATA IN NPD (Kenneth, 2013)
STIMULUS DATA HELPED TO HIGHLIGHT KEY ISSUES TO GENERATE IDEAS ALIGNED TO BUSINESS OBJECTIVES
STAGE 4
ACTIVITY 4: OPPORTUNITY MAPPING
METHOD 1: IDEA TEMPLATE
VISUAL TEMPLATES AD-HOC
TEMPLATES HELP TO SIMPLIFY DATA & STIMULATE COMBINATION OF DATA TO CREATE IDEAS
IMPORTANCE OF USING BESPOKE TEMPLATES IN I.G. I.S & I.D. (Bresciani & Eppler, 2009)
THE USE OF AD-HOC VISUAL TEMPLATES HELPS TO SHAPE THE DISCUSSION TOWARDS SPECIFIC OUTCOMES
METHOD 2: IDEA GENERATION & SELECTION
MULTIDISCIPLIN. TEAM
BEST PRACTICE → RAPID IDEA CANVAS → BLENDING BEST PRACTICE PRINCIPLES
CLARIFYING SESSION OBJECTIVES, SCOPE (ALWAYS REMINDED BY FACILITATOR)
IDEA EVALUATION:
- FEASIBILITY
- NOVELTY
- ALIGNMENT TO BUSINESS OBJEC
THE FACILITATOR MAINTAINS THE THREAD FROM INSIGHT TO IDEA (ENABLING DECISION MAKING)
AGREEMENT ON THE BENEFITS OF GENERATING IDEAS INDIVIDUALLY & DEVELOPING COLLECTIVELY
R. I. C. COMBINES
- NOMINAL BRAINSTORMING
- HIT
- DIRECTED BRAINSTORMING
SHIFT FROM SEEKING QUANTITY TO QUALITY IN IDEA GENERATION
A GOOD IDEA IS FEASIBLE, NOVEL and aligned to BUSINESS OBJECTIVES (Valacich et al., 1994)
KEY LEARNINGS I.G.
- THE ROLE OF THE FACILITATOR IS KEY
KEY LEARNING I.G.
- COMMON TERMINOLOGY TO SHARE IDEAS HELPED UNDERSTANDING
- DESCRIPTION OF IDEAS HELPED A DEEPER I. DEVELOPMENT
THE TOOLS & TECHNIQUES INTRODUCE DEPTH DURING I.G. TO GO BEYOND THE GENERIC
METHOD 3: IDEA DEVELOPMENT
METHOD 4: IDEA

A.6 Ethics Form

BIAD Research Ethics Form

Proposer: Marta Perez Garcia Staff/Student: Student

Project title: Design Driven Innovation: Enhancing Idea Quality in Front End Idea Generation Practices in Large Multinational Companies.

Funding provider:

Ethical Questions

For each question, please write a brief paragraph addressing the issues outlined in the Guidelines. If you have any doubts or concerns, you should consult one of the recommended Ethics Codes. (Note, to avoid introducing numbering into your text, you should use shift + return to create new paragraphs.)

1. Please give a brief summary, including the justification, for this research

This research study is about Design Thinking and Idea Generation Practices in Large Multinational Companies. It focuses on understanding how front end idea generation practices within large multinational companies can be enhanced in order to improve the quality of ideas created and their alignment to business objectives (and thus competitive positioning) at an organizational level. This research will address the identified imbalance in current idea generation practices, whether they are too systematic and not very creative or too creative but do not address business objectives.

The practical outputs of this project will include a set of tools and methods for idea generation practices that can be used in repeatable projects, specifically at the Front End of Innovation. Academically I anticipate the production of three journal papers by the completion of the PhD study. This research will be of value to other scholars, innovating organisations, policy makers and innovation practitioners to let them know what works in terms of tools and idea stimulus.

2. Please indicate your research methods and any associated ethical issues.

My research methods are based on case studies, interviews, observation in industry and qualitative testing.

3. Does you research involve participants? Yes No *If yes, go to Question 4. If no, go to Question 6. If your research involves children or vulnerable adults, please provide further details here*.

Yes ☒ No ☐

4. How will you address the process of informed consent?

Research purpose and use of data will be made explicit and a consent form will be issued obtaining their consent to take part and permission for recording and be observed. The participants will be also informed about their right to withdraw from the study at any time. They will also be provided with information following the research.

6. Where appropriate, how will you ensure:

c. The confidentiality of information?

d. **The anonymity of participants?**

a. The information about the participants will not be shared with anyone else than the researcher. The information collected from this research project will be kept private. Nothing that the participant will tell us will be shared with anybody outside the research team, and nothing will be attributed to them by name. The knowledge that we get from this research will be shared with the participants before it is made available to the research study. Each participant will receive a summary of the results to check accuracy and consent.

b. Any information about the participant will have a number instead of their name. Only the researcher will know what their number is and that information will be locked up and stored as an encrypted file. It will not be shared with or given to anyone.

