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A review of micro-practices in commodity value chains in the global south

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Abstract

Micro-practices in the commodity value chains (CVCs) have experienced dramatic evolution through digital technology (DT). This article reviews the literature to identify four critical periods in this evolutionary cycle, from 1980 to 2020, to explicate the dimensions through which DT has foregrounded the burgeoning patterns of change in practice. Focusing on three key levels of micro-practices: farm level, production level, and institutional level, a nuanced analysis of the role of relevant stakeholders in mobilizing resources and provides support to leverage DT. Our study shows how stakeholders' receptiveness has facilitated the radical (re)construction of micro-practices in CVC. Implications for theory and practice are outlined.

KEYWORDS
certification programs, commodity value chains, digital technology, micro-practices, third-party

JEL CLASSIFICATION
F23, J80, M16

1 | INTRODUCTION

The mad rush for digital technology (DT) in organizations and across the commodity value chain (CVC) in emerging economies has been growing steadily in recent times (Antikainen, Uusitalo, & Kivikytö-Reponen, 2018; Bacco, Barsocchi, Ferro, Gotta, & Ruggeri, 2019; Foster, Graham, Mann, Waema, & Friederici, 2018). This growth reflects on wider trend in the digital era as producers, consumers and relevant stakeholders within the CVC aim at maintaining efficiency, production capacities, quality management processes, influence organizational decision-making, accelerate forecasting decisions as well as enhancing economic growth among emerging economies (Gallardo-Echenique, Marqués-Molías, Bullen, & Strijbos, 2015). Most importantly, recently, it is obvious how DT have come to play out in micro-practices within the CVC, a pivot to the competitiveness of global businesses and as a driver of economic growth in most advance and emerging economies (Degryse, 2016; Solomon & van Klyton, 2020). Interestingly, an emerging consensus across international business points to DT as a mechanism in streamlining international trade across various sectors in emerging and developed economies (Anwar, 2007).

Recasting discussions on the evolution of DT in micro-practices in the CVC, the emerging literature has redirected attention to how stakeholders within the CVC have adhered to DT in their organizing practices (Gereffi & Kaplinsky, 2001; Kos & Kloppenburg, 2019). These practices reinforce the long-held belief that producers and other stakeholders within the CVC are generally illiterate and poor and have influenced their inability to adapt to the technological change in various sectors across emerging economies. Adekunle and Fatunbi (2012), in their study on stakeholders' adoption of DT, found out that in recent times DT has become the mechanism in connecting businesses and enhancing sector operations, which have also developed into the firms-sustaining operational norm. The explanation of Adekunle and Fatunbi (2012) further emphasized that the current trend of operations and growth in CVC tends toward multi

stakeholder's engagement which is heavily driven by DT across both developed and emerging economies. Also, Küçükçolak and Taylan (2021), in their analysis of DT within the CVC, argued that DT drives the facilitation of primary and secondary stakeholder activities within the CVC. Subjective understanding of how DT provides standardization and integration in CVC, identifying core problems and defining strategic decisions to resolve them are all underlining roles of DT. They further emphasized that the use of DT in the CVC is an opportunity in providing solutions to deficiencies that emerged from the down and upstream activities across the industry. These arguments thus suggest that the mainspring of DT is to enhance efficiency in firms' and individuals' routine practices in the CVC across developed and emerging economies.

Nevertheless, little is known about the commodity industry or context within which stakeholders' operations have shaped their ability to adopt DT in their micro-practices. In the effort to fill this gap, this study follows Adekunle and Fatunbi (2012) and Küçükçolak and Taylan (2021) showing that the institutionalization of DT in micro-practices across the CVC in emerging economies is not a single sector phenomenon but a collective effort by all stakeholders both public and private.

Our study makes two main contributions to the literature on DT in CVC. First, while previous studies have extended our understanding of how producers and institutional structures may have constituted the slow pace to adopt DT in the CVC, our study further sheds light on how DT has evolved in micro-practices from 1980 to 2020 across emerging economies. Second, the study outlines the transition micro-practices at the farm, production, and institutional levels and provides insight into how various stakeholders' receptiveness may have contributed to the evolvement of DT in micro-practices at these key levels CVC. Interestingly, the "micro-practice" approach offers an alternative perspective to theorize and examine how DT has evolved in the CVC from the 1980s to the 2020s. The rest of the paper unfolds as follows: a literature selection method is presented, followed by a discussion on micro-practices in the CVC from 1980 to 2020 and a description of how DT has evolved over that period. The third section unpacks DT driven micro-practices from the 1980s to 2020s to show how the transition has emerged over the years. The fourth section discusses how DT may contribute to developing micro-practices across the CVC. The last section concludes and suggests a direction for future research.

2 | LITERATURE SELECTION METHOD

An extensive literature review was conducted for this research. The search focused on the leading scholarly journals in the agribusiness, agricultural economics and development economies disciplines, focusing on the following keywords: micro-practices, DT, and CVCs. With Google scholar as our primary research repository, our initial search produced 510 results. From these, we eliminated 217 articles from the total articles identified as they were not in our preferred academic disciplines. Another article was duplicated—leaving a total of 162 articles. These articles were all checked further for relevance. The Scopus database search of the same list of journals produced 1,253 results ordered by relevance, of which 240 articles were checked. Relevance of the identified articles weakens as one goes down the list. Of these selected articles, 120 articles are from another source, leaving a net of 120 articles checked for relevance.

There is, of course, much overlap between the results of different databases searching the same sources. The exact number of those repeated articles was not checked because of their irrelevance to the research area. The majority of the relevant articles deal with micro-practices in the CVC and how DT play out from the 1980s to 2020s. Looking deeply into this vast literature on micro-practices and the evolvement of DT from 1980s to 2020s within the CVC, there is defining context to analyze micro-practices and how DT have evolved over the temporal period.

3 | MICRO-PRACTICES AND DT IN CVCS

The agricultural sector is the largest industry within the CVC and contributes significantly to gross domestic product and socioeconomic growth among most commodity production countries (Johnston & Mellor, 1961; Subasinghe et al., 2009). Interestingly, the commodity industry employs about 70% of the labor force in most emerging economies in the global south (Epaphra & Mwakalasya, 2017). However, despite the evolution of DT at the pivot of production and operation across its value chain, evidence suggests that the CVC is still floundering (Vanderhoef, 2016). The next section presents a temporal discussion on micro-practices in the CVC from the 1980s to 2020s and how DT have evolved over the period.

3.1 | Micro-practices of CVCs between the 1980s and 1990s

Across the emerging markets, the total net increase in agricultural expansion was estimated at more than 100 million hectares during the 1980s and 1990s, with crop production being the lead (FAO, 2021). However, it has globally been accepted that the commodity industry and its value chain activities in emerging economies have been underperforming. It is also considered one of the poorest industries within the global economy over the past decades (Bjornlund, Bjornlund, & Van Rooyen, 2020; Christiaensen, Demery, & Kuhl, 2011; Diao, Hazell, & Thurlow, 2010; FAO, 2021). Most importantly, achieving sustainable production to meet domestic and global consumer demands requires collective input from all stakeholders within the CVC (Donald, 2004).

From the early 1980s to 1990s, commodity production has undergone a series of organizing micro-practices to sustain the industry. This array of value chain activities has employed producers and other stakeholders (Laven, 2011). However, Sarker et al. (2019) argue that DT has been the critical underlying tool facilitating operational activities and micro-practices across the industry. Nonetheless, with the onset of DT in production processes, producers within the period still adopted traditional farming practices due to the high illiteracy rate

that coupled them to adopt the digital change (Das & Sahoo, 2012; Norgaard, 1984). Here, producers were less knowledgeable on the use of DT in their production practice (Ali, Man, & Muharam, 2020; Amekawa, 2009; Chuang, Wang, & Liou, 2020). Interestingly, Crang, Hughes, Gregson, Norris, and Ahamed (2013) posit that during this period successive governments, and regulatory institutions responsible for dissemination and educating producers on best practices and the use of mechanized tools contributed less to these training and development of the industry across emerging markets (Van der Ven, Sun, & Cashore, 2021). In that regard, stakeholders lost sight of production records, which resulted in poorly managed inventory among producers and institutions, despite DT being at the core front of the value chain (Disney & Towill, 2003; Kopczak & Johnson, 2003).

Additionally, Sinha (2007) and Srivastava (2011) postulate that the issue of child labor between the 1980s and 1990s was unbridled. Producers had no informal education on the effects and consequences of child labor. However, Bachman (2000) argues that news was broadcast on various digital platforms on child labor. However, the high illiteracy rate impedes producers from understanding the consequences of engaging children in their production practices. Interestingly, in the late 1980s, the CVC began to have a marginal shift in micro-practices across the emerging economies, as discussed in the next period.

3.2 | Micro-practices in non-digital CVCs (1990–2000)

Traditional agricultural practices over the years continue to dominate in most emerging economies. However, the CVC continues to witness a minimal upscaling in its micro-practice. As credibly argued by Beckford and Barker (2007), producers' knowledge of micro-practices is not a panacea for the commodity industry's development but requires technical know-how and training to champion and improve production practices across emerging economies in the global south. During this era, producers adopted non-mechanized farming practices such as clearing the lands, which takes a few weeks to dry up, they then burn them to pave the way for sowing of the seeds, the burning of the farms sometimes leads to bush fires, where fire extends to other neighbors already grown farms (Russell-Smith et al., 2007).

To understand these practices, Nabhani, Daryanto, Yassin, and Rifin (2015) argue that this act is due to a lack of training on best farming practices and a high illiteracy rate among producers and stakeholders. However, with basic technology at the center of production, producers continue to use the traditional methods of sowing seeds, where essential tools such as holes and cutlasses were used to plant seedlings (Olea & Mateo-Tomás, 2009). More importantly, they only rely on seasons for their cultivation and have no mechanized irrigation dams to support their production (You, Rosegrant, Wood, & Sun, 2009). Moreover, there were no proper spraying mechanisms outlined for producers. Producers use fungicides and other chemicals that agricultural experts did not prescribe in spraying their farms (Van den Berg & Jiggins, 2007). Following these practices, Fold and Larsen (2008) argue that regulatory institutions monitoring these farm practices had no modern tools to monitor this act but instead relied on manual inspection, which sometimes gives conflicting results.

Another concerning issue stirs up during the harvesting periods in the 1990s. Here, producers adopted a manual strategy, where cutlasses and other manual farming tools were used. It is observed that government agencies and other stakeholders have contributed less technological inputs to the development of the commodity industry from the 1990s to 2000s (Alam, Hoque, Khalifa, Siraj, & Ghani, 2009). Indeed, the output from production has been less to compete locally and on the global market. In contrast, changes in production were beginning to show much improvement in the mid to late 1990s. This evolution was due to the economic and agricultural reforms in most developing countries (Cornia, 1985). Here, producers began education and training on mechanized farming practices. Interestingly, training on-farm management, inventory management, and records keeping emerged in the late 1990s (Kilpatrick, 2000; Kilpatrick & Johns, 2003). Moreover, structured finance and insurance services in rural areas emerged across the farming communities, where producers were registered through associations for soft loans to boost their production (Turvey & Baker, 1990).

3.3 | Transition from non-digital to digitalized CVCs (2000–2010)

Thus, from 2000 to 2010, the CVC used a mixed-based method to distinguish one micro-practice from other types (Odini, 2014). The core advantage of this strategy, over the list of attributes to other micro-practices, is that DT within the period is characterized not only in one micro-practice but in explicit comparison with other stakeholders' decisions across the CVC in emerging markets (Haileslassie, Priess, Veldkamp, Teketay, & Lesschen, 2005). This comparison sets boundaries between different micro-practices and makes the CVC more precise in their operational activities (Gereffi & Kaplinsky, 2001).

Aguera et al. (2020) propose a categorization between digitalized and non-mechanized micro-practices coupled over the period. Digitalization means the extent of influence that technology has over its micro-practices and its outcomes on the entire CVC (Klerkx, Jakku, & Labarthe, 2019). Non-mechanized pertain to the non-usage of automated devices in practice (Sharma, Bhati, & Singh, 1991). However, juxtaposing these two methods within the CVC produces an enormous outcome. More importantly, Robert, Parris, and Leiserowitz (2005) argue that the transformation in production practices was based on the agenda of the first-millennium development goals, to eradicate hunger and poverty, which set the pace and gave much attention to commodity production across the emerging markets.

Additionally, Laven (2011) accentuated that the commodity sector is vital in the agricultural industry. Notably, it has contributed to national development in revenue generation and employment. In this regard, stakeholders have called for numerous reforms and national policies to sustain the industry and open the internal and external markets within the period. Moreover, between 2000 and 2010, the global attitudes toward commodity production began to change significantly compared to the 1980s and 1990s. However, there are

notes of hope and potential, backed up by global statistics that indicates growth in the commodity industry from 2000 to 2010 (Bair & Peters, 2006). Producers' associations began to spring up. They underwent training on production practices, inventory management, records keeping and the merger of the manual and digitalized machine in production (Bratton, 1990). Here, most farmers were trained through UTZ certified, and rainfall Alliance third-party certification programs (Hatanaka, Bain, & Busch, 2005), on best farming practices like pegging and sowing nursery of seedling before planting, farm maintenance activities such as weeding, agrochemical applications, pruning, the use weedicides and machines in clearing farmlands. The merger of digitalized and other essential farm tools improved micro-practices within the commodity industry.

According to the world bank report in 2009, most private firms across Asia were keen on investing in the commodity industry across most underdeveloped areas in emerging economies in the global south (Agrawal, 2005; Epaphra & Mwakalasya, 2017) to reduce poverty and enhance micro-practices (World Bank, 2008; Christiaensen et al., 2011). Recent studies (Chimhowu, 2013; Odeh, 2010) have shown that there has been a transformation and reforms in micro-activities within the CVC from 2000 to the year 2010, with the effort of both public and private stakeholders. Commodity micro-practice has evolved with the merger of DT along with non-mechanized practices within the period. Interestingly, Fielke et al. (2021) and Shang, Heckelei, Gerullis, Börner, and Rasch (2021) argue that the practice reflected in production capacity over the period compared to the previous periods.

Despite the extensive transformation through DT in the CVC practices from 2000 to 2010, few producers and stakeholders still use the traditional methods in the farming practice, here, producers and some regulatory stakeholders believe adopting to traditional micro-practices will serve as a support to their production and provide a source of additional income to their livelihood. For instance, preplanting activities such as sowing, the nursery of seedlings, and other micro-activities such as bagging and spraying of most commodities serve as employment opportunities in their local communities in most emerging economies (Ray, Clarke, & Waley, 2021; Rigg, 2006).

3.4 | Micro-practices in CVCs in the digital age (2010–2020)

In recent times, the CVC has seen an extensive reform in its micro-practices in most emerging economies across the global south. This period experienced extensively mechanized micro-practices across the CVC operations. Micro-practice toward production, marketing, sales, inventory management, records keeping, stakeholder's management, the role of regulatory institutions, decision-making, and distribution within the CVC has significantly improved (Adenle, Wedig, & Azadi, 2019; Philips, Phillips, 2015). To understand the significant improvement in micro-practice over the digitalized era, we unpacked the transition micro-practices at the farm, production, and institutional levels as described in the next section.

3.4.1 | Farm level micro-practice

DT can provide improved production opportunities and increased income for stakeholders across the CVC (Shepherd, Turner, Small, & Wheeler, 2020). Moreover, it has become a popular strategy for economic development in many emerging economies in the global south (Johnston & Mellor, 1961). However, limited farm-level data suggests how DT has evolved in micro-practices within the temporal period. Thus, the digitalized era from 2010 to 2020 production seasons (Kovács & Husti, 2018). Off-farm producers have adopted a modern mechanized practice such as tractors, combine harvesters, the monoculture, sprinkler, seeder and fertilizer distributor, Baler, and other sophisticated digitalized machines along with manual tools like cutlasses, arks, holes, mattock in the production processes.

Accordingly, these mechanized farming tools and machinery used during the period reduced the level of human effort and improved agricultural production (Chui, Manyika, & Miremadi, 2016). Most importantly, the mechanized equipment and machines used in weeding, fumigation, seedling planting, tillage, and fertilizer application have replaced most traditional farming practices where cutlasses and holes are used in cultivation as in the 1980s and 1990s. The period has also witnessed massive best micro-practices in the entire value chain. Here, the introduction of third-party certification programs in the agricultural food chain has impacted micro-practices and improved best practices over the period (Hatanaka & Busch, 2008; Lee, Gereffi, & Beauvais, 2012; Marschke & Wilkings, 2014).

Additionally, education and training on best practices for producers on seed sowing methods, fertilizer application, harvesting, environmental conservation, and other best practices instituted into the CVC have transformed the industry over the digitalized period (Radhakrishnan, 2017). Keeping on with the arguments, Parr, Papendick, Hornick, and Meyer (1992) emphasized that the use of DT in micro-practices play out by establishing the attributes of soil and plants nutrients for cultivation, here, digitalized devices help in identifying these attributes of plants and soil, such as the soil texture, yield after harvest base of the texture of the soil, the level of plants nutrients accrued in the soil, fertilizer application, mechanized drainage, and irrigation systems (Gregorich, Carter, Doran, Pankhurst, & Dwyer, 1997; Watson, Atkinson, Gosling, Jackson, & Rayns, 2002). However, DT stands at the "pivot" in ascertaining these micro-farming practices compared to conventional farming, where manual tools are used in farming. Likewise, DT will help certification managers have a clear direction in their training practices for producers and compare how it will help ascertain the level of soil and plant nutrients in their farming practices during the pre-cultivation stage of production.

Bhalotra and Heady (2003) argue that issues with child labor, which has caused adverse wealth effects to producers, has seen signs of reduction in the digitalized era. Here, producers were trained on the effect of child labor and its impact on the global economy. With the support of DT, producers were privileged to watch documentaries on child labor. Interestingly, to reduce child labor issues at the farm level, producers were paid a premium to support their livelihood

through third-party certification programs introduced as standards for adhering to best practices across the CVC (DeFries, Fanzo, Mondal, Remans, & Wood, 2017).

3.4.2 | Production level micro-practices

Commodity production, aiming to sustain producers, the economy, and the global market, has been developing very quickly around the global south in recent years due to DT (Qiao, Halberg, Vaheesan, & Scott, 2016). Recently, there has been a massive rise in the pairing of certification programs, contributing to a massive rise in production capacity. However, Raynolds, Murray, and Heller (2007) and Blackman and Rivera (2011) argue that the increase in production capacity within the CVC from 2010 to 2020 can be attributed to the increase in certification programs across the global south.

For this reason, there has been a significant improvement compared to previous years. Producers have adopted a modern way of transferring the raw produce into semi-finish for export and internal use. For instance, in cocoa production in the emerging economies from the year 2010 to 2020, producers have adopted a mechanized method in drying the cocoa beans such as solar-powered methods, oven drying, microwave drying in addition to the traditional sun-drying method (Dzelagha, Ngwa, & Nde Bup, 2020; Fagunwa, Koya, & Faborode, 2009). Likewise, the cocoa and labeling processes' weighing has been enhanced through the Fairtrade eco-labeling certification program (Hatanaka & Busch, 2008). In this globalized era, the expectations of customers, stakeholders, and lead firms regarding the speed, accuracy, and quality of service are seeing a rapidly growing trend (Zavyalov, Zavyalova, Saginova, & Kireeva, 2021). There is the need for global firms to adopt the digitalized period in their everyday practices, here, to digitalize the operational activities on a single platform where every stakeholder can have access to their operations irrespective of their geographical area (Iafrate, 2018).

Taking a stance from Antikainen et al. (2018), the concept of "digitalization" is seen as optimizing a firm's operational activities with software and information technology solutions that will make it simpler, efficient, and robust in transferring information to prospective customers and relevant stakeholders. In this context, linking Antikainen et al. (2018) definition to the third-party certification program in the commodity industry, an industry been highly fragmented and geographically dispersed, DT plays out by creating a centralized system for stakeholders. Here, an enterprise resource planning software platform that will enable all stakeholders to access, monitor, and share common data across its operations irrespective of their geographical locations is required to transfer information to relevant stakeholders within the CVC (Hsu, 2013).

3.4.3 | Institutional level micro-practices

The upskill and the use of technology-inclined devices such as agricultural drones by management and regulatory institutions in monitoring the conservation and plantations across farms set the pace for efficient certification programs across the CVC in the global south. Thus, drawing a stance from "precision agriculture" provides an avenue to monitor the output of the third-party certification program on a farm-by-farm basis by various institutions (Guoxiang, Jun, Yubin, & Chengliang, 2005; Trendov, Varas, & Zeng, 2019). Interestingly, institutions can monitor and convey every activity across the digital space irrespective of the geographical area. Thus, the down and upstream levels (Ozdogan, Gacar, & Aktas, 2017). However, between 2010 and 2020, the merger of certification officers and DT into the commodity certification program clearly understands efficient certification practices. Besides, given the magnitude and pace of today's global digital revolutions, the ability to react quickly to a key development is a significant competitive advantage for individuals and businesses operating under the digital space (Koch & Windsperger, 2017).

Contrariwise, drawing on several inputs by scholars and industry players on how DT has transformed various industries, individual businesses, competition across the global market, and contribution to economic growth among various developed countries (Erensal & Albayrak, 2008; Sarker et al., 2019; Weltzien, 2016). The commodity industry is still seen in the noob of the digital age in emerging economies (Bacco et al., 2019; Devaux, Torero, Donovan, & Horton, 2018). Therefore, growing evidence suggests that the commodity industry in emerging economies is still struggling with technology in its production, micro-practices, and entire value chain operations (Adenle et al., 2019; Kariuki, 2011; Mwangi, 1996). However, technology has advanced over the years, and modern equipment has been introduced into other sectors of developed countries to make production quick, efficient, and parallel to compete within the global value chain (Sturgeon, 2008). For instance, most commodity producers are privative to technology in their production and farming practices in the global south. Besides, the knowledge and benefit of how DT such as the use of agricultural drones, mobile cash transfers, blockchain technology, computing, digital sensors, GPS, and other telemetry systems, which may help transform and improve their farming and production practices, are not known, compared to other developed countries like Japan, where DT plays a key role in their farming and production practices (Akintelu, Mele, Sobanke, & Adewunmi, 2019; Furuholt & Matotay, 2011; Newman, 2018).

Moreover, Nkamleu, Nyemeck, and Gockowski (2010) argued that the low technology management in commodity production and farming practices has caused inefficiencies in the industry, and the entire CVC in meeting the prime target of producers, stakeholders, and consumers despite the introduction of third-party certification programs as best farming practices and environmental management (Al–Ghailani & Moor, 1995; Lederer & Singh, 1997). The lack of a proper digitalized monitoring system set the pace for producers to deviate from the core objective of the certification management systems by these private, nongovernmental organizations and other stakeholders within the CVC (Ansah, Kaplowitz, Lupi, & Kerr, 2020; Damba et al., 2020).

The slow pace of DT across institutions within the CVC in emerging economies have caused delays in the payment of premiums to

TABLE 1 Digital technologies driven micro-practices from 1980 to 2020

Year	Micro-practices	Role of technology	Organizing practices	Seminal sources
1980–1990	Manual and Analog	Basic tools	Physical inspection, no record keeping, manual handling,	Amekawa (2009) and Van der Ven et al. (2021)
1990–2000	Traditional	Basic tool	Inspection, manual handling	Russell-Smith et al. (2007)
2000–2010	Manual/digital	Intermediary, connecting stakeholders	Certification, accreditation, standardization, quality management	Hatanaka and Busch (2008) and Wilkinson (1998)
2010–2020	Digitalized	Intermediary connecting stakeholders, producing reports	Smart production, automation systems, satellite, and drones for monitoring, computers, voice and video recording, ERP systems, RFID system, AI system, and E-procurement.	Brunsson, Rasche, and Seidl (2012)

certified producers. Certification officers could have trained producers on the use of mobile cash transfers services (Hughes & Lonie, 2007; Jack & Suri, 2011; Mutong'Wa, Campus, Khaemba, & Mengich, 2014; Razaque & Hassa, 2013) in payment of premiums, this initiative would have been an option for institutions in payment of premiums to certified producers, while minimizing decoupling and prevention of sale of certified commodities to conventional buyers for ready cash (Ricketts, Turvey, & Gómez, 2014).

The micro-practices have grown in the CVC especially in the digitalized era from the year 2010 to 2020 (Table 1). Evidence suggests that there are still noncertified commodities that get to the world markets (Nanyunja et al., 2015; Ssebunya et al., 2019), due to lack of technology in distinguishing between certified and noncertified produce and other technical issues which confront the industry across the emerging economies (Salau & Agbede, 2020). These unethical practices have brought significant challenges to commodity producers and economies in the region. The questions regarding whether and how DT will play out to transform micro-practices and be able to have a parallel operational integration across the global value chains have, so far, received little attention. DT-driven micro-practices across the CVC are discussed. Digitalization drives the commodity industry as a coevolutionary mechanism. The following section examines its evolution from 1980 to 2020.

3.5 | Discussion and conclusion

This article looked at the micro-practices that evolved in the CVC. This study has focused on DT as a mechanism that influenced the evolution of micro-practices in the CVC from 1980 to 2020 across the global south. Although some questions on micro-practices in CVC has been explained using several review approaches to capture the various levels such as farm, production, and institution that spurs the evolution in the CVC (e.g., Adenle et al., 2019; Aguera et al., 2020; Dzelagha et al., 2020; Fagunwa et al., 2009; Phillips, 2015). The existing body of knowledge lacks a singular theoretical explanation to fully illuminate our understanding of these practices.

First, to fill this gap, a review of DT was focused on the evolution of micro-practices from 1980 to 2020 in the CVC across emerging economies. Evidence from our review analysis suggests that DT influenced the evolution of micro-practices from 1980 to 2020 throughout the periods. During the evolution periods, between 1980 and 2020, the high illiteracy rate (Foster et al., 2018; Irivwieri, 2007; Marcu, Suciu, Bălăceanu, Vulpe, & Drăgulinescu, 2020; Obidike, 2011) impeded producers to understand how DT will influence their operations and resorted to the use of non-mechanized practices even at the digital age.

Second, the review of micro-practices at various periods and the coevolution of DT demonstrated the influence evolving in the practices. The theme of this coevolution is that DT at the central point of operation, and with the high illiteracy rate of producers impeded them to adhere to modern practices from 1980 to 2000, but rather stick to their non-mechanized practices and see DT as mechanism to cut down their business practices such as wedding, manual inspection, middlemen in selling produce to conventional buyers (Kos & Kloppenburg, 2019), which have provided a source of extra income to their livelihood. Producers and stakeholders sometimes engaged in these non-mechanized practices, not because of the high illiteracy rate but the fear of DT taking over some aspect of their manual practices, which is a source of extra income to their livelihood. For instance, the third-party certification program introduced into the CVC was set to maintain standards within the CVC.

