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Digital Business Strategy's Optimisation Model for Differential Value Creation in the Digital Age

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ABSTRACT

In the age where every firm is digitizing, it is no longer digitisation that leverages a firm's competitive edge. Instead, it is the know-how of digital business strategy's optimisation which is increasingly turning into an idiosyncratic strategic value creating resource. But even if that is the case, discerning how to bolster digital business strategy's optimisation is still a paradox as most of the previous studies have been largely fascinated with digital transformation as a driver of digitisation. As this undermines how firms can discern how to optimise their digital business strategy, it is such a paradox that this paper sought to address by exploring a model for leveraging digital business strategy's optimisation as a driver of differential value creation. The paper uses interpretivist research paradigm, exploratory research design and qualitative research method to explore and socially construct the opinions of sixty-six digital business managers and IT managers from the energy and chemical sector about the approaches for digital business strategy's optimisation as well as its impact on value creation and major impediments among the multinational companies in the global energy and chemical industries. The sixty-six digital business managers and IT managers were purposively drawn from eighty multinational energy and chemical companies that are operating in South Africa, Uganda and Nigeria. Apart from investment in relevant digital technologies and digital transformation, findings revealed factors that leverage or even constrain digital business strategy's optimisation to create differential values to often arise from how the digital business strategy is crafted and utilised as well as digital skills and level of digital culture transition. Such findings contrast theories that indicated strategic levers of digital business strategy's optimisation to include scope, scalability, speed and sources of value creation of the digital business strategy. However, in conclusion, the paper proposes an alternative digital business strategy's optimisation model that executives can replicate as an idiosyncratic strategic value creating resource to leverage a firm's competitiveness in the modern complex digital age.

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1. Introduction

Digital business strategy's optimisation leverages a business' sustainable performance. In the increasingly more competitive and turbulent contemporary digital age, the know-how and level of digital business strategy's optimisation often turn into an idiosyncratic strategic value creating resource that edifies a business' sustainable performance (Prescott, 2016:92; Yoo, Boland, Lyytinen & Majchrzak, 2012:1398). Digital business strategy's optimisation connotes how a bundle of digital business technologies, skills, competencies and analytic capabilities is optimally utilised to create, deliver and capture a combination of differential values that catalyse a business' effective performance (Svahn, Mathiassen & Lindgren, 2017:239). As all major players in the digital ecosystem invest enormously in the establishment of relevant digital technologies, it is not just the investment in relevant digital technologies that create differential values. Instead, it is how the digital technologies, skills, competencies and analytical capabilities articulated in digital business strategy are seamlessly combined to create differential value that often turn into inimitable and non-substitutable strategic value creating resource. This creates points-of-difference that spawn a business' overall competitive edge (Taxal, 2018:3).

Such unique skills, competencies and capabilities aid unique optimisation of all forms of digital business technologies as well as machine learning, artificial intelligence, digital sensors, big data analytics, web analytics, marketing-mix modelling, heuristics and attribution modelling to create largely inimitable, non-substitutable and heterogeneous strategic digital value creating resource that a business has at its disposal (Prescott, 2014:573). Persistent seamless usage of a bundle of such digital resources may also over time spawn emergence of inimitable capabilities to optimise reprogrammability, data homogeneity and self-inferential capabilities of digital innovation technologies. These can enable a firm create enormous attractive novel products, services and business processes that can restructure the entire digital ecosystem to a firm's advantage (Lyytinen, Yoo & Boland, 2016:47).

However, inspite significant strides in the implementation of digital business strategy and transformation among certain businesses, empirical facts signify there are still complexities with the know-how and level of digital business strategy's optimisation. Inadequate internal capabilities as caused by insufficient skills, experience and expertise as well as acute shortage of data scientists in Africa and across the global digital ecosystem has forced some of the businesses to outsource their digital analytics architectures to external service providers (Teradata, 2018:2). Thus, with data scientists from contracted companies lacking insights on the details of a firm's internal physical and digital operations, it undermines high level of digital technologies' optimisation to discern immediate performance improvement initiatives that must be undertaken in certain problem areas (Teradata, 2018:2).

In the energy and chemical sector, these are further exacerbated by lack of investment in relevant digital technologies to track and improve the safety and health of pipelines, mining operations and chemical manufacturing that often undermine consistency of the vision to create, deliver and capture socially, economically and environmentally sustainable differential values (Blomberg, 2021:2; Reynolds, 2020:2). Other constraints often arise from limited capabilities to optimise the existing digital business technologies to reshape the existing digital energy and chemical ecosystem to each of the firm's advantages (Africa Insight, 2020:2). Combined with poor digital business strategy/business model alignment (Sasol, 2021:6), it is a multitude of such complexities that this paper sought to address by exploring a model for leveraging digital business strategy's optimisation as a driver of differential value creation in the modern complex digital age. But even if that is the case, the study is also influenced by epistemological trends on digital business management that have not offered significant

insights on how digital business strategy's optimisation can be improved among industry operators (Khan & Karodia, 2013:10; Moodley, 2019:5; Mhlungu, Chen & Alkema, 2019:a995; Lekhanya, 2015:37).

Most studies in Africa and across the globe offer critical inputs on digital business strategy development as well as digital business transformation but without much insights into the approaches on how such digital systems can be efficiently and effectively optimised to create, deliver and capture the desired differential values (Khan & Karodia, 2013:10; Moodley, 2019:5; Priyono, Moin & Putri, 2020:104; Mhlungu *et al.* 2019:a995; Lekhanya, 2015:37). Thus, it is in that context that this research sought to explore the approaches and level of digital business strategy's optimisation as a driver of differential value creation among the multinational firms in the energy and chemical sector. Through such analysis, the study aims to identify the major complexities and extract the remedial digital business strategy's optimisation model that can be replicated to create the desired differential values in the increasingly more competitive and turbulent digital age. In otherwords, the notion that digital business strategy's optimisation edifies differential value creation to catalyse a firm's sustainable competitive edge is well accentuated in the literature and theories on digital business management.

2. Literature Review

Digital business strategy is a strategic process of leveraging digital technologies and resources in organisational strategy's creation and execution to create, deliver and capture significant differential values. Degree of digital technologies' leverage may vary across businesses to equally reflect varying differential results often obtained by different businesses (Kingsnorth, 2016:5). Digital business strategy's optimisation is the maximum utilisation of the existing digital technologies at all levels and structures to leverage efficiency and effectiveness of the existing operational processes and business models to create as much desired differential values as possible. It is the highest degree to which a business coherently utilises the existing digital technologies in its operational processes and business model to create, deliver and capture differential value. Level of digital business strategy's optimisation may therefore either catalyse or even constrain a business' overall superior market performance.

Porter and Heppelmann (2015:96) reveal the level of business strategy optimisation to arise from whether or not business executives and leaders recognise digital technologies not just as a functional IT strategy, but as a unique resource pervasively integrated to leverage efficiency of the other related functions like operation, marketing, procurement, human resource and supply chain management. It requires recognition and valuing of digital systems and technologies not just as an IT strategy, but as a unique, inimitable and irreplicable strategic value creating resource that creates significant differential values to transform a business' overall performance. Digital technologies available at a firm's disposal are therefore part of its strategic value creating resources. Such reasoning echoes Barney's (1991) resource-based theory that since firms are heterogeneous, each can use its inimitable and irreplicable heterogeneous resources constituting of unique assets, capabilities and competencies to create differential value that delivers enormous superior competitive advantages. Digital technologies' recognition as a strategic value creating resource elevates IT usage from just as efficiency and productivity enhancing initiative to a critical driver of strategic differentiation that creates and sustains a business' competitive edge.

But Weill and Woerner (2013:70) caution that high level of digital technologies' optimisation as a strategic value creating resource requires the creation and usage of a suitable and compatible digital business model. Digital business model is a set of complementary digital

tactics and strategies that isolate critical value proposition, interlinked networks, costs, revenue-generating sources and other differentiators to create, deliver and capture enormous business' differential value. Efficient and effective creation of such compelling value propositions is often aided by certain three complementary components of a digital business model. Such components are content, experience and platform (Weill & Woerner, 2013:70).

Content constitutes of the actual products or services that a business deals in as well as the complementary information about such products or services and how online customers can go about purchasing them. Experience focuses on triggering online customer touchpoints to delight customers by offering easily usable and navigable online systems, shopping carts, payment options and messaging systems for payment acknowledgements, delivery alerts, tracking and after-sale online customer care (Westerlund, Leminen & Rajahonka, 2014:6). Experience also seamlessly integrates with customer-generated contents reflecting sophisticated search, product rating, reviews, purchase records and tailored recommendations. Platform is a system of integrated digitised business processes, data and infrastructure that offer digital contents to customers and manage actual physical products' delivery to customers. It constitutes of internal and external systems.

Weill and Woerner (2013:70) herald internal system of platform to manage product display, customer data and critical business processes like customer analytics, merchandising, accounts, finance and human resource. External system of platform manages phones, tablets and computers that various customers utilise in product search and purchase. It also coherently integrates with telecommunication networks that customers use and delivery partner businesses that convey physical products to customers and generate delivery text messages. Westerlund *et al.* (2014:6) highlight external system to seamlessly integrate with a digital business' internal system to create a platform that create and deliver delighting content and experience to customers. However, to gain the desired economies of scale, Kingsnorth (2016:5) emphasises that such a platform must cut across all the business divisions, departments and units to mitigate risks of emergence of silos and fragmented platforms and systems. In addition to that, different theories and literature offer different insights reflecting a combination of different antecedents for digital business strategy's optimisation.

3. Antecedents for Digital Business Strategy's Optimisation

Theories and literature imply the critical antecedents for digital business strategy's optimisation are often reflected in models for digital business transformation, digital business strategy's alignment with business model and strategic levers for digital business strategy's optimisation (Wolfgang & Schmid, 2020:985; Horlacher & Hess, 2016:5126; Taran, Nielsen, Montemari, Thomsen & Paolone, 2016:492). As digital business transformation is undertaken and aligned with business model, it creates favourable conditions for the four strategic levers reflecting a combination of different tactics to be applied to optimise digital technologies to create, deliver and capture as much values as possible.

3.1. Digital Business Transformation

Digital business transformation is one of the strategies that create the digital foundation for leveraging digital business strategy's optimisation. Digital business transformation is the process of investing in the required digital technologies and making relevant structural changes as well as changes of practices, culture and behaviours to support seamless transition from analog-based business approach to a fully-fledged digital business system (Becker, Schmid & Botzkowski, 2018:4534). It soothes changes and transformation that create a favourable

platform for digital business strategy implementation as well as its subsequent optimisation in different value creation activities. To achieve full scale digital transformation and its optimisation, Wolfgang and Schmid (2020:985) propose that business executives must use certain four critical steps. The four steps are development of a digital business strategy that recognises strategic role of digital technologies in value creation, digital technologies' integration in value addition and creation, digital business strategy's alignment with structural changes and modifications and investment of sufficient digital business resources. Wolfgang and Schmid (2020:985) elaborate development of a digital business strategy that recognises strategic role of digital technologies in value creation to require critical evaluation of how the existing digital technologies can be optimised to spawn a business' overall effective performance. It demands not just discerning how such digital technologies can be used to spawn operational efficiency, but also to create enormous desired differential values.

Combined with leveraged operational efficiency, Becker *et al.* (2018:4534) note such differential values to often manifest in the creation of superior products or services as well as the associated elevated customer service quality. In turn, this creates inimitable and sustainable competitive advantages. However, Wolfgang and Schmid (2020:985) stress that evaluation of the strategic role of digital technologies also requires analysis of how digital technologies already at a business' disposal can be optimised and integrated with the unfolding new technologies assimilated from the market to sustainably create more differential values. As Ganguly (2015:5) notes, this aids a business' capabilities to optimise its existing technologies to create inimitable values whilst at the sametime also countering and diffusing emerging new disruptive threats. In such quests, businesses can also depending on available resources, create their own digital technologies to suit their unique needs or can invest in digital technologies already prevailing in the digital market and ecosystem.

But whether the business develops its own digital technologies or purchases from the digital market, Wolfgang and Schmid (2020:985) emphasise that recognition of strategic digital technologies' roles in value creation must be accompanied with digital technologies' integration in value addition and creation processes. It requires digitalisation of a business' entire value chain processes ranging from sourcing inputs, manufacturing, storage, marketing and delivery of finished products to the market. To identify new value creation points, critical evaluation and questions must be asked on the new values that the new digitalized value chain can offer as contrasted to the relegated traditional and analogue-based classical value chain system. Such analysis enhances identification of new points-of-difference and values that can be created using the newly digitalised value chain system (Sebastian, Mocker, Ross, Moloney, Beath & Fonstad. 2017:197). Value chain digitisation must also be accompanied with transition from classical physical products to usage of smart products and data.

With digital technologies' values significantly recognised in digital business strategy and integrated in value chain, Wolfgang and Schmid (2020:985) also highlight the essence for digital business strategy's alignment with structural changes and modifications. Such initiative requires structural changes and modifications to digitalise every structure and processes of the business. It demands integration of digital technologies from corporate management level to divisions, functional departments and units that deal with inter alia operation, manufacturing, human resource, accounts and finance, marketing, procurement and logistics and public relation management.

Structural change, modifications and alignment with digital business strategy as Matt, Hess and Benlian (2015:339) insinuate must be accompanied with change and transformation of organisational culture, practices and behaviours to seamlessly support analogue-digitalisation transition. This implies all decisions and strategic actions that a business applies must be

informed by the outcomes of data analytics accomplished using a combination of different digital or data analytics' technologies. However, just like Wolfgang and Schmid (2020:985), Horlacher and Hess (2016:5126) also argues that successful digital transformation and its later optimisation in all aspects of a business depend on the level of investment in digital business resources. Investment requires not only commitment of sufficient financial resources in the establishment of relevant digital technologies, but also in human resources.

Improved human resource capabilities through re-training and re-skilling of the existing employees as well as recruitment of external unique digital skills bolster transformation and optimisation of the established digital technologies. It spurs not only digital technologies' utilisation in relevant business processes, but also optimisation of digital technologies to accomplish the required data analytics (Horlacher & Hess, 2016:5126). Data analytics' prowess across all departments enables business leaders at all levels to internalize the unfolding data to discern a business' capabilities vis-à-vis the trends emerging from its external digital ecosystem. This aids coherent coordination of decision and action on how the existing digital business strategy can be modified or repositioned to thwart threats whilst also responding to the unfolding opportunities (Horlacher & Hess, 2016:5126). Yet, as digitalisation cascades across the organisation, theories imply digital business strategy must also be aligned with the overall business model to further bolster its optimisation level (Amshoff, Dulme, Echterfeld & Gausemeier, 2015:10).

3.2. Digital Business Strategy/Business Model Alignment

Digital business strategy's alignment with business model is the other antecedent for leveraging the degree of digital business strategy's optimisation. Amshoff *et al.*'s (2015:10) posit digital business strategy's alignment with business model to edify attainment of the overall critical goals and objectives outlined in the business model. Business model connotes a plan detailing the process for successful business operation as well as revenue sources, intended customer base, products and mechanisms of financing a business operation in the context of the prevailing environment (Matt, Hess & Benlian, 2015:339). Business model often emerges from practices that have proved overtime as critical for leveraging successful business performance. It defines how an enterprise creates, delivers and captures value to respond to its market needs in the given economic, social, cultural and technological context (Matt *et al.* 2015:339). But due to its usage over a long period of time, Amshoff *et al.* (2015:10) caution that unless modified, well-established but incompatible business models can often hinder digital business strategy's optimisation. Such incompatibilities create situations where digital business strategy is not optimised to support business model and a business model is also not used to support digital business strategy. As Amshoff *et al.* (2015:10) note, this reduces the values that each of them is able to induce to spawn a business' overall market proficiency. Mitigation of such incompatibilities requires thorough analysis during conceptualisation of digital business strategy to ensure that it is aligned with the business model (Taran *et al.* 2016:492).

Likewise, introduction of digital business strategy also requires a business model's modification to ensure that it is supported by digital business strategy in the way it creates, delivers and captures value in the context of the unfolding market and industry trends. Due to capabilities of digital technologies to gather data and offer insights on the unfolding business trends, Taran *et al.* (2016:492) argue that this bolsters executives' capabilities to read the industry and market situation to proactively modify their business models to counter the impending threats. Digital business strategy's alignment with business model enhances optimisation of the available digital technologies to create and deliver novel value that improves the overall effectiveness of the business model being used to create as enormous

differential value as possible. However, even if that is the case, Giovana and Ariel (2018:338) still highlight that digital business strategy's alignment with business model may require realignment of the critical business model's components with digital business strategy. They reveal such components to include company's strategy, articulation, value proposition, resources, client-business interface, value network, target market segment, business processes, business structure, cost management strategies, human resource approaches and profit formula.

To attain desired business outcomes, Giovana and Ariel (2018:338) state that all these components must be aligned with digital business strategy. Such alignment bolsters capabilities of the business model in place to create and deliver simpler, convenient and more affordable products and services to respond the modern market needs and counter threats of the increasingly technology abreast and efficient competitors. However, Tongur and Engwall (2014:525) point out that achievement of such desired business values are often not only predicted by digital business strategy's alignment with business model. Instead, it also depends on how such alignment is blended with deployment of the requisite competencies like strategic skills as well as skills to create and deliver new disruptive products and services and to seamlessly make coherent changes in partner networks. Yet, besides digital business strategy's alignment with business model, Bharadwaj, Elsawy, Pavlou and Venkatraman (2013:471) also highlight the level of digital business strategy's optimisation to be influenced by certain strategic levers for digital business strategy's optimisation.

3.3. Strategic Levers for Digital Business Strategy's Optimisation

In a view supported by Porter and Heppelmann (2015:96), Kingsnorth (2016:9) and Rachinger, Rauter, Muller, Vorraber & Schirgi (2019:1143), Bharadwaj *et al.* (2013:471) state that there are four strategic levers that must be integrated in any digital business strategy to leverage its overall level of optimisation. The four strategic levers are scope, scalability and speed of digital business strategy as well as sources for business value creation and capture in a digital business strategy.

3.3.1. Strategic Lever 1: Scope of Digital Business Strategy

Scope of digital business strategy aids analysis and linking of the business to relevant digital technologies, IT infrastructure, industries and external digital ecosystem as well as how digital business strategy can be effectively used in the context of the unfolding trends in the digital business ecosystem (Bharadwaj *et al.*, 2013:471). Creation of such a situation requires scope of digital business strategy to be crafted to transcend traditional functional and process silos. This enhances coherent integration of traditional functional divisions or departments like marketing, procurement, logistics, operation and IT to create, deliver and capture values that transform a business' performance. Such a view echoes Weill and Woerner's (2013:70) argument that capabilities of digital technologies to cut across the business' divisions and functional departments leverage digital business strategy's maximum optimisation.

However, Rachinger et *al.* (2019:1143) emphasise that quests must also be undertaken to ensure the digital business strategy's scope also integrates product and service digitisation as well as their associated information. This catalyses digitalisation of all aspects of the business to edify optimum utilisation of the digital business strategy put in place. It enhances the utilisation of technologies for big data and data analytics to conceptualise, create and deliver existing product modifications with new features or even completely new products that enable a business attain superior performance to respond to its digital business strategy's goals and objectives. Yet, as product and service digitisation are undertaken, Porter and Heppelmann (2015:96) note that scope of digital business strategy is also defined by the extent to which it

traverses across and beyond firm boundaries and supply chains to dynamic ecosystems that also transcend the traditional industry boundaries.

Porter and Heppelmann attribute this to the fact that digital business strategy is conceptualised, developed and executed in the context of a business internal and external ecosystems' dynamics. Thus, digital business strategy must not only be aligned with a business' internal digital systems and operations, but also with the dynamics unfolding in its external digital ecosystem. Such external digital ecosystem often constitutes of intertwined unfolding waves of existing and new alliances, partners, competitors and array of digital technologies that either pose threats or create new opportunities. Hence, alignment of digital business strategy with the external digital ecosystem is therefore noted by Porter and Heppelmann (2015:96) to be critical for discerning how the existing digital technologies can be optimised to maximise such opportunities whilst also countering the emerging threats. Such capabilities spur successful digital business strategy's implementation. But Bharadwaj *et al.* (2013:471) still argue that development of digital business strategy's scope that aid optimisation of the existing as well as new digital technologies must also be integrated with scalability as another complementary strategic lever for digital business strategy's optimisation.

3.3.2. Strategic Lever 2: Scalability of Business Strategy

Scalability of digital business strategy refers to the extent to which it can easily be changed or modified to accomplish a range of activities to achieve as an array of different desired values as possible. McAfee, Bonnet and Westerman (2014:5) explain scalability of digital business strategy to be measured by how it easily enhances rapid digital scale up or down as a strategic dynamic capability. Such scalability requires digital business strategy to integrate easily scalable digital technologies like cloud computing to attain strategic dynamic capability for a business to easily scale up or down its infrastructure. Cloud computing infrastructure does not only facilitate linkage with a pool of configurable computing resources, but it is also hinged on on-demand self-service, virtualized resources, rapid and elastic resource utilisation, broad network access and measured quality of services. Cloud computing supports a wide range of a business' functional activities. And thus, McAfee *et al.* (2014:5) elaborate that fusion of digital infrastructure with digital business strategy leverages scalability to bolster a business' strategic dynamic capability to adapt to the digital marketplace dynamics.

Besides such strategic dynamic capability, Farrington and Alizadeh (2017:24) also note scalability to be determined by how the digital business strategy permits optimisation of relevant digital technologies to evaluate network effects of different digitalised activities. Network effects often arise when product or service value increase as more customers utilise intertwined digital platforms like e-mail, social media and buy-sell exchanges to consume more of such products or services. Alternatively, network effects may also emerge as more supply-side partners augment their services. Hence, Farrington and Alizadeh argue that digital business strategy's scalability is measured by how it enhances optimisation of such network effects as differentiators and drivers of value creation as more products and services get digitally connected.

At the same time, Scott (2011:5) reveals that scalability of digital business strategy does not only depend on investment in relevant digital platforms intertwined with broadband networks, cloud computing and billions of smart-end users. Instead it also depends on how digital business strategy clarifies strategic actions for internalizing and interpreting the abundance of the unfolding information to develop new ways of creating, delivering and capturing value. Scott (2011:5) states that such capabilities would require utilisation of relevant data analytics and big data technologies to analyse and understand trends in data so as to discern how to further improve a business' performance. Scalability of digital business strategy is also

catalysed by the degree to which executives recognise the need to digitally link and collaborate with alliances and partners in the digital ecosystem to bolster their performance in the areas where they have less competitive advantage. Bharadwaj *et al.* (2013:471) states in a view which is also accentuated by Pagani (2013:617) that scalability of digital business strategy must be accompanied with speed of digital business strategy as the other strategic lever that leverages the level digital technologies' optimisation.

3.3.3. Strategic Lever 3: Speed of Digital Business Strategy

Pagani (2013:617) explains that speed of digital business strategy edifies a business' capabilities to achieve its designated digital business strategy outcomes. Speed of digital business strategy must leverage the pace and fastness of new product's development and introduction into the market to bolster attainment of first-mover advantage. Pagani (2013:617) reveals that speed of digital business strategy is influenced by the overall efficiency and digital production technologies put in place. It is also edified by the prowess of the digital marketing technologies. Bharadwaj *et al.* (2013:471) attribute such situation to the efficiency and fastness of digital production technologies as combined with efficient digital marketing technologies to edify faster product's manufacturing and introduction in the market. Digital technologies influences coordination of product launches across different platforms. As this is catalysed by efficiency of digital marketing technologies, it leverages faster diffusion of the new products into the market and subsequently leverage of the speed of digital business strategy to achieve the desired digital business outcomes. However, Mithas, Tafti and Mitchell (2016:511) caution that attainment of such leveraged capabilities and digital technologies' optimisation would require improvement of the functionality of digital technologies. It also demands development and use of multiyear sequenced product roadmap to remain competitive. Mithas *et al.* (2016:511) further reveal that speed of digital business strategy is also influenced by how digital technologies have been programmed to gather, mine, analyse and present structured meaningful information. Such structured information influences speed of decision-making on the immediate strategic actions that can be undertaken to deal with identified market or industry eventualities.

Optimisation of digital technologies does not only imply investment in relevant technologies, but also how the collected data is analysed and interpreted to make meaningful decisions. But Arnold, Kiel and Voigt (2016:10) note that speed of decision-making is not only determined by speed of the top executives to make relevant decisions. Instead, it is also influenced by the empowerment of the executives and managers of all functional departments and units to internalize the unfolding digital information and make relevant operational changes that are critical for leveraging effective performance of their individual departments. This enhances vertical and horizontal concerted efforts of the managers at all levels to ensure delivery of the outcomes outlined in the digital business strategy. At the sametime, Savastano, Amendola, Bellini and D'Ascenzo (2019:891) also highlight that speed of digital business strategy is also measured by the business' realtime fastness to respond and deliver to customer requests using relevant digital platforms.

To achieve this, they explain most digital businesses have been utilising different social media platforms as well as optimising relevant multifunction and integrative command centres to organise and streamline information flows across the internal and external platforms. Such initiative leverages capabilities to sense and respond to market trends' changes in a way which is quite faster than before. Savastano *et al.* (2019:891) further note that speedy and faster response to market trends' changes also require improvement of the speed of supply chain orchestration as well as speed of network formation and adaptation. But Bharadwaj *et al.* (2013:471) further emphasise that in addition to speed of digital business strategy, sources of

value creation and capture must also be identified and activitated as part of the levers for digital business strategy's optimisation.

3.3.4. Strategic Lever 4: Sources of Value Creation and Capture

Bharadwaj *et al.*'s (2013:471) views are echoed in Parida, Sjcodin and Reim (2019:6) reasoning that identification and activation of the sources of value creation and capture bolster the translation of digital business strategy into the desired digital business outcomes. However, achievement of such outcomes requires high level of digital technologies' optimisation to reshape the traditional business models of value creation and capture. It demands the utilisation of the abundant information to analyse and discern sources of value creation and capture. Parida *et al.* (2019:6) explain that an avalanche of unfolding digital information must be analysed to identify the sources of value creation and capture that are often latent in product features, attributes, core functions and service quality elements preferred by customers. Other sources of value creation often reside in intangible assets like technology, innovation, intellectual property, alliances, management capabilities, human resource management, customer relationship management and brand value. Majchrzak, Markus and Wareham (2016:267) state that isolation of these sources of value creation and capture bolsters identification of areas where digital technologies' optimisation efforts must be directed to extract, create and capture as much values as possible. Attributable to that is that digitisation has leveraged democratisation of contents as well as resharing, remixing, redistribution and resyndication of contents in newer and more useful forms. As Majchrzak *et al.* (2016:267) note, this enables digital businesses to easily discern what customers want, what they are thinking and what they will want in the future. On the otherhand, Butschan, Heidenreich, Weber and Kraemer (2019:195) suggest that optimisation of digital business strategy to identify the sources of value creation and capture may require the use of multisided and multilayered business model.

In multisided and multilayered business model, they elaborate that two or more different customer groups are identified and after interacting with them, products are designed and delivered in a way that connects the two or more groups. This improves the creation and capture of value from different dimensions of the digital business. Butschan *et al.* (2019:195) also reiterate that sources of value creation and capture in a digital business often reflect the coordinated business models in the networks of critical partners. Coordinated business models in the networks of partners in the internal and external digital ecosystem often offers critical insights on product design vis-à-vis unfolding market needs and the process of delivering them to the market. Yet, as the digital business grows and becomes dominant, Fremont, Frick, Age and Osarenkhoe (2018:111) argue that intense optimisation of digital business strategy can also induce value appropriation through the control of digital industry architecture.

Digital industry architecture constitutes of partners, intermediaries and end-users. Reshaping of the digital industry architecture therefore permits digital businesses to earn profits not only from the sale of their products, but also from the share of revenues earned by partners and intermediaries in the digital industry chain. Fremont *et al.* (2018:111) link such approach to Apple's digital business strategy where it has been able to reshape the digital industry architecture to earn profits not just from the sale of its iPhone and iOS, but also from the share of the revenues earned from end-users by its partner telecom carriers. In otherwords, these antecedents for digital business strategy's optimisation imply as digital business transformation is undertaken and aligned with business model, it creates favourable conditions for the four strategic levers reflecting a combination of different tactics to be applied to optimise digital technologies to create, deliver and capture as much differential values as possible. Yet, as optimisation of digital business strategy aids achievement of such outcomes, theories also

indicate that its desired effects on leveraging a business performance have often been quite enormous.

4. Digital Business Strategy's Optimisation and Differential Value Creation

Digital business strategy's optimisation leverages a business' capability to perform relatively better than the competitors. As compared to businesses that have not embraced digitalisation, digital businesses tend to have wider market outreach (Yoo *et al.* 2012:1398). This improves a business' capabilities to reach all aspects of the targeted market segment with their products. Optimisation of digital business strategy also aids a business' prowess to counter competitors that have embraced digitisation. Countering competitors that have embraced digitisation with digitisation implies the points-of-difference offering competitive edge to rivals may therefore tend to shift to other areas (Yoo *et al.* 2012:1398). Yet, as digitisation spawns such capabilities, it also tends to be critical for other eventualities that can disrupt a business' performance. Optimisation of digital business strategy enables a business counter threats of climate changes that can cut the business off from customers (Dougherty & Dunne, 2012:1467). Like the recent Texas hailstorms and winter that cut off a lot of Texas' businesses from their customers, optimisation of business digital strategy tends to offer alternative digital means for reaching customers as well as for customers to reach businesses.

In otherwords, with the increasing global warming, optimisation of digital business strategy guarantees the uninterrupted operation of the business even in the event of acute climate changes in certain markets. But even if such acute climate conditions does not arise, digital business strategy's optimisation has been found by Papadopoulos, Baltas and Balta (2020:102) and Pedersen and Ritter (2020:17) to respond to market needs during the pandemic like Covid-19 that locked customers in their homes and cut them off from accessing businesses. In such situations, Papadopoulos *et al.* (2020:102) reveal that businesses that had adopted high level of digital business strategy's optimisation were and are still able to operate uninterrupted. As governments across the world engaged in on and off lockdown to contain the virus, businesses with high level of digital business strategy's optimisation were still able to reach their customers.

As digital businesses engage in such practices, Pedersen and Ritter (2020:17) state that they were able to attract sales and increase their customer base by attracting customers from undigitised businesses to consistently or even increase their level of profitability during the pandemic. With Covid-19 pandemic still anticipated to persist, Mckinsey (2020:2) share similar views with Priyono, Moin and Putri (2020:104) that digital business strategy's optimisation is so far the best way forward for businesses to maintain consistent performance. Mckinsey further reiterates that this is further exacerbated by the fact that fear among businesses of the Covid-19 lockdowns as well as customers' fear of the contagious nature of Covid-19 virus are increasingly shifting all businesses as well as customers to the web. Since this implies enormous opportunities are shifting from the physical market place to the digital ecosystem, it is only businesses with high level of digital business strategy's optimisation that are most likely to gain.

In otherwords, Pedersen and Ritter (2020:17) posit digital business strategy's optimisation to leverage businesses' innovativeness to operate multi-and-layered business models with resilience to overcome any form of threats and eventualities. Such reasoning accentuates Prescott's (2014:573) argument that high level of digital business strategy's optimisation often induce high level of innovativeness that enable businesses develop not only new products and services, but also processes to seamlessly operate even in the midst of turbulence. All these induce outcomes that respond to key performance metrics like increased responsiveness to

market needs, customer base, sales, market share, revenue and profitability that in turn improves on a firm's overall financial bottom-line. But even if these processes in digital innovation illustrate how digital business strategy can be optimised to sustainably leverage a business' performance, other authors also note that digital business strategy's optimisation spawns digital marketing prowess. Through high level of digital business strategy's optimisation, businesses are able to use a combination of digital marketing technologies like Web Analytics, marketing-mix modelling (MMM), heuristics (reach, cost and quality-RCO) and attribution modelling to gather and analyse customer information. This aids discerning how the market can be approached with the available products and services.

Bhandari, Singer and Der Scheer (2014:5) also state that while using high level of digital business strategy's optimisation, digital marketing experts are often able to use multiple channels, customer journeys, new data sources, realtime analytics and predictive models. This leverages a business' near realtime response, audience segmentation, personalizing experience and use of programmatic advertising. It also improves quality of decisions on new products or services that must be created and delivered to the market. In turn, it improves a firm's precisive response to its customers' needs and subsequently catalysation of a business' overall effective performance. Certainly, all these imply digital business strategy's optimisation spawns differential value creation and a business' overall effective performance. Unfortunately, even if that is the case, questions still remain unanswered as to the appropriate digital business strategy's optimisation model that firms can replicate in such endeavours. Thus, as indicated in the methodology, it is such questions that this paper sought to address.

5. Methodology

To diagnose and understand the nature and all the dimensions of the complexities of digital business strategy's optimisation from the perspectives of the actual users of different digital technologies in the energy and chemical industries, the study uses interpretivist ontology. Interpretivist ontology is an epistemological process of knowledge generation that focuses on collecting and analysing data from its natural settings in order to make social construction and logical conclusions about the phenomenon being investigated (Gill, Johnson & Clark, 2016:19). Usage of interpretivist ontology was accompanied with the application of the exploratory research design to analyse, explore, discover and identify all the facets of the complexities of digital business strategy's optimisation among the firms in the global energy and chemical industries. To analyse and explore answers to questions as to why, what, when and how of the complexities emerging from the designated energy and chemical companies' digital business strategy's optimisation, usage of exploratory research design was integrated with qualitative interviews as the principal research method. Qualitative interviews were used as the principal primary data collection method to elicit the desired information from sixty-six participants that constituted of digital business managers and IT managers that were purposively drawn from eighty multinational companies that are operating in the energy and chemical industries in South Africa, Uganda and Nigeria. Each of the sixty-six sample digital business managers and IT managers was subjected to semi-structured interviews that were based on the Interview Research Instrument that examined the approaches for digital business strategy's optimisation as well as its impact on differential value creation and major impediments among the multinational companies in the energy and chemical industries. Combined with the measures for enhancing credibility and trustworthiness of the study, the emerging qualitative interview data was analysed using thematic and narrative analysis and below are the overall findings of the study.

6. Findings

Apart from investment in relevant digital technologies, most managers' narratives revealed factors that leverage or can even constrain digital business strategy's optimisation to create differential values that spawn a firm's competitive edge to often arise from how the digital business strategy is crafted as well as digital skills and digital culture transition. Details of these themes and their accompanying subthemes and narratives are evaluated as follows.

6.1. Digital Business Strategy

Clearly crafted business strategy emerged from the findings as one of the strategies for enhancing digital business strategy's optimisation. Clearly crafted digital business strategy was reiterated to aid discerning the critical actions that must be undertaken to optimally utilise the available digital technologies to attain the desired competitive edge. Unfortunately, even if that is the case, findings still revealed some of the energy and chemical companies to not only have poorly crafted digital business strategies, but also to lack such a strategy. Yet, with less effective digital business strategy in place, participants noted it is difficult to discern how the available and new digital technologies can be acquired and optimised to achieve the designated digital business outcomes. Even if some of the energy and chemical companies have attained significant strides in the implementation of their digital transformation strategies, findings indicated that some of them still embraced digitisation late as compared to their competitors. Thus, timing of digitisation tends to determine the first-mover advantages that a business gains as compared to competitors that delay to do so. As compared to competitors that delay to do so, findings reiterated energy and chemical companies that have embraced digitisation for some years now to render them more experienced in digital business strategy's optimisation as compared to those that only digitised recently. Such a view is accentuated in the opinions of one the digital business managers from one of the energy and chemical companies that explained that:

> "Digitalisation is a process and in that process, timing is of essence because as new digital technologies emerge and the company embraces it as soon as possible, it influences its capabilities to gain advantages that others that adopt such technologies only at the later stages cannot gain."

Hence, some of the managers noted that timing of digitalisation influences the level of digital business strategy's optimisation. They explained that it is such poor timing that elucidates on why some of the energy and chemical companies' digital transformation and level of digital business strategy's optimisation are still in the infant stages as compared to some of their competitors that embraced digitalisation long ago. It also signifies some of the energy and chemical companies still lack the requisite digital experience to effectively optimise their cloud-based data analytics architecture and other digital technologies to reshape the existing digital ecosystem in the energy and chemical industry to their advantages. Elimination of such disadvantages will require some of the energy and chemical companies to speed up their digital transformation initiatives, investment and level of digital technologies' optimisation to maintain or even leverage their competitive edge in the digital energy and chemical space. Unfortunately, such complexities are further compounded by the outsourcing tendencies of some of the energy and chemical companies that undermine digital business strategy's optimisation. As some of the energy and chemical companies avoid investing in their own digital technologies and resources, outsourcing the management of analytical digital architecture was found to undermine effective digital business strategy's optimisation. Thus, some of the managers noted that as analytical digital architecture's outsourcing plays a more peripheral role, it must only be a short-term strategy that can enable a business develop and

build its digital analytical capabilities in the long-run. But if outsourcing is prolonged, they noted that it can constrain a business' capabilities to develop, build and nurture its own internal digital analytical architecture and capabilities to enable it attain leadership in the digital energy and chemical space. Such limited attention to developing and building internal digital analytical capabilities are reflected in the fact that as some of the businesses spend enormously on installing relevant technologies as well as digital outsourcing, only limited resources have often been committed in the development and improvement of internal capabilities through re-skilling and change and transformation of the organisational culture, practices and behaviours to leverage the level of digital business strategy's optimisation.

6.2. Digital Skills

Digital skills development through re-skilling and retraining emerged from the findings to be critical for aiding all employees at all levels to embrace, utilise and optimise different digital technologies. But attempts to undertake such initiatives have still been undermined by lack of adequate highly skilled and trained data scientists, machine learning, artificial intelligence and data analytics' experts in both the African continent and the entire global digital ecosystem. Thus, it is not just some of the Africa based energy and chemical companies that face such a challenge, but also energy and chemical business operators in highly developed markets like the United States, Germany, Australia and United Kingdom. As only a few universities in Africa and around the world have redirected their resources towards training and developing data scientists and data analytics' experts, this constrains most businesses' capabilities to recruit sufficient data science experts to impart the necessary skills through such re-skilling and re-training programmes. Yet, as some of the energy and chemical companies experience such data analytics' skills' constrains, it also tend to undermine the level of digital technologies' optimisation. The implications are that in most instances, some of the energy and chemical companies have often ended up using IT experts that are often not necessarily data scientists or data analysts. This mars capabilities of the business' enterprise information management to effectively use machine learning and artificial intelligence tools and sensors to gather, mine, analyse, interpret and advise other departments like R&D, manufacturing and marketing on the new values that must be created, delivered and captured. In otherwords, if such deficiencies persist even in the midst of the increasing volatilities in the African and global energy and chemical digital ecosystem, it is likely that their negative impacts on some of the companies' effective performance will easily be felt in the period not far from the near future. Such a view is echoed in one of the digital business managers' assertion that:

> "Our company recognises digitalisation is disrupting the oil and gas industry and thus, it is seeking to lead the digitisation journey by staying at the forefront of adopting cloud-based data analytics at scale. Failure to do that implies its maintenance of its position in the digital energy and chemical space may not be sustainable to undermine its digital space reputation and brand image. Tarnished reputation and brand image in the digital space may also affect its reputation and brand image already built in the physical energy and chemical space."

Similarly, other managers noted that outsourcing of data analytics and management of analytical digital architecture to specialist digital analytics service providers may not be sustainable in the long run. As volumes of data and information increase with time as a result of the increasing embracement of digitisation across the extensive global operations as well as their extensive networks of alliances, partners, distributors, target market segments and the general public, the contracted companies may also not have the capabilities to internalize all

the insights and comprehensive information on all areas for the energy company to take the required actions. Experts in the contracted companies may have the required data science expertise, but not detailed insights of the business' internal dynamics and complexities to identify and structure information according to highly vulnerable and the less-vulnerable areas. This may limit a business' capabilities to optimise its digital technologies to read and identify all vulnerable areas and respond accordingly. Yet, it is not only such complexities that mar a business' optimisation of its digital technologies, but also the infancy of its digital transformation as reflected in shortage of digital technologies required for it to create, deliver and capture socially, economically and environmentally sustainable values as articulated in its future value-based growth strategy. Such a view is accentuated in the fact that in a bid to further leverage their digital capabilities in all dimensions of their energy and chemical business operations, some of the companies are just contemplating investing in digital technologies that can fly drones along pipelines to monitor and transmit multiple types of sensor data for algorithms to detect pipe asset health and monitor equipment inspection. However, in such quests, findings highlighted that there is a challenge with the level of investment in predictive maintenance technologies using Internet of Things (IOT) to gather and analyse data to accurately discern ways for coherent achievement of efficient, sustainable and profitable future. Yet, as more and more energy and chemical companies enter into the digital energy and chemical space, findings indicated that it has unlocked digital war among the major players in the digital ecosystem of which each company must strive to win if it is to have a more sustainable future. But as findings revealed, it is only the energy and chemical companies that have fully transitioned into a culture that embraces digitalisation that may win such a war.

6.3. Digital Culture Transformation

In addition to poorly crafted digital business strategy, organisational cultural transformation to support digitalisation in all aspects was also found to be one of the major impediments of digital business strategy's optimisation. In such situations, complexities of digital business strategy's optimisation were reiterated to often arise from multifaceted challenges categorised as market, organisational, economic and societal challenges. Market challenges emanate from the complexities of transitioning from the traditional business models to new digital business models to respond to the increasingly digitised markets. Other market challenges are noted to be associated with the complexities of managing the effects of digitalisation on supply chains and producer-customer relationships as well as managing unintended consequences of the relocation of partner business operations to high labour cost locations around the world as a result of production processes' automation in energy and chemical industries. Such market challenges were revealed by some of the managers to mutate with certain organisational complexities to undermine effective knowledge management in businesses to develop and manage their information repositories and the information-based platforms. Such organisational problems are often characterised by poor re-organisation and re-engineering to create a new bundle of skills and resources to aid cultural transition that supports optimal utilisation of the available digital technologies. Such a finding corroborates of one the managers' narratives that:

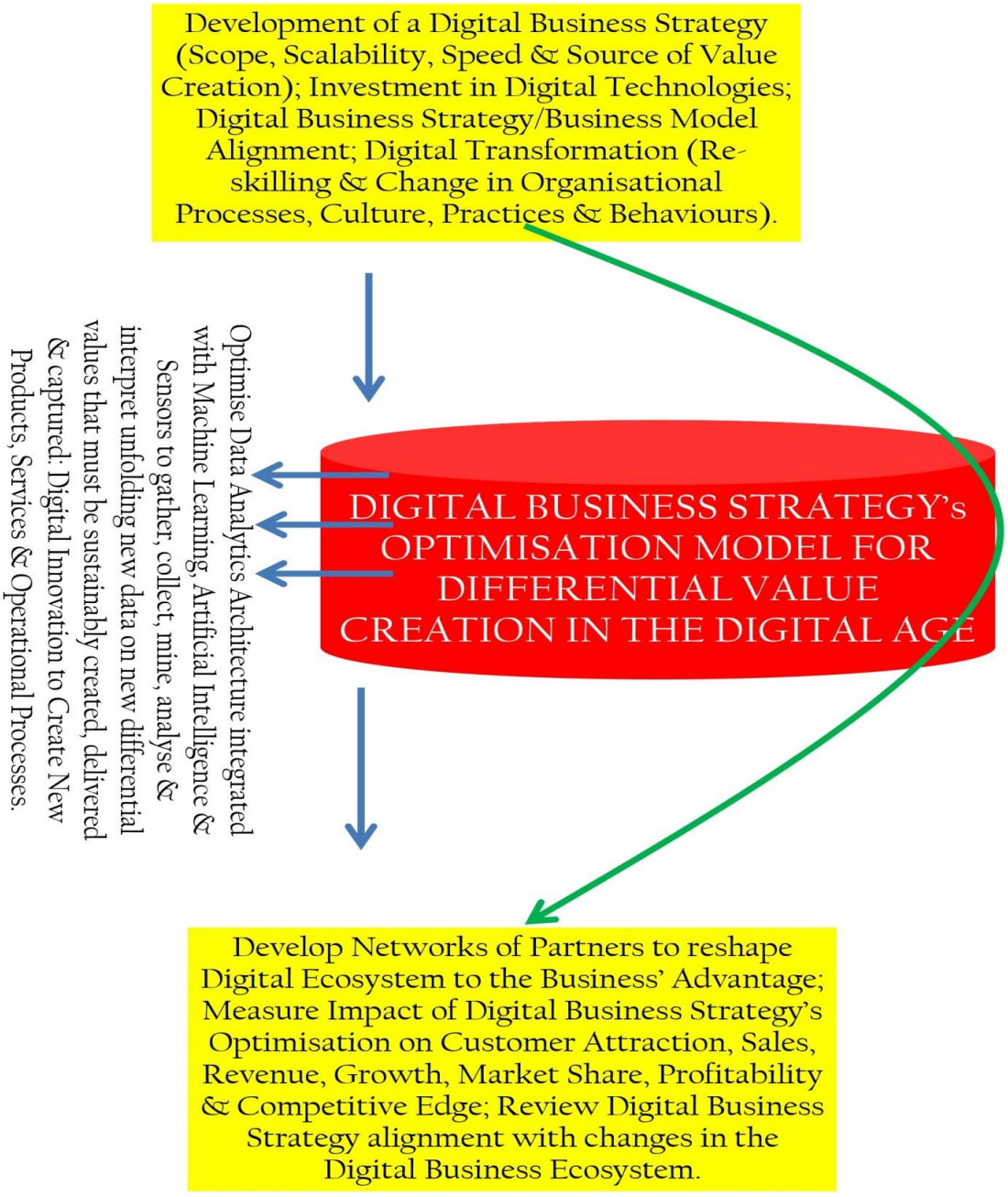
> "Low level of digital business strategy's optimisation in some businesses often arises from failure to develop and implement supportive digital practices among human resources. Failure to introduce and implement the requisite change management capabilities also combines with these factors to undermine complete transition from analog business models to completely digital business models."

It was also established that constraints of digital business strategy's optimisation are often associated with shortage of IT skills, poor organisational change management skills, constantly evolving customers' needs in the digital space and lack of defined digital business strategy. Budgetary limitations, poor data management and inherently inefficient business processes were also established as the major causes of poor digital business strategy's optimisation. Such limitations also echo other digital business managers' revelations that complexities of data analytics' technologies as well as the required technical skills undermine digital business strategy's optimisation. At the sametime, poor management of service quality in partner businesses like delivery and logistic handling companies also hamper optimisation of the available digital business platforms in most of the energy and chemical companies.

In otherwords, it evident from these narratives that apart from investment in relevant digital technologies, factors that leverage or can even constrain digital business strategy's optimisation often arise from how the digital business strategy is crafted as well as digital skills and digital culture transition.

7. Conclusion

1. Given these findings, it is argued that the adoption of the model in Figure 1 would leverage digital business strategy's optimisation to create differential value that spawns a firm's competitive edge. Basing on Barney's (1991:99) Resource-Based Theory as cited in Barney, Ketchen and Wright (2011:1299), the model in Figure 1 treats the level of digital business strategy's optimisation as an idiosyncratic resource that spurs a firm's competitive edge among its rivals. This is because in any digital ecosystem, every business with the required resources can invest in any digital technology to erode the exclusive sustainable competitive advantages associated with the possession of such technology by a particular business. However, the source of sustainable competitive advantage often arises not from the acquisition of such technologies, but from how uniquely such digital technologies are optimised in the process of creating, delivering and capturing a business' various differential values. It is on that basis that this research tows the logic in Barney's (1991:99) Resource-Based Theory to suggest that the uniqueness of how a business optimises its digital business strategy as reflected in the kinds of required skills and competencies often turns into an idiosyncratic strategic value creating resource that leverages a business' sustainable competitive advantage.



2.

Figure 1: Digital Business Strategy's Optimisation Model for Differential Value Creation in the Digital Age

3. In his seminal paper titled "Firm Resources and Sustained Competitive Advantage", Barney's (1991:99) Resource-Based Theory elaborates sustainable competitive advantage to be derived from how a firm utilises a combination of its valuable tangible and intangible resources to create values in the way that cannot easily be replicated by rivals. Such tangible strategic value creating resources are among others physical assets, land, human resources, machineries and production plants, distribution networks, proximity to resource markets, digital and IT infrastructure, logistics handling equipments and raw-materials. Valuable intangible resources include skills, expertise, experience and competencies, intellectual property, goodwill, brand image, relationship networks and strategy.

4. Capabilities of a bundle of these tangible and intangible resources to convert short-run competitive advantage to sustainable competitive advantage in the long run depend on their

heterogeneity, immobility and non-tradability. Heterogeneity, immobility and non-tradability features of such resources limit capabilities of other rivals to easily replicate such resources to undermine a firm's sustainable competitive. If such features or conditions occur, Barney reasons that such tangible or intangible resources often turn into strategic value creating resources that are neither perfectly imitable nor substitutable without great effort. Persistence of such conditions subsequently renders it possible for a bundle of such strategic value creating resources to sustain a business' above average returns.

Thus, given the capabilities of the businesses in the energy and chemical digital global ecosystem to acquire all forms of superior digital technologies, this research uses Barney's (1991:99) Resource-Based Theory in the context of the model in Figure 1 to reason that it is not just investment in superior digital technologies that will induce and sustain competitive advantage. Instead, it is conceptualised that it is how such digital technologies are utilised and optimised to create, deliver and capture the desired differential values that will distinguish a business from its rivals to create sustainable competitive advantage. That implies building capabilities must be structured around building the requisite digital skills, competencies and expertise to create superior approach and level of digital technologies' optimisation. As postulated in Figure 1, such initiatives would require integrating the process of digital business strategy's development and transformation with capabilities building and improvement in different areas of digital business operation.

In the quests to achieve that, Figure 1 highlights the essence for the development of an effective digital business strategy because later attempts to optimise ineffective digital business strategy is almost equivalent to doing almost nothing to improve a business' performance in its digital space. Thus, establishment of an effective digital business strategy must be accompanied with investment in digital technologies and digital business strategy/business model alignment. Subsequently, digital transformation entailing re-skilling and change in organisational culture, practices and behaviours must be undertaken to leverage optimisation of data analytics architecture to gather, collect, mine, analyse and interpret digital information on new different values to be sustainably created, delivered and captured.

To create further sustainable competitive advantage, it is conceptualised in Figure 1 that such capabilities must be combined with digital innovation to create new products, services and operational processes. This will create points-of-difference that are reflected not only in the unique and attractive product quality and services, but also in the quality of customer services. More capabilities' building initiatives would require development and utilisation of digital networks of partners to reshape digital ecosystem to the business' advantage. Finally, conceptualisation of digital business strategy's optimisation model in Figure 1 implies businesses must consistently measure the impact of digital business strategy's optimisation on customer attraction, sales, revenue, growth, market share and profitability. This should be accompanied with periodic review of the digital business strategy to align it with the changes emerging in the digital business ecosystem.

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