7. How will you manage, store and protect the future use of any personal or confidential data?

Only the interviewer will be present during the interviews and as for the non-participatory observation during the pilot and main studies the researcher will be attending the testing sessions to take field notes and contrast information and insights, however the researcher will try not to disturb people's behaviours during the session. The information recorded as voice or field notes is confidential, and no one else except Marta Perez will access the information documented during the interviews and observation sessions. The entire interviews will be recorded on a mobile device, but no one will be identified by name on the recording. The recording will be downloaded to a private device only accessible by the researcher as an encrypted file only accessible with a password and deleted from the mobile device. The same will happen with the field notes from observation, none of the participants will be identified and the field notes will be rapidly scanned, the hard copy will be torn apart and stored as the same encrypted file. The information recorded is confidential, and no one else except Marta Perez will have access to the recordings and notes.

8. Does your research involve any risks?

If so, please indicate the measures you have put in place to deal with these.

To yourself ☐ no yourself ☐ no risk ☒

9. Are there any other ethical issues associated with this research? *Consult one of the recommended Ethics Codes if you are uncertain*.

Yes ☐ No ☒

10. Have you read the *Birmingham City University Guidelines and Procedures for Good Research Practice*?

Yes☒ No ☐

11. What training have you received to deal with these ethical issues? *If none, please give an indication of your training needs*.

I have had training on Ethics during the Postgraduate Certificate in Research Practice at BCU. I do not think the ethical considerations of this project will cause any problems (I believe I have addressed them), however I am willing to undertake further training in research ethics.

A.7 Consent form for Interviews and Observation

Observation Consent Form

Design Driven Innovation: Enhancing Idea Quality in Front End Idea Generation Practices in Large Multinational Companies

The purpose of this study:

This PhD research project focuses on the necessity to balance systematic and reflective practices in idea generation processes in front end innovation. Imbalances currently exist due to current approaches becoming more systematized, which impact negatively on the levels of creativity in front end innovation (FEI). Generating, evaluating and selecting good ideas requires adequate people, knowledge, tools and skills, and consequently, a successful idea management process that many organisations still lack. The second key issue that underpins this study is the relevance of idea quality versus the generation of a large number of ideas without clear objectives. Idea quality has been undervalued and some organisations encourage employees to generate a large number of ideas without a clear focus, resulting in large amounts of random ideas that do not lead to innovation.

The purpose of this study is to address the imbalances described above by developing a unique rapid innovation toolkit that will blend systematic and reflective practices in order to help unlock and increase the flow of high-quality ideas in the FEI process.

Researcher- Marta Perez Garcia- marta.perezgarcia@mail.bcu.ac.uk

Participant:

Content Agreement

I agree to be observed for the above research project, and authorise the researcher to refer to the content of this idea generation session in her thesis and any work publishing under her name as an author and co-author, which is solely for academic purposes. I also agree to be identified as a participant of this session.

The researcher agrees to respect any restrictions the participant might have. The participant will have the right to anonymity and the optional to withdraw should they request it.

Signature of participant:

Signature of researcher:

Date Completed:

Working Title:

Interview Consent Form

Design Driven Innovation: Enhancing Idea Quality in Front End Idea Generation Practices in Large Multinational Companies

The purpose of this study:

This PhD research project focuses on the necessity to balance systematic and reflective practices in idea generation processes in front end innovation. Imbalances currently exist due to current approaches becoming more systematized, which impact negatively on the levels of creativity in front end innovation (FEI). Generating, evaluating and selecting good ideas requires adequate people, knowledge, tools and skills, and consequently, a successful idea management process that many organisations still lack. The second key issue that underpins this study is the relevance of idea quality versus the generation of a large number of ideas without clear objectives. Idea quality has been undervalued and some organisations encourage employees to generate a large number of ideas without a clear focus, resulting in large amounts of random ideas that do not lead to innovation.

The purpose of this study is to address the imbalances described above by developing a unique rapid innovation toolkit that will blend systematic and reflective practices in order to help unlock and increase the flow of high-quality ideas in the FEI process.

Researcher- Marta Perez Garcia- marta.perezgarcia@mail.bcu.ac.uk

Interviewee:

Content Agreement

I agree to be interviewed for the above research project, and authorise the researcher to refer to the content of the interview, including quotation, in her thesis and any work publishing under her name as an author and co-author, which is solely for academic purposes. I also agree to be identified as the interviewee.

The researcher agrees to provide transcripts for approval, to ensure all quotations are accurate, and to respect any restrictions the interviewee wishes to place on parts of the interview that she/he does not wish to be quoted. The interviewee will have the right to anonymity and the optional to withdraw should they request it.

Signature of interviewee:

Signature of researcher:

Date Completed: