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Scaling Digital Innovation's Generativity to Re-Invent Organisational Capabilities

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Abstract: As firms in the Schumpeterian environment of creative destruction seek to creatively edge out each other, frequent organisational capabilities' re-invention tends to be a critical prerequisite for unlocking new capabilities to catalyse a business' sustainability. Given the growing importance of self-disruption as an antecedent for organisational re-invention, this empirical research explores whether improved level of the optimisation of digital innovation's generativity would leverage organisational capabilities' re-invention to counter threats in the constantly changing Schumpeterian environment of creative destruction. Using a qualitative research method, the empirical research explored the opinions of twenty-five personnel that constituted of IT and electronics engineering personnel from five innovative IT and digitally abreast organisations in Glasgow-Scotland. The Delphi method that was accomplished in five sequential focus group discussions explored the impact of the emerging digital innovation technologies not only on new digital product or service innovations, but also on organisational capabilities' re-invention. Although novel service and retail models as well as novel marketing approaches were found to emerge from the utilisation of different digital innovation technologies, major inhibitors of the optimisation of digital innovation's generativity were still found to arise from deeply embedded analog business systems or the paradox of having to digitize and respond to the needs of the yet largely analog-skewed market. To address such a challenge, this study proposes a digital organisational capabilities' re-invention model to agitate the need for most businesses to adopt digital business approaches as antecedents for leveraging the optimisation of digital innovation's generativity. This will not only aid the creation of new products or services, but also re-invention of new capabilities to bolster a firm's competitive edge. However, future research can still explore skills and competencies that are critical for digital innovation's optimisation.

Keywords: digital product innovations; digital service innovations; organisational capabilities; optimising digital innovation's generativity; organisational capabilities' re-invention

1. Introduction

As firms in the Schumpeterian environment of creative destruction scamper to engage in creative destructive activities to reshape the existing business landscape to their favour, the use of digital innovation is often one of the pivotal innovative antecedents for capabilities' reinvention. It is such capabilities' re-invention that enables firms to create new differential values to counter rivals' volatile competitive activities. Digital innovation's generativity replenishes and recreates a firm's new specific heterogeneous resources to enable it gain new

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competitive edge over rivals (Dougherty & Dunne, 2012:1467) [1]. Digital innovation connotes the process of conceptualising and applying a combination of new digital and physical inputs to extract and create novel products or services, processes, business models and structures (Iansiti & Lakhani, 2014:91) [2]. Organisational capabilities constitute of a bundle of inter-related unique and idiosyncratic approaches that exhibit the uniqueness of how a business combines and applies a combination of its tangible and intangible strategic value creating resources to achieve the intended results in the context of the unfolding industry and market conditions (Kock & Gemunden, 2016:670) [3].

In contrast, organisational capabilities' re-invention entails analysis, re-thinking and recreating how a combination of such resources, strategies, structures, processes, business models and defined practices can be applied to aid effective response to the emerging changes. It aids the recreation, modifications and replenishment of the existing strategic value creating resources, processes and business models to create the desired bundles of superior value offerings (Prescott, 2014:573) [4]. Quite often, it is during such quests that digital innovation's generativity may enhance not only the extraction of new products or services, but also novel processes and business discourses to reshape the overall level of a firm's market performance. Digital innovation's generativity aids intense analysis of the unfolding uses of digital technologies not only by customers, but also suppliers, business customers, distributors, product developers as well as the general communities of companies in a particular industry.

Through such analysis, it enhances the executives' capabilities to discern the overall unfolding patterns of digital technologies' application and usage in organisations as well as by customers (Grover & Kohli, 2013:655) [5]. This leverages the extraction and invention of novel business discourses, practices, services, products, platforms, customer experience and principles. This offers not only new differential values, but also new capabilities that induce new sources of competitive advantage. That signifies even if Teece's (2007:1319) [6] notion of "Explicating Dynamic Capabilities" seems to offer interesting insights on organisational capabilities' recreation, it still seems it is often through such processes of digital analysis and extraction of novel business concepts that digital innovation catalyses capabilities' re-invention. This enables a firm create and deliver relatively superior products/services to attain superior market performance and the desired competitive edge.

Organisational capabilities' re-invention is often instigated by the emergence of the changes and turbulence in the Schumpeterian environment of creative destruction that renders it difficult for firms to survive without recreating or modifying their existing capabilities. That signifies diagonal diagnosis of the unfolding external trends vis-à-vis a firm's internal capabilities to withstand such trends is critical for discerning the capabilities' re-invention initiatives that can be undertaken. To accomplish that, capabilities' re-invention may require the review of the exiting business approaches, models, processes, systems and resources to introduce new ones that are more responsive to the changing environment (Yoo, Boland, Lyytinen & Majchrzak, 2012:1398) [7]. It is often through such diagonal diagnosis that the application of relevant digital innovation technologies enhances relevant capabilities' re-invention to respond to the emerging turbulence. Unfortunately, with the concept of digital innovation being yet a largely novel phenomenon, its literature and theories seem to have not yet been significantly enriched to aid discerning how it leverages capabilities' re-invention. It is such epistemological gap that this research seeks to explore by evaluating how digital innovation can be optimised to aid organisational capabilities' re-invention.

2. Literature Review

High level of digital innovation technologies' optimisation leverages capabilities' re-invention to enable a business respond more effectively to the dynamics in the unfolding market changes (Bharadwaj, Sawy & Pavlou, 2013:633 [8]; Hui, 2014:5 [9]; Wirtz, Schilke & Ullrich, 2010:272 [10]).

2.1. Digital Innovation

Digital innovation utilises a combination of science, technology and business paradigms to aid the extraction and creation of new value offerings as well as new business discourses from the emerging different digital technologies' uses that are unfolding from a firm's digital technologies' ecosystem (Nambisan, Lyytinen,

Majchrzak & Song. 2017: 223) [11]. Digital innovation also influences process innovation. But the focus of digital innovation is often to leverage the extraction and development of novel product concepts or components from the existing digital data. Digital innovation strongly relies on digitisation to improve the programmability, addressability, sensibility, communicability, memorability, traceability and associability of physical products. Digital innovation is also often aided by the reprogrammability, data homogeneity and self-inferential capabilities of digital technologies (Svahn, Mathiassen & Lindgren, 2017:239) [12]. It is the reprogrammability aspect of digital technologies that edifies the effectiveness of digital innovation. Reprogrammability leverages the flexibility of the digital technology to receive and execute coded instructions to perform all forms of data analytics to achieve the desired outcomes. Reprogrammability is the epicentre of digital innovation. It permits flexibility for new coded instructions to be issued several times to perform different analysis of the same data to extract different novel concepts or ideas from the same product (Lyytinen, Yoo & Boland, 2016:47) [13]. Such capabilities are often catalysed by the digital technologies' capabilities to execute data homogenisation.

In the accomplishment of different data analytics, digital technologies leverage data homogenisation by converting all forms of analog signals or data into bits or binary numbers. It is during such a process that data homogenisation decouples analog data from its special devices to spawn the storage, transmission, processing and accessibility of digital data across all digital devices as well as platforms (Lee & Berente, 2012:1428) [14]. This renders it possible for different partners and product developers in the digital innovation's ecosystem to engage in the analysis and the development ofdifferent product layers or components from the same sets of data. It also enhances the amalgamation of data from different sources to create the desired superior value offerings. The self-inferential aspect of digital technologies constitutes of a bundle of relevant digital devices and software which are critical for accomplishing different digital innovation processes.

The notion that digital innovation's generativity edifies capabilities' re-invention is also echoed in Yoo, Henfridsson and Lyytinen's (2010:724) "Layered-Modular Architecture" [15]. To modify or to extract different components or layers from the same product, Yoo et al.'s (2010:724) "Layered-Modular Architecture" offers new insights on the types of product architectures that can be easily modified and the ones that cannot. Such two types of product architectures constitute of the integral and layered modular product architectures. Products with integral architectures cannot easily be decomposed into different components and recombined to create an integrated single product.

Such products are often associated with certain specific meanings that cannot easily be interpreted and modified to create additional components. Products with integral architectures are often stringently nested in an integral design hierarchy with overlapping specific product components. In effect, decomposition of such components may easily unpredictably affect the rest of the product's specific components (Barrett, Davidson, Prabhu & Vargo, 2015:135) [16]. In contrast, products with modular architectures are often easily modifiable. Due to their ambiguous boundaries and meanings, digital innovation can easily be undertaken to attribute additional new meanings from which new components or concepts are extracted and created.

Layered modular product architectures constitute of loose components that can easily be decomposed and recombined to create additional new features or functions. Such decomposability also renders it possible for new services or products to be integrated in the layered modular product architectures. It comprises not only of multi-layered components that are developed by different partners in the digital innovation's ecosystem, but also agnostic components that are attached to an array of meanings for further future modifications (Yoo et al. 2010: 724) [15]. As compared to the components in the integral product architectures that are often developed and manufactured by firms with specific product knowledge, in layered modular product architectures, different firms tend to hold skills and competencies that are specific for the production of each of the different layers and components. Such layers and components are often coupled and interwoven together by certain shared standards and protocols.

Despite the fact that there are certain product architectures that cannot easily be modified, the generativity of digital innovation still aids the analysis and understanding of the different product structures and layers (Marion, Meyer & Barczak, 2015:98) [17]. This enhances discerning the additional services or products that can be added as part of such a product's components. It is through such initiatives that digital innovation often unlocks a

product's new potential as well as the re-invention of a business' capabilities to reshape the existing industry and market boundaries. Digital innovation's generativity creates a new business model. It also aids the review and change of the existing new processes, structures and systems to create new capabilities that can reposition a firm to effectively maximise the emerging new opportunities.

Yet, as the business cooperates with competitors in the development of other product layers, it also leverages the acquisition of new capabilities that can be used to spawn a firm's overall effective market performance. Such a view is echoed in the fact that the use of multiple partners that are involved in the development of a product's components bolsters a firm's marketing and promotion prowess as well as distribution capabilities (Bharadway & Noble, 2016: 560) [18]. Although it emphasises the utilisation of digitisation in the quests to achieve such outcomes, in some of the cases, some of the results of digital innovations are often not necessarily also digital.

Digital innovation can influence the creation or modifications of tangible products that are not necessarily digital products. Through such initiatives, it influences the enrichment of a firm's existing portfolios of products (Simmons, Palmer & Yann, 2013: 744) [19]. Yet, as it tracks and captures the unfolding new digital technologies' usage, digital innovation may also aid proactive analysis and creation of business concepts as well as value offerings that can enable a business respond to the unfolding customer needs. It influences frequent capabilities' modifications to re-invent new capabilities that reposition the business to tap new opportunities in new ways that the competitors may not be able to easily replicate (Porter & Heppelmann, 2014: 64) [20]. It bolsters a firm's first-mover advantages into the digital space or market.

Digital innovation uses a combination of digital methodologies, infrastructure and software such as 3D printing, cloud computing, data analytics and mobile computing. In the application of such techniques, infrastructure and software, it collects and extracts valuable data and information about customers, products, services as well as the evolving digital industry practices to discern new digital values that can be created to enable a firm respond to the unfolding industry and market trends (Gagliardi, 2013: 891) [21]. Sources of such data and information often constitutes of information on the unfolding product searches, e-commerce sites, opinions from product review sites, news media, internal transactions, business websites and the emerging new usage of digital technologies (Mithas, Tafti & Mitchell, 2013:511) [22].

As it collects an array of structured and unstructured data such as images, text, GPS, RFID, metadata and event logs, digital innovation utilises big data analytics to analyse the unfolding heterogeneous and high velocity data to understand the dynamics surrounding a firm's products, services, customers, competitors, business partners and the unfolding industry and market dynamics (Prescott, 2016: 92) [23]. It is often through the analysis and extraction of such new insights that digital innovation utilises big data to aid the re-invention of the existing organisational capabilities to perform more effectively. The argument that digital innovation's generativity is not only accentuated in Yoo et al.'s (2010:724) "Layered-Modular Architecture" [15], but also in Nylen and Holmstrom's (2015:57) "Digital Innovation Strategy" [24].

To extract and create new products, services and business models from data unfolding from different sources, Nylen and Holmstrom's (2015: 57) [24]. "Digital Innovation Strategy" offers critical insights on the framework that can be used to enhance the overall effectiveness of a firm's digital innovation strategy. The model offers holistic insights on the three dimensions and five areas that are linked to such three dimensions to influence the overall effective management of digital product and service innovation. The three dimensions of digital innovation refer to a firm's product, environment and its properties.

The five areas constitute of user experience, value proposition, digital evolution scanning, skills and improvisation. The dimension of a firm's digital products is explained by the areas of user experience and value proposition. User experience emphasises the need for the extraction and creation of factors that offer significantly distinguishable level of a firm's digital products and services' usability, aesthetics and engagement. It is such high levels of the digital products and services' functionality, its attractiveness and meanings that set a firm's digital products and services apart from those of rivals (Bharadwaj, El Sawy & Pavlou, 2013:471) [25]. This leverages a firm's overall effective market performance.

Value proposition enhances the analysis and understanding of the customer base to discern the pricing

strategy that can be adopted as well as how digital products and services can be innovatively bundled to respond to the identified needs of the target market. It diagnoses how value can be created, captured and integrated in the designated digital products and services to catalyse their overall effective market performance. In contrast, the dimension of a firm's digital environment emphasises the need for constant digital evolution scanning. Constant digital evolution scanning aids the identification, extraction and utilisation of the new unfolding information on the emerging new digital devices, channels and changes in digital users' behaviours(Grover & Kohli, 2013: 655) [5].

It is through such analysis that a business is often able to stay ahead of competitors by identifying and extracting new digital products and services to respond to the changes that are unfolding in its digital markets. However, whereas the dimension of a firm's digital environment focuses on digital evolution scanning, the dimension of a firm's properties emphasises the need for the existence of the appropriate skills and competencies as well as improvisation. For a firm to successfully implement its digital innovation strategy, the properties of skills and competencies emphasise the need for the acquisition of the internal and external competencies (Grover & Kohli, 2013:655) [5].

The properties of skills and competencies also agitate for the continuous learning of the unfolding new unique properties of digital innovation technologies to not only create, but also to continuously improvethe developed digital products and services. It is also such initiatives that often leverage the improvisation and malleability of the digital innovation technologies to create significantly differentiatable value offerings. However, as Nylen and Holmstrom's (2015: 57) [24] "Digital Innovation Strategy" focuses on how digital innovation can be used to invent and re-invent product and service offerings, Prescott's (2016:92) "Concepts of Digital Data Genesis and the Knowledge Staircase" offers insights on how digital innovation can be used to modify and re-create an organisation's capabilities [23]. Using the knowledge staircase model, Prescott (2016: 92) [23] argues that digital innovation offers the sequential processes through which data is acquired and converted into information which is also subsequently transformed into knowledge that in turn gets replicated in the organisation's improved capabilities. It is such improved organisational capabilities that bolster its prowess to discern new capabilities that can be created as well as the existing capabilities that must be re-created to unlock new capabilities that offer new competitive edge.

However, to create and re-create such capabilities to unlock new capabilities that offer new competitive edge, firms have to base their decisions on accurate, complete and accessible information on its internal operations, rivals, suppliers and business partners and networks. That explains why Prescott (2016: 92) [23] emphasises that in addition to using the knowledge staircase, it is also critical for a firm to exhibit the desired superior level of digital data genesis capabilities. Digital data genesis capabilities uses "born digital" approach to measure how relevant information technologies and systems are integrated in all critical business processes at all levels and in all divisions, departments and units to aid the axiomatic acquisition and utilisation of data. As compared to the semi-automatic analog data entry processes, digital data genesis capabilities leverage the accuracy, completeness and accessibility of the gathered information as well as the accuracy of the business decisions that are drawn from such data and information. Digital data genesis capabilities do not only entail the use of technologies in data acquisition and utilisation, but also a process of creating new knowledge. Through such new knowledge, businesses are often able to invent new organisational capabilities or to re-invent the existing capabilities to bolster a firm's overall capabilities to respond to the unfolding industry and market trends (Piccoli & Ives, 2005:747 [26]; Van Der Aalst, 2011:5 [27]).

2.2. Organisational Capabilities' Re-Invention

Organisational capabilities connote a bundle of inter-related unique and idiosyncratic approaches that explains the uniqueness of how a business combines and applies a combination of its tangible and intangible resources to influence the achievement of the intended outcomes within the given unfolding industry and market conditions (Helfat, Finkelstein, Mitchel, Peteraf, Singh, Teece & Winter, 2007: 9) [28]. Capabilities reside in a firm's specific non-transferrable resources. Such resources often emerge from how a business utilises a combination of its strategic value creating resources to create the desired value offerings that can enable it

achieve its strategic motive of delivering superior market performance (Prahalad & Hamel, 1990:79) [29].

Capabilities are influenced by a firm's bundle of competencies and skills, technology as well as the underlying defined know-how, practices and culture that explain how a firm's approaches different business situations. As firms utilise a combination of such resources, capabilities often emerge from how a firm is able to apply carefully planned and designed bundle of such resources to withstand all the unfolding industry and market turbulence to achieve the desired outcomes. A firm's capabilities are also measured by the extent to which a business is able to read the unfolding industry and market trends and undertake necessary adjustments of how its strategic value creating resources are applied to avoid turbulence (Peteraf, 1993:179) [30].

The view that a firm's capabilities are derived from how it is able to apply its strategic value creating resources to achieve the desired ends is echoed in the resource-based theory. It is the fundamental argument in the resource-based theory that a firm's capabilities to achieve sustained competitive advantage reside in how it combines and applies a combination of its tangible and intangible resources. Such tangible resources may constitute of machineries, raw-materials, equipments, business infrastructure and physical locations (Piccoli & Watson, 2008:113) [31]. Intangible resources may comprise of a firm's skills, competencies, intellectual output, product formulas, established networks and technologies. Depending on the kinds of resources that a firm uses, it is often the heterogeneity and immobility of such resources that sustains a firm's competitive advantage (Barney, 1986:656) [32]. High levels of heterogeneity and immobility render such resources not only valuable, but also rare, in-imitable and non-substitutable by rivals. It is the emergence of such conditions that influences a business' capabilities to sustain its competitive advantage over rivals.

As the resources turn valueable, it also spawns a firm's capabilities to continuously conceptualise and apply its value creating strategies to achieve the intended outcomes. Degree of resources' valuability is often easily discernible in the extent to which the rents accruing from such value creating strategies significantly exceed the costs of investment in such resources (Barney, 1986:656) [32]. To sustain a firm's competitive advantage, such resources must also be rare, heterogeneous as well as non-transferrable. Whereas in-imitability measures the resources' irreplicability by rivals, non-substitutability explores rival's inability to find alternative resources that can be used to create values that are relatively similar to a firm's value offerings. Certainly, such strategic value creating resources may initially influence a firm's capabilities to sustain its competitive advantage. However, with time, intense research and innovation coupled with pragmatic industry practices' evolution and improvement may still cause the erosion ofthe competitive advantages that were derived from such resources' in-imitability and non-substitutability. Intense research and innovation in perfect market conditions tend to with time weaken the strengths of the previously heterogeneous resources (O'Reilly & Tushman, 2008:185) [33].

As the emergence of such situations threaten a firm's capabilities to sustain its competitive advantage, it therefore implies constant capabilities' replenishment and re-invention are critical for unlocking new capabilities to spawn a firm's sustainable competitiveness during all seasons of turbulence. That implies a firm's capabilities is not only measured by how it applies a bundle of the required strategic value creating resources, but also by how it constantly reads and undertakes adjustments to leverage a firm's sustainability in the midst of all the unfolding discontinuities and uncertainties (Eaterby-Smith & Prieto, 2008:235) [34]. It also measures a firm's capabilities to constantly re-invent new capabilities to bolster its overall sustainability. Organisational capabilities' re-invention connotes the process of reviewing, modifying and introducing additional business approaches that unlock new capabilities to enable a firm respond to the changing market conditions. It is a dynamic approach that focuses on analysing and tracking the unfolding market changes to discern how the existing capabilities can be modified to respond to the unfolding new market needs.

Organisational capabilities' re-invention is the process of conducting relevant trends' analysis and re-thinking how a combination of its existing resources, strategies, structures, processes, business models and defined practices can be modified to aid effective response to the emerging changes (Dosi, Nelson, & Winter, 2000: 10) [35]. Certainly, organisational capabilities' re-invention is a concept that is widely emphasised by most industry practitioners and academics. However, it seems to have not received much attention in most of the contemporary strategic management studies. In such limited research on organisational capabilities' re-invention, it is Teece's (2007:1319) notion of "Explicating Dynamic Capabilities" that came closer to exploring

how organisational capabilities' re-invention can be undertaken [6].

It is the fundamental argument in Teece's (2007:1319) notion of "Explicating Dynamic Capabilities" that constant analysis and modification of a firm's capabilities leverages its dynamic capabilities to respond to the unfolding new market and industry changes [6]. To undertake such analysis to reconfigure the existing capabilities, intense analysis of the existing data is critical for understanding the existing state of a firm's performance as well as the prevailing industry and market trends. It is during the accomplishment of such analysis that digital innovation that emphasises a strong culture of data optimisation tends to play a significant role (Pavlou & El Sawy, 2006: 198) [36]. In such initiatives, digital innovation edifies not only product innovation, but also review and modification of a business' processes and operational models to re-invent new capabilities that are critical for leveraging a firm's overall market performance. However, as firms strive to match their capabilities to the unfolding market changes, dynamic capabilities' approach emphasises the need for analysis and identification of the capabilities, routines and processes that have turned valueless that must be modified and recombined to create new sources of capabilities. This causes the invention of new capabilities that leverage a firm's overall effective responsiveness to the unfolding market changes. In such initiatives, capabilities to sense, learn and undertake the necessary reconfigurations to adapt to the emerging changes are often supported by certain three sets of foundational variables.

In the context of Teece's (2007:1319) [6] explanations, the three sets of foundational variables encompass the analytical systems that aid a firm's capabilities to learn, sense, filter, shape and calibrate the opportunities that are emerging from the unfolding market trends. Quite often, it is the investment in technologies such as business digitisation and digital innovation technologies that often catalyse such capabilities. The second set of foundational variables constitute of enterprise structures, procedures, designs and incentives for seizing opportunities. The other set of the foundational variables of dynamic capabilities constitute of the capabilities to undertake frequent alignment and re-alignment of the specific tangible and intangible assets to influence the achievement of the desired outcomes. As a firm seeks to extract and create new capabilities from such analysis, it is often such foundational variables that influence a firm's dynamic capabilities of sensing, seizing, transforming using relevant organisational and managerial processes of learning, coordinating or integrating and reconfiguration (Prescott, 2014:573) [4].

Sensing uses business intelligence system to enhance effective analysis of the internal and external environment for relevant timely responses to be undertaken to mitigate risks of turbulence that are most likely to emerge. Learning aids the acquisition and utilisation of new information to create new capabilities that spawn a firm's overall improved responsiveness to the unfolding changes. Whereas integration spurs the combining and the introduction of the undertaken structural, process and model changes into the overall organisation's operational architecture, coordination facilitates the cascading of the newly acquired knowledge through all the levels as well as divisions, departments and units of the organisation.

Routinising is the process of normalising the newly introduced changes into the daily processes of organisational activities' accomplishment. Certainly, all these imply the use of Teece's (2007:1319) [6] notion of "Explicating Dynamic Capabilities" influences analysis and organisational capabilities' re-invention to reposition the organisation to effectively respond to the unfolding market changes. However, the fact that Teece's (2007:1319) [6] notion of "Explicating Dynamic Capabilities" relies on a more analog based processes implies the accuracy of the emerging information may also cause accuracy related issues on the undertaken decisions.

Even if Teece (2007:1319) [6] emphasises the use of business intelligence system to sense the emerging threats, it seems its effectiveness can be further edified by the use of the digital innovation technologies and methodologies such as big data analytics, artificial intelligence and machine learning tools (Taxal, 2018:2) [37]. In such initiatives, digital innovation systems seem to offer more accurate holistic analysis that can act as the preface for the application of Teece's (2007:1319) [6] notion of "Explicating Dynamic Capabilities" to discern the areas of organisational capabilities that must be re-invented to reposition the business to effectively respond to the emerging changes. It isagainst that backdrop that this research explores how digital innovation technologies and methodologies can be integrated as part of the approaches for undertaking organisational

capabilities' re-invention. However, since theories on digital innovation have not yet been enriched to aid discerning how it leverages not only new product development, but also process and business model reviews and modifications, this research seeks to fill such a gap by exploring how digital innovation can be optimised to aid organisational capabilities' re-invention.

3. Methodology

Empirical research was based on a case study research design. A case study research design refers to the ontological and epistemological process of inquiry that bases the study on only a few samples against which necessary generalisations are drawn about the phenomenon being researched (Avella, 2016:305) [38].

3.1. Case Study

Since digital innovation is a relatively novel phenomenon, a case study research design was considered critical for aiding the study to focus only on the businesses that have gone significantly digital. Through such analysis, it was deciphered that the study would be able to reach relevant logical conclusions on whether digital innovation enhances organisational capabilities' re-invention. To accomplish this, the use of the case study research design was accompanied by the application of the qualitative research method. A qualitative research method often applies techniques such as observation, content analysis and interviews to aid eliciting of detailed underlying insights on the phenomenon being researched (Christensen, Johnson & Turner, 2013:13) [39].

Qualitative research method contrasts with the approach in the quantitative research method that focuses on eliciting summarised numerical information on the phenomenon being researched. Since the quantitative research method only focuses on exploring the relationship between different variables or constructs and not the underlying facets of facts that explain or describe the why and how of such relationships, this research opted for the application of the qualitative research method. This is attributable to the fact that this research seeks to explore how and why and not whether digital innovation enhances organisational capabilities' re-invention. Since the concept of digital innovation is still a novel phenomenon, the understanding of how and why digital innovation enhances organisational capabilities' re-invention is critical for determining the key steps as well as hindrances that must be addressed to leverage the optimisation of digital innovation as part of the methodologies that spawn organisational capabilities' invention.

Certainly, the literature and theories on digital innovation as well as organisational capabilities' re-invention are also still underdeveloped. Given such a gap, the application of the qualitative research method was considered to be of significant importance for accessing detailed insights that would enrich the existing theories to offer new scholarly insights on how businesses can undertake digital organisational capabilities' re-invention to gain the desired competitive edge. To accomplish this, the application of the qualitative research method used the focus group discussions and interviews as the main qualitative research technique to seek answers to the research questions that entailed the evaluation of what instigates the use of digital innovation technologies, the types of digital innovations as well as the methodologies that businesses use. It also explored how such methodologies induce values that do not only influence product or service development, but also organisational capabilities' re-invention. To seek answers to these research questions, the study used focus group discussions to extract only the opinions of about twenty-five electronics engineering experts from five organisations in Glasgow-Scotland that have gone largely digital (Vernon, 2009:69) [40].

3.2. Sampling

Basing the study on the opinions of only the electronics engineering experts was also considered critical for gaining new insights on how digital innovation cannot only be utilised by the businesses to influence product and service innovations, but also to offer other values such as organisational capabilities' re-invention. The application of focus group discussions was influenced not only by the fact that digital innovation is still a novel concept that has not been widely adopted by most of the businesses, but also by the fact that this research emerged as part of the consultancy research work that was being done on digital marketing for about five

organisations in the period between 2021 and March 2022. It was during the discussions of the trends on digital marketing that the notion of digital innovation also emerged.

Hence, such a study created a framework for field analysis on the trends as well as the depth of digital innovations by the businesses in Glasgow-Scotland. This is attributable to the fact that they were also interested in exploring how the use of digital innovation can also be improved in their organisations. Using such a framework, the focus group discussions was used to have the discussions take place using five setups and five phases that engaged five employees who were not only electronics engineering experts (Sekayi & Kennedy, 2017:2755) [41], but also deeply knowledgeable about the concept of digital business applications.

Since, five employees were drawn from each of the five businesses; this meant that the study used about twenty-five electronics engineering experts as the sample population for the study. Each of the five sets of interviews and discussions with the five employees took place in the workplaces of each of the five groups of electronics engineering experts. In each of the five sets of interviews and discussions, the interviews were largely semi-structured on the basis that a question would be asked and the audience of the five employees would be requested to respond and invoke discussions.

3.3. Interviews

The interview questions explored trends on digital innovation's adoption by the businesses, the reasons why some of the businesses are doing so while others are not. The discussions also examined the types of digital innovations as well as the methodologies that businesses use. It also explored how such methodologies induce values that do not only influence product or service development, but also organisational capabilities' re-invention. Subsequently, the questions and discussions focused on evaluating the challenges that limit most businesses' capabilities to adopt digital innovations.