However, over the period, evidence suggests that at the core edge of DT, the program is still floundering because institutions, producers, and other stakeholders believe the certification program will render them redundant and take away some traditional practices which produce extra income to the livelihood (Hatanaka et al., 2005; Hatanaka & Busch, 2008). However, underlying this individual and management syndrome is the conformity to operational norms surrounding micro-practices in the CVC that impedes producers and regulatory institutions members mindless to adapt to changing evolution at the digital age.

In this context, the present study responds to the scholarly necessity of finding an extensive review of micro-practices within the CVC

across emerging economies. This regard contributes to the literature by drawing on DT as a coevolution mechanism driving micro-practices, particularly in emerging economies. The DT is the coevolutional tool that drove manual to digitalized practices. It illustrates how stakeholders in the commodity industry across emerging economies have not fully materialized in their micro-practices and still adhere to manual practices even in the digital age. Our case analysis also provides some practical insights to deconstruct the review underpinnings on how DT has evolved in various micro-practices over the years. While the usage of DT in CVC in recent times have attracted scholarly attention in most emerging economies, prior contributions have deficient in providing practical evidence to why at the digital age certification programs micro-practices, and other interventions within the CVC are still floundering (COSA, 2013; Kaloxylos et al., 2013), and suggest measures by which producers, institutions, and other stakeholders who oversee these interventions in the CVC learn from past.

In this regard, our study proposed concrete guidance for practitioners to conceive and implement effective, manageable solutions to the floundering micro-practices even in the digital age. DT drives and improves micro-practices. Stakeholders within the CVCs technology influence the evolution but not solely determine micro-practice evolution across emerging economies. Further, macro-policies from central governments affect the evolution of DT within the CVC in emerging economies. The most poignant part of the evolution of DT in micro-practices is the inability of stakeholders to monitor the floundering third-party certification programs. Central governments must focus on the institutionalization of DT in every production sector. This action will help enhance the production process and improve micro-practices such as the floundering third-party certification program across emerging economies. Also, due to globalization, diverse stakeholders draw on different technologies from different geographical locations to meet growing demand, and these technologies may sometimes influence evolution practices. The commodity industry needs to train its stakeholders to leverage other stakeholders' technologies in this digitalized era and be parallel to meet global competitions.

Although reviews from the third-party certification program across the emerging economies show that producers resorted to selling their products to conventional buyers for ready cash due to delays in payments of premiums, an opportunity emerges for stakeholders to monitor production and distribution processes within the CVC. With the support of DT, institutions in charge of payments can use mobile cash transfers services in payments of premiums to certified producers, to the fastest ways of paying premiums to producers in most remote areas, preventing them from selling their produce to conventional, not certified buyers. Premiums are allocated incentives for certified commodity producers to support micro-practices and their livelihood. Payment of these premiums through mobile cash transfers would help the commodity industry mired in such controversies for producers to have quick access to their premiums, which can support their livelihood and to reduce child labor (Leonard & Berlan, 2009) and other deviance vices producers in the growing areas in emerging economies.

The focus of this study has been on DT in micro-practices within the CVC from 1980 to 2020. Certifying a single commodity (Murdoch, Bond, & Anderson, 2012) in an emerging market can sometimes be a marginal solution to the larger picture (Tlusty, 2012). Therefore, the output to a single certified commodity can be minimal and can sometimes fail from the global market level when there is a price reduction. Researchers interested in global value chains could explore concerns on how certification programs can be extended to other related commodities in the emerging economies of the digital age.

DT has evolved in micro-practices from 1980 to 2020 within the CVC. Its implications for stakeholders in a fast-growing and changing sector regard the unrelenting competition to create and capture sustainable value across emerging economies. Institutionalization and maintaining the DT are not just a single sector issue that all public and private stakeholders must tackle.

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