Exploring strategies to reduce moral hazard and adverse selection of Ghanaian Public-Private-Partnership (PPP) Construction Projects

Abstract

Purpose: Conditions of inadequate and asymmetric information when an agent is hired by a principal have resulted in the problems of moral hazard and adverse selection (MHAS) in Public Private Partnership (PPP) construction projects. The objective of this study was to explore strategies to reduce moral hazard and adverse selection in PPP construction projects.

Design/methodology/approach: Questionnaires were used to elicit responses from respondents. Mean score ranking was used to rank these strategies while reliability analysis was conducted using Cronbach Alpha coefficient and level of agreement tested using Kendall’s concordance. Factor analysis grouped the strategies into eight components.

Findings: From the mean score ranking, Monitoring; Transfer of risks; Screening; Managing of construction risks; and Increased incentives to control costs were the most significant strategies. The eight components were: Transparent process and contract; Incentives and monitoring; Screening and technical assistance; Unbundling and benchmarking; Funding and small liabilities; Information clarification and signalling; Risk and contract management; and Cooperation and finance factors.

Practical implications: The findings of this have identified the most significant strategies to reduce MHAS on PPP construction projects to serve as a guide to PPP practitioners in reducing MHAS.

Originality/value: The output of this research contributes to the checklist of strategies that reduce PPP project failures arising from MHAS and contributes to the development of the agency theory.

Paper Type - Research paper

Keywords Strategies, moral hazard, adverse selection, Public-Private-Partnership, construction projects
INTRODUCTION

Moral hazard is the situation of information unevenness or asymmetry that happens after the principal takes a decision (Owusu-Manu et al., 2018a). On the other hand, this is called hidden action because the actions and activities of the agent are not fully exposed to the principal (Pana, 2010). Correspondingly, within the extant literature, adverse selection is recognized to be the sole or private information possessed by the contractor and which is not available to buyer (Biong, 2013). In adverse selection, information gap occurs preceding the principal making his decision. This phenomenon is also referred to as hidden knowledge. This is due to the potential agent having information which the principal lacks and thus leading to the principal making a wrong decision.

The agency problem is a conflict of interest inherited in any relationship where one party is expected to act in another's best interests (Lobner, 2009; Buvik and Rokkan, 2003). Agency theory is concerned with resolving problems that exist in agency relationships due to unaligned goals or different aversion levels to risk. The most common agency relationship in constructions occurs between principals (clients) and agents (contractors) (Iossa and Martimort, 2008).

Public-Private-Partnerships date back to the twelfth century (Wettenhall, 2010; Owusu-Manu et al., 2017). According to Bovaird (2010), in traditional procurement in the public sector, the government is responsible for settling on design and specifications of the facilities. After the bidding process, a private sector contractor is paid to construct the project (Ismail, 2013). Despite controversies about PPP policy in developing countries, many developing countries actually have huge infrastructure deficit and excessive government debts which in a way has led to poor economic development and lower standards of living (Osei-Kyei and Chan, 2017a). This serves as an incentive for PPP to be explored in these nations to augment infrastructure development and boost the living standards of citizens (Osei-Kyei and Chan,
Owusu-Manu et al. (2018b) stated that MHAS was one of the major challenges affecting PPP construction projects in developing countries; and their study went ahead to explore a number of negative effects of MHAS. McCann et al. (2015) in their study too established that MHAS was a challenge in Australian PPP projects and PPP projects’ failure to meet delivery outputs’ minimum requirements.

Like other governments, the Government of Ghana (GoG) has also shown great interest in the PPP concept, particularly for construction projects (Osei-Kyei and Chan, 2017b). Since 2004, few construction PPP projects in Ghana have been initiated with many of the projects failing to proceed successfully due to a number of reasons including moral hazard and adverse selection (Osei-Kyei and Chan, 2017b; Owusu-Manu et al., 2018b). In Ghana, the Ghana National Housing Project (GNHP), which was the first ever major PPP housing project to be initiated in the country’s housing sector failed due to the problems of MHAS (Osei-Kyei et al., 2019).

There has been theoretical development over the recent years in researching on the problems of moral hazard and adverse selection. However some gaps do exist in their literature since there is dearth and scarcity of literature in these areas especially in strategies to reduce MHAS in PPP construction projects. This study not only extends existing work but also identifies and ranks significant strategies to reduce MHAS in PPP construction projects.

Practically, the identified and prioritized strategies will serve as a guide and managerial support in future PPP projects. As such, the findings of the research may guide construction stakeholders in reducing failure of PPP projects due to MHAS. These stakeholders and practitioners will improve project success by recognizing and planning against failure of these PPP projects.
LITERATURE REVIEW

Public Private Partnerships (PPP)

PPP refers to ways of collaboration between public and private stakeholders which purposes to guarantee the financing, building, refurbishing, administration or preservation of a service or an infrastructure (Torres and Pina, 2001). Public-Private-Partnerships are carried out in countless diverse sectors, for example: transportation, residential facilities, metropolitan development, municipal renaissance, operating institutions of culture, educational areas.

In a study by Budäus and Gründing (1997), Public-Private-Partnership is characterized in a smaller way by:

- Relations among government and private stakeholders
- Placing emphasis on accomplishment of similar objectives
- Probability of synergy by way of mutual aid
- Orientation of process
- The associate’s distinctiveness and conscientiousness
- Stipulation of cooperation relationship

Due to the extended contract period (around thirty years), it is not feasible to lay down the exact privileges, risks, rights, expenditures, accomplishments and liabilities in advance (Budäus, 2006).

Moral hazard and Adverse Selection (MHAS) in PPP construction projects

A moral hazard problem arises when the agent’s action is not verifiable, or when the agent receives private information after the partnership has been commenced (Owusu-Manu et al., 2018a). Moral hazard should not pose as a challenge or problem if both the principal and agent had the same objective functions. The misunderstanding about which action should be taken out is the basis for agency costs (Lobner, 2009).
An adverse selection problem happens when the agent holds private information before the relationship begins (Owusu-Manu et al., 2018a). The principal will be able to authenticate the agent’s behavior; however, the optimal decision, the cost of this decision relies on the agent’s type which is private information to the agent. The principal is aware that the agent is one of several possible types but he/she cannot identify it (Lobner, 2009).

The two information problems do not exist disjoint, on the whole. This is as a result of the existence of synergies between stages of the venture, accounting for why different tasks are bundled in a distinct activity and delegated to a sole responsible private firm. The effort that the firm exerts at the construction stage influences the circumstances it encounters at the operation stage. For example, exerting effort might enhance the chance of encountering a high demand for the service (since the infrastructure is more dependable) or a reduced price of production (since the cost is an internal attribute of the project).

**Impact of MHAS on PPP construction projects**

Being a long term and global contract, the partnership contract enhances the traditional issues of MHAS related to the choice of a bidder. It implies high transaction costs for both the public and private partners, due to duration of the negotiation and the skills and resources involved (Allen, 2003). The requirements of the contract are generally complex and expressed in terms of outputs rather than inputs. MHAS selection in PPPs raise transaction costs because the government has to negotiate with and monitor the private sector partners who have their own interests and agendas.

The widespread problem of MHAS in the construction market are the main reason for the dishonesty of the construction market and is the primary cause of the construction project risk as well (Akintayo, 2018). If the problem of adverse selection cannot get effective settled, it will be difficult to form a "win-win" situation in the construction market, which leads to the harmonious project management being not formed.
The problem of adverse selection is particularly prominent in domestic construction market. Each contractor’s strength level is uneven, which is the fundamental cause of adverse selection. Because of asymmetric information, the owner has little or false information of the contractor’s technology, management, credit, etc., leading to the owners tend to be at a disadvantage position in the game of both sides, which leads to adverse selection—that is "bad money drives out good money." Problems resulting from MHAS in PPP projects are economic disadvantages for one of the parties, the inefficient use of resources, and the resulting losses of welfare.

**Strategies to reduce moral hazard and adverse selection in PPP construction projects**

*Transfer of risk* by way of enforceable contracts curtails greatly the problems of moral hazard and adverse selection (Akintayo, 2018). Simply put, transfer of construction risk results in projects where only the most qualified builders have to control their own construction liabilities and risks (Blanc-Brude, 2013). *Increased incentives to control costs:* Selecting most qualified construction companies coupled with the incentive to manage costs restricts moral hazard and adverse selection (Blanc-Brude, 2013). A fraction of construction risk existent in infrastructural projects is a product of who is exposed to the risk (Laffont and Tirole, 1993).

*Managing of construction risks:* Construction risks are controlled by way of a network of contracts (Gatti, 2013) and transferred to construction companies which efficiently make available insurance against unanticipated construction costs (Owusu-Manu et al., 2018b). *Benchmarking:* Asymmetries of information on the operating costs can also be reduced through benchmarking and market testing processes (yardstick competition) (Kumar et al., 2018). Elementary parts of the service provided by the contractor can be periodically evaluated against market prices (Bureau and Mougeot, 2007).
**Financial unbundling:** Financial unbundling is an effective way of ensuring transparency in projects by inducing a disclosure of the contract financial main points. The commitment of financial institutions into the contract allows, the assessment of the completion of value for money and reinforces, and the monitoring upon the special purpose entity (SPE) (Gatti, 2013).

**Bond spread:** An inadequate risk transfer to the contractor can be discovered by the reasonability of the bond spread (Ameyaw and Wilhelm, 2017). For instance, if the public partner takes on almost all the demand risk, it can be, in financial expressions, like providing to the contractor an advance contract for free (Välilä, 2005).

**External finance:** External finance brings about a new agency relationship to the contract (Gatti, 2013). It is positive to the public contractor since the interests of external financiers are similar to its objective. In this way, part of the monitoring expenses can be externalized (Blanc-Brude, 2013). **Funding competition:** At the negotiation period, funding competition helps to raise the public sector's information on the deal (Ameyaw and Wilhelm, 2017). However, the cost of gathering this information must not override the savings it brings about. In this instance, the size of the deal, and the number of bidders, has a crucial role in the trade-off (Singh et al., 2006).

**Contain private liabilities to small size:** Private liabilities should be contained to an adequately small size (Blanc-Brude, 2013). PPP projects are to be effectively run and should not be extremely leveraged (Danau and Vinella, 2014). **Securing contract enforcement:** To be able to induce the firm to fulfil the contract, there should be the requirement of investing a satisfactorily worthy quantity of money in advance, and it should be allowed to recuperate that investment by the passage of time at the execution stage (Blanc-Brude, 2013).

**Contract guarantees and technical assistance:** Modern development banks or current multilateral banks will offer monetary support, assuring guarantees and giving out the most
excellent international actions for project evaluation and risk appraisal, and the best
techniques of innovative finance (Hart, 2003). All these help reduce MHAS in PPP projects.

Screening: Screening refers to the term for all activities whereby the principal attempts to
gain more accurate information on the quality attributes of the agent which are pertinent
(Kumar et al., 2018). These include: references, work probes, certificates, and credit
worthiness (Dewatripont and Legros, 2005). Monitoring: Monitoring is essential after a
contract has been signed. The intent of monitoring is to make certain that the agent is acting
in harmony with the contract (Owusu-Manu et al., 2018b). This in the long term decreases
the problems of MHAS in PPP projects (Dewatripont and Legros, 2005).

Signaling: The market party which has more information, for example the contractor, signals
its type to the client who is the least informed market stakeholder, using some signals (Kumar
et al., 2018). In case of signaling, the initiative goes out from the better-informed market
participants who send out their signals first and who only then get contracts offered by the
worse informed market party (Dewatripont and Legros, 2005). Cooperation among project
participants: Trust takes time to develop between the parties, and it is very fragile, but once
developed it outshines all the other strategies in terms of project control and risk
minimization (Osei-Kyei and Chan, 2017a). Formal planning and control systems create
more transparency with regard to the actions of the PPP project participants (Danau and
Vinella, 2014).

METHODOLOGY

This study was quantitative in nature and deductive research approach was adopted.
Questionnaires were the main research instrument to collect data. The designed instruments
were pre-tested and piloted before the main survey. As opined by Oppenheim (2000) and
Creswell (2005), pre-testing and piloting surveys are significant in establishing complete
consistency in the data collection (Yin, 2009). Using stratified sampling technique, two
respondents each from government agencies, consultancies and construction firms involved
in PPP projects with insightful expertise and having features of proposed respondents were
asked to pre-test the questionnaires. These six respondents were asked to check the research
instrument (RI) for ambiguity, clearness and time used to finish answering the questionnaires.
They were also to give insights which will improve the preciseness of the questionnaires.
Feedbacks received indicated that the questionnaires were very clear to comprehend and were
very likely to get pertinent answers in the main survey. Comments from the piloting were
used to make a few additions and fine-tuning of the questionnaires for the main survey. The
real survey spanned two months and respondents were asked to rank twenty (20) strategies to
reduce moral hazard and adverse selection of PPP construction projects. The Likert scale 5-
point grading system was used where 1=not significant; 2=moderately significant;
3=significant; 4=very significant and 5=extremely significant. Mean values greater than 3.00
were significant.

The sampling technique for this study with relation to its design, purpose, and realistic
inference on this research topic is purposive sampling. The researcher chooses what needs to
be identified and undertakes to locate respondents who are willing to release the information
by merit of experience or knowledge (Tongco, 2007). In this research, this strategy involved
identifying the professionals involved in Public-Private-Partnership (PPP) construction
projects. Furthermore, snowball sampling was used in getting the sample size due to the
challenges encountered in evaluating the population size. This strategy is a solution to
reaching hard-to-reach or concealed populations. It exists on the assumption that a link exists
among the original sample and extras in the similar target population (Creswell, 2005). This
mixed sampling process was used to obtain a representative sample size of fifty-six (56)
government agencies, consultancy firms and construction companies in charge of Public
Private Partnership projects. Questionnaires were distributed to five (5) respondents in each of these companies and agencies resulting in a total of two hundred and eighty (280) respondents. Two hundred and ten (210) questionnaires representing seventy five percent (75%) response rate was attained.

Mean score ranking was used to rank these strategies while reliability analysis was conducted using Cronbach Alpha coefficient. Kendall’s concordance analysis was conducted to measure the agreement of different respondents on their rankings of strategies. Factor analysis using Principal Component Analysis (PCA) grouped the strategies into eight components.

DATA ANALYSIS AND DISCUSSION

Respondents’ profile

40 percent of respondents work with government agencies in charge of PPP construction projects. 39 percent of respondents work with consulting firms in charge of PPP construction projects. Finally, 21 percent of respondents work with construction firms in charge of PPP construction projects. This research comprises respondents who are working in various sectors and firms responsible with construction projects and are knowledgeable about the operations of PPP construction ventures. This therefore lends credence to the reliability of the study.

Since PPP is quite new in the Ghanaian industry, respondents were not restricted to their experience in PPP projects but were rather asked their years of working experience. 10.5 percent have less than 5 years’ experience. 28.1 percent have 5-10 years’ experience. 74 respondents representing 35.2 percent have 11-15 years’ experience. 14.3 percent have 16-20 years of working experience while the remaining 11.9 percent have above 20 years of experience. In conventional work practice and relying on the practical perception of
employment practice in Ghana, having at least six years of working experience qualifies a worker for the position of senior management. In addition, possessing at least ten years of working experience makes a worker suitable for the position of senior management. Inferring from this, it can be deduced that the respondents for this study have adequate working experience in the industry. In summary, their responses for this study are seen to be reliable and valid.

10.5 percent of respondents have an HND degree. 47.6 percent have a BSc degree. Furthermore, 40 percent have an MSc degree while the remaining 1.9 percent have a PhD. Considering the practical standpoint of the teaching and training courses offered by various professionals in the Ghanaian industry, it can be seen from this results that the majority have passed through the tertiary level with the minimum being a BSc degree. The implication for this study is that, the respondents have satisfactory background in education and hence have the propensity to better understand and interpret the variables. Their responses are therefore anticipated to be credible and consistent.

Reliability Statistics

The internal consistency analysis of the responses received shows a Cronbach’s alpha coefficient value of 0.812. Tavakol and Dennick (2011) postulated that a Cronbach’s alpha coefficient value between 0.800 and 0.900 is good for a research. This implies that the internal consistency of the response that was received is strong. Table II presents the analysis of the reliability statistics of the responses.

Mean score ranking for strategies to reduce moral hazard and adverse selection of PPP construction projects
Table III shows the results for the mean score ranking. Based on the mean scores, two factors had means of above 4 and hence were very significant. The top five strategies are stated below with their standard deviation values. Monitoring was ranked 1st with a mean of 4.06 and standard deviation of 0.891. Transfer of risks was ranked 2nd with a mean of 4.02 and standard deviation of 0.923. Screening was ranked 3rd with a mean of 3.93 and standard deviation of 0.813. Managing of construction risks was ranked 4th with a mean of 3.90 and standard deviation of 0.868. Increased incentives to control costs was ranked 5th with a mean of 3.87 and standard deviation of 0.745. All the mean values for the factors in the table were above the population mean (3.0). It is inferred that all these factors are significant as far strategies to reduce moral hazard and adverse selection of PPP construction projects is concerned.

In a study conducted in France by Bureau and Mougeot (2007), benchmarking was ranked as the most significant factor in reducing MHAS. However in this study, it ranked at a low position of 18th. Increased incentives to control costs was identified in a study by Blanc-Brude (2013) as the most significant indicator for addressing MHAS. In this study, this factor ranked 5th which was also significant and therefore agrees with the past study undertaken.

Kendall’s concordance analysis

Kendall’s concordance analysis was conducted to measure the agreement of different respondents on their rankings of strategies based on mean values within a particular group. If the Kendall’s coefficient of concordance (W) was statistically significant at a pre-defined significance level, a reasonable degree of consensus amongst the respondents indicated. Table IV shows the test results of the Kendall’s concordance analysis for each group of stakeholders at a significance test value of 0.05. The values of W range from 0 to +1, where a value further from 0 indicates a strong degree of consistency on the rankings of factors within
each group (Sheskin, 2011). Results suggest that there is consistency on the rankings within each group: (government agency, consulting firm and construction firm).

FACTOR ANALYSIS FOR STRATEGIES TO REDUCE MORAL HAZARD AND ADVERSE SELECTION OF PPP CONSTRUCTION PROJECTS

Initial Considerations

With reference to the data presented in Table V, the data from the survey is adequate by these tests. The data has 210 observations per variable with the value of KMO being 0.784 which is greater than 0.50.

From Table V, Bartlett’s test is highly significant and hence recommended for factor analysis. This determinant of the matrix is used in testing for multicollinearity. The determinant or the R-matrix should be greater than 0.00001. Field (2005) opines that if it is less than the value, the variables that correlate very highly should not be included in the analysis. However, no two variables correlate very highly. Mild collinearity according to Field (2005) is not a problem for factor analysis and hence the data is appropriate for factor analysis.

The Guttmann-Kaiser rule and the Cattel scree test were used in determining the number of factors to be extracted. Guttmann-Kaiser rule suggests that only factors with an eigen value greater than 1 should be retained whilst the Cattel scree test suggests that all further components after the one starting the elbow should not be included. Applying these criteria on the number of principal components to be extracted suggests that eight (8) components should be extracted.
DISCUSSION OF FACTOR ANALYSIS

Component 1 (Transparent process and contract)

Component one consists of the factors: Well-designed contract, Create a clear and transparent process and Harmonization of interests. From observations of the relationship among the variables loaded onto this component, it has been termed ‘Transparent process and contract’ factors. This extracted component accounted for 12.117% of the total variance. It is predictable that these have been weighed highly because the respondents must have considered these strategies as very critical in reducing the problems of moral hazard and adverse selection.

Well-designed contract with eigen value of 0.896 is very important. Contract is the most vital instrument that regulates the information between the project owner and contractor (Ameyaw and Wilhelm, 2017). Therefore, a well-designed contract which defines the ways of information transfer is the most effective way to decrease the information asymmetry risk (Lobner, 2009). This agrees with past study conducted by (Owusu-Manu et al., 2018b) where well-designed contract was identified as a significant factor in curbing moral hazard and adverse selection in PPP projects.

Create a clear and transparent process had an eigen value of 0.458. Routinization and standardization will create a market for PPPs that provides the public and private sector with a clear roadmap for success. This will ultimately lead to a reduction of the agency problems of moral hazard and adverse selection (Ameyaw and Wilhelm, 2017).

Harmonization of interests with eigen value of 0.896 is also another significant strategy. A main instrument for reducing the risks of moral hazard is the harmonization of interests, by profit sharing of the contractor. For the planning participants, contractual incentives must be given so that the targets of the principal are achieved (Dewatripont and Legros, 2005).
Component 2 (Incentives and monitoring)

Component two consists of the factors: *Increased incentives to control costs* and *Monitoring*. It has been named ‘incentives and monitoring’ factors. This extracted component accounted for 8.743% of the total variance.

*Increased incentives to control costs* had an eigen value of 0.599. The self-selection of the most qualified construction companies merged with the incentive to manage costs as a remaining claimant curtails with moral hazard and adverse selection (Blanc-Brude, 2013).

*Monitoring* had an eigen value of 0.676. Monitoring is essential after a contract has been signed. The intent of monitoring is to make certain that the agent is acting in harmony with the contract. This in the long term decreases the problems of information asymmetry (Dewatripont and Legros, 2005).

Component 3 (Screening and technical assistance)

The factors of the third component were *Contract guarantees and technical assistance* and *Screening*. This extracted component accounted for 8.185% of the total variance. It was named ‘screening and technical assistance’ factors.

*Contract guarantees and technical assistance* had eigen value of 0.503. Overall, the responsibility of a modern development banks or current multilateral banks would involve steps at national and international stages, comprising from fiscal and risk mitigation features, including the terms of technical guidance (Blanc-Brude, 2013).

*Screening* had eigen value of 0.637 and refers to the term for all activities whereby the principal attempts to gain more accurate information on the quality attributes of the agent which are pertinent. These include: references, work probes, certificates, and credit worthiness (Dewatripont and Legros, 2005). The aim of screening is to gain useful
information to the principal in an attempt to be more conversant with the qualifications of the agent (Blanc-Brude, 2013).

**Component 4 (Unbundling and benchmarking)**

Component four consists of the factors: Benchmarking and Financial unbundling. This extracted component accounted for 7.604% of the total variance. It was named ‘unbundling and benchmarking’ factors.

*Benchmarking* had eigen value of 0.754. Asymmetries of information on the operating costs are reduced through benchmarking and market testing processes (yardstick competition). Elementary parts of the service provided by the contractor must be periodically evaluated against market prices (Bureau and Mougeot, 2007).

*Financial unbundling* had eigen value of 0.575. Financial unbundling is an effective way of ensuring transparency in projects by inducing a disclosure of the contract financial main points (Kumar et al., 2018).

**Component 5 (Funding and small liabilities)**

The factors of the fifth component were Funding competition and Contain private liabilities to small size. This extracted component accounted for 7.388 % of the total variance. It was named ‘funding and small liabilities’ factors.

*Funding competition* had eigen value of 0.720. At the negotiation period, funding competition helps to raise the public sector's information on the deal. However, the cost of gathering this information should not override the savings it brings about. In this instance, the size of the deal, and the number of bidders, has a crucial role in the trade-off (Singh et al., 2006). This agrees with study conducted by Akintayo (2018) on minimizing risks in PPP construction projects.
Contain private liabilities to small size had eigen value of 0.716. Private liabilities should be contained to an adequately small size (Blanc-Brude, 2013). As well as requiring that the firm not spend so much in the project, in spite of its assets, this necessitates that the firm not depend on debt greatly, even if it has unrestricted access to the credit market. PPP projects are to be effectively run and should not be extremely leveraged (Danau and Vinella, 2014).

Component 6 (Information clarification and signaling)

Component six consists of the factors: Signaling and Clarifying the need for information in the project. It has been named ‘Information clarification and signaling’ factors. This extracted component accounted for 7.263% of the total variance.

Signaling had eigen value of 0.464. The market party which has more information, e.g. the contractor, signals its type to the client who is the least informed market stakeholder, using some signals. In case of signaling, the initiative goes out from the better informed market participants who send out their signals first and who only then get contracts offered by the worse informed market party (Dewatripont and Legros, 2005).

Clarifying the need for information in the project had eigen value of 0.722. This agrees with a study conducted by Ameyaw and Wilhelm (2017) where need for information was identified as a risk mitigation strategy. The necessity for information which a project participant requires to accomplish his tasks within a definite period of time is explained according to quality, type and quantity (Ameyaw and Wilhelm, 2017).

Component 7 (Risk and contract management)

Component seven consists of the factors: Managing of construction risks and Securing contract enforcement. It has been named ‘Risk and contract management’ factors. This extracted component accounted for 7.211% of the total variance.
Managing of construction risks had eigen value of 0.721. In financing of projects, not excluding Public-Private-Partnerships, construction risks are controlled by way of a network of contracts (Blanc-Brude, 2008) and transferred to construction companies which efficiently make available insurance against unanticipated construction costs to the financiers and sponsors of the Special Purpose Entity (SPE).

Securing contract enforcement had eigen value of 0.681. To be able to induce the firm to fulfill the contract, there should be the requirement of investing a satisfactorily worthy quantity of money in advance, and it should be allowed to recuperate that investment by the passage of time at the execution stage (Blanc-Brude, 2013). To be brought on to partake in the partnerships, private firms should be wealthy to start with. This would discourage the speculative and probable unpredictable investors (Danau and Vinella, 2014).

Component 8 (Cooperation and finance)

The eighth and last component had the following factors: Bond spread; External finance; Cooperation among project participants and Information disclosure. It has been named ‘Cooperation and finance’ factors. This extracted component accounted for 6.917% of the total variance.

Bond spread had eigen value of 0.583. An inadequate risk transfer to the contractor is discovered by the reasonability of the bond spread. For instance, if the public partner takes on almost all the demand risk, it is expressed in financial expressions, like providing to the contractor an advance contract for free (Välilä, 2005).

External finance had eigen value of 0.600. Dewatripont and Legros (2005) distinguish two types of external financiers, outside shareholders and debt creditors. They consider that the financial structure of the contract is not without significance on the private partner incentives. Commercial finance literature reiterates that outside debt or equity might lower incentives to exert effort for the contractor (Jensen and Meckling, 1976).
Cooperation among project participants had eigen value of 0.755. In connection with moral hazard, the frequency of the cooperation of the project participants is of major importance (Owusu-Manu et al., 2018a). If the contractual partners repeatedly cooperate with one another, this leads to a reduction of information asymmetries. The mutual trust resulting from long-term cooperation will cause a reduction of risk costs (Lobner, 2009).

Information disclosure had eigen value of 0.552. The agent delivers information to the client using some special files for client’s reference. The client will esteem the agent’s reputation as a significant evaluation index when he selects agent, which is because the project implementation needs the agent’s strength, experience, credibility, moral qualities among others, and these all constitute private information of the agent (Gatti, 2013).

CONCLUSIONS

Summary of findings

From the mean score ranking, Monitoring; Transfer of risks; Screening; Managing of construction risks; and Increased incentives to control costs were the most significant strategies to reduce the problems of moral hazard and adverse selection in PPP construction projects.

After the factor analysis using Principal Component Analysis, the eight components were: Transparent process and contract; Incentives and monitoring; Screening and technical assistance; Unbundling and benchmarking; Funding and small liabilities; Information clarification and signalling; Risk and contract management; and Cooperation and finance factors.

Empirically, the robust and rigorous identification of MHAS strategies in the current study have useful theoretical, practical and wider implications. Overall, the study makes a unique
contribution to the MHAS and PPP body of knowledge through benchmarking the most significant strategies that can be used to reduce PPP project failures arising from MHAS.

Theoretically, the research constitutes the first exclusive assessment of the generic, significant strategies in Ghanaian PPP projects. From a theoretical lens, the output of the research contributes to the checklist of strategies that reduce PPP project failures arising from MHAS and may contribute to the development of the agency theory. Additionally, the outcome of the research provides a sound basis for future research on MHAS in PPP projects in any country. This is of relevance to academic, industry and PPP policy researchers.

Practically, the identified and prioritized strategies will serve as a guide and managerial support in future PPP projects. Although no case studies were used to validate the findings, the outcome draws on wealth of experiences and lessons and thus, may reflect the realities of PPP project failures. As such, the findings of the research may guide construction stakeholders in reducing failure of PPP projects due to MHAS. These stakeholders and practitioners may improve project success by recognizing and planning against failure of these PPP projects.

A limitation in this study is the fact that the research applies mainly to the Ghanaian and makes the generalisation limited to the study environment due to the peculiar nature of PPP projects in different jurisdictions.

Since the current findings have not been validated, future studies should adopt interviews and desk reviews to help in triangulation and validation of the strategies of MHAS. This will also expand the relevance of the findings to other national and industry settings.
REFERENCES

Ahadzie, D.K. (2007), A model for predicting the performance of project managers in mass house building projects in Ghana, PhD Thesis, School of Engineering and the Built Environment, University of Wolverhampton


Blanc-Brude, F. (2013), Towards efficient benchmarks for infrastructure equity investment, EDHEC-Risk Institute


[Accessed 27/01/19]

Dewatripont M. and Legros P. (2005), Public-private partnerships: contract design and risk transfer, European Investment Bank (EIB) Papers, Vol. 10, No. 1


Iossa E. and Martimort D. (2008), The Simple Micro-Economics of Public Private Partnerships, CEIS Tor Vergata, Research Paper Series, Vol. 6, No. 12, pp.139


Pana, R. M. (2010), Ownership Structure in Romanian Listed Companies a Corporate Governance and Corporate Performance Perspective. Unpublished MSc thesis Aarhus University School of Business


Tongco, D.Y. (2007), An empirical study of e-recruitment technology adoption in Malaysia: Assessment of modified technology acceptance model. Multimedia University, Malaysia