Following agreement on the principles of anonymity and confidentiality, the five different groups had agreed on sharing opinions that emerged from the discussions in each group. Hence, during the discussions, the responses from the previous groups were also put forward to invoke further discussions. Although brief notes that constituted main points of the discussions were undertaken as the interviews and the discussions unfolded, most of the discussions were mainly tape recorded even by the participants themselves. This is attributable to the fact that they were also interested in exploring how the use of digital innovation can also be improved in their organisations.

3.4. Data Analysis

On completion of data collection in March 2022, the tape recorded data were transcribed into written form. Thereafter using transcribed information while also listening and re-listening to the tape recorded discussions to leverage the accuracy of the extracted information, the analysis was accomplished using inductive-thematic analysis. This entailed extracting key themes and thereafter subthemes as well as the accompanying narratives that explained each of such mainthemes. Comparison and contrasting of each of themes from each script indicated not only digital product innovations, but also some other forms of digital innovations like digital retail outlets and digital marketing strategies.

Common meanings of such themes were imputed to not only refer to more of digitised business approaches, and enhance, it influenced the extraction of the discourse of digitised business approaches. The second set of themes were interpreted to refer to the discourse of analog-based business approaches because it mainly constituted of themes like deeply entrenched analog-business system as well as the largely analog market. It was from such analysis that the study explored whether or not digital innovation edifies capabilities' re-invention to catalyse a firm's overall sustainability. Yet, as such analysis as well as the entire study was being undertaken, measures were also undertaken to enhance the credibility, dependability and reliability of the study.

3.5. Validity

In such initiatives, basing the study only on experts' opinions that understood how digital innovation works

as well as whether it edifies capabilities' re-invention improved the overall content validity and reliability of the study (Creswell, 2014: 10) [42]. As it also improved the veracity and credibility of the findings, the other measures for improving the credibility and reliability of the findings encompassed audit trail, fact-checking and soliciting of the opinions of experts and other personnel with detail understandings of the trends in the digital industry to check and confirm the veracity and credibility of the findings.

Such initiatives were accompanied by comparing and contrasting different experts' opinions during the interpretation of the findings. This improved the assessment of the areas of similarities that could be corroborated to leverage the validity and reliability of the findings. Combined with triangulation of the findings with theories, such analysis also enhanced the identification of new insights that were not easily discernible in the theories. It is such initiatives that improved the overall comprehensiveness of the findings to spawn the overall credibility, dependability and transferability of the study. The details of the findings are as presented and discussed in the next sections.

4. Findings

Deriving from discourse analysis and extraction, findings are presented according to two discourses that encompass digitised business approaches and analog-based business approaches. The details are as follows.

4.1. Digitised Business Approaches

Findings indicated some of the digitised business approaches that some of the businesses have undertaken to have not necessarily entailed digital product innovations, but some other forms of digital innovations. Such digital innovations either fell in the domains of the innovations leading to the establishment of different digital retail outlets or the conceptualisation and application of different digital marketing strategies. The details of the findings are as follows.

4.1.1. Digital Retail

Most trends of digital innovations among most of the businesses were reiterated to have entailed only the development of different digital retail concepts. Digital retail outlets were found to be easier to establish as compared to the establishment of the digital manufacturing entities. Most narratives attributed such trends to the fact that the technologies, equipments and software for the establishment of the digital retail outlets are often less costly. This contrasts with the technologies, equipments and the software for the establishment of the digital manufacturing plants that are often quite expensive. Even if there is increasing trends of the utilisation of the emerging digital technologies to establish different digital retail concepts, findings still indicated that there is often a greater preponderance of most of the businesses to replicate e-commerce models. With e-commerce models already developed; most of the businesses were reiterated to often feel comfortable to commit the necessary required resources on the replication of such concepts rather than on the innovation and development of new digital retail concepts. Increment in the rate of the emergence of different digital retail concepts were found to be instigated by the constantly increasing digital population. Such a view is accentuated in the opinions of one of the electronics engineering consultant who stated that:

"It is the retail sector where I think tremendous achievements have been made in as far as trends on digital innovation are concerned."

However, even in the midst of such increasing rates of the emergence of new digital retail outlets, some of the participants still highlighted that trends on digital innovation have not been about digital product innovations, but instead more about digital service innovations. Ranging from the sectors such as finance, tourism, insurance, real estate services and energy, most of the participants shared similar views that as contrasted to the quests for digital product innovations, most of the businesses have often been more engaged in the development of digital service business models. Discussions on the emergence of digital service models in the domains like finance, tourism, insurance, real estate services and energy linked sucha trend to the fact that it quite easier to establish digital service business models. This contrasts with digital product innovation and

development that often require hefty costs and more complex technologies. Such a view was found to corroborate the opinions of one of the participants who argued that it's more cost-effective and easier to establish the digital retail outlet as compared to the digitisation of the manufacturing plants. However, in the quests for the establishment of such digital service business models, most narratives indicated most of the businesses to be driven by the need for the re-invention of new capabilities to counter the emerging market dynamics. Instead, findings revealed most of the businesses to engage in the development and establishment of relevant digital service business models as a cost minimisation of strategy. With most of the customers now available online, some of the participants argued that some of the businesses in thefinance, tourism, insurance, real estate services and energy are increasingly opting for digitisation to minimise overheads. Such a view was echoed in the opinions of one of the IT consultant from the tourism sector who argued that:

"Almost everyone is now reachable through the internet or some mobile device. If the business is in the sectors such as real estate, insurance or even tourism, why must you waste a lot of funds on hiring several foot sales agents to hunt for customers? That can easily be done on line."

Quests for the minimisation of overheads as compared to the essence to re-invent the existing capabilities to counter competition were found to be a major driver of most of the businesses to engage in the development of different retail concepts. As the competition intensifies among the retailers in the finance, snacks and food retailers, insurance and the appliances and the grocery retail, most reiterations indicated most of the retailers to engage in different digital retail innovations. Through such innovations, most of the retailers often strive to discern how the existing digital technologies can be effectively optimised to reach different consumers. It also aids the analysis and identification of the alternative different models through which different services can be delivered in a way that delights customers. Such quests were not only found to be a major driver for the establishment of different retail outlets, but also as explanatory factors that lure most of the businessesto innovate and adopt different digital marketing models.

4.1.2. Digital Marketing

Digital marketing emerged from the findings as part of the digital innovation phenomenon which is being largely undertaken by most of the businesses. As compared to the other forms of digital innovations, findings revealed that it is digital marketing which was commonly undertaken by several businesses. Whether large or small, findings indicated most of the businesses to significantly value the importance of digital marketing. However, as contrasted with the trends in most of the big businesses that tend to innovate and develop own digital marketing models; most narratives indicated most of the businesses not to engage in the research and development of their own digital marketing strategies. Instead, findings indicated a greater preponderance of the mainly small and medium size enterprises to engage in the replication of the emerging digital marketing concepts rather than in the development of their own. However, whether it is copied or developed by a business on its own, one of the IT consultants and a digital marketing manager still argued that most businesses still recognise digital marketing as critical for bolstering their marketing capabilities. In such initiatives, she explained that:

"Digital marketing is important for enhancing real-time interactions with customers. Through such real-time interactions with customers, one can take the opportunities to directly engage and convince customers into making purchase. Yet, as sales, revenues and profitability improve, it also enhances the reduction of the cost of marketing."

Even if the costs of the establishment of some of the digital marketing technologies were reiterated to be hefty, some of the participants still argued that it is often the quests for the increment of sales, revenues and profitability that drive most of the businesses to invest in different marketing technologies. Digital marketing was also noted to lower the overall cost of marketing. It was such quests to lower costs and leverage profitability that were also found to drive most of the businesses to innovatively use different digital marketing methodologies such as the internet, social media and mobile digital marketing. However, such approach was found to be mainly common among the small and medium size entities, as compared to most of the large businesses. In most of the large businesses, most reiterations indicated a greater preference for the use of digital

marketing due to the fact that it aids innovation on how to augment the marketing of their different products and services. Such a view was accentuated in the narratives of one of the IT specialists who stated that:

"These days, most of the businesses prefer to use digital marketing innovations whether for television or internet marketing because it enables the use of different animation methodologies to create and develop marketing images and pictures as well as the communication strategies that the business wants."

It appears in such quests, businesses are often not driven by the need to lower the costs of marketing, but more by digital marketing's capabilities to leverage the innovation of different marketing communication strategies. In such initiatives, some of the businesses were found to engage in digital marketing innovations to innovate, develop and animate their marketing communication images and pictures in different ways. In such initiatives, one of the participants explained that the results of such innovative digital marketing have often been reflected in the development of more attractive digitised and electronic billboards. Other positive results were also reiterated to be accentuated in the development of more attractive television advertisement images and pictures as well as social media videos. In otherwords, as large businesses strive to out-compete each other, the values of digital marketing innovations were found to be critical for positioning and repositioning a business differently from their rivals.

Certainly, despite lack of evidence of digital product innovation, it seems findings imply that innovations leading to the establishment of different digital retail outlets as well as the application of different digital marketing approaches seem to unlock new capabilities of some of the businesses to perform differently. However, as some of the businesses have gone digital in such endeavours, it was still highly discernible from the findings that even though some of the businesses tend to engage in capabilities' modifications and re-inventions, they often tend only do it in more analog-based approaches.

4.2. Analog-Based Business Approaches

Most narratives indicated major constraints of most businesses' initiatives to commit significant investments on relevant digital technologies to leverage innovative capabilities to often arise from the use of deeply entrenched analog-business system as well as the largely analog market that still prefer to use analog approaches in most business transactions.

4.2.1. Analog-Business Systems

It emerged from the findings that the use of deeply entrenched analog business systems has affected digitisation to leverage a business' capabilities to engage in different digital innovation initiatives. Even for businesses that use some of the digital methodologies such as digital retail and marketing, most of the participants reiterated that they still tend to use more analog-based processes and systems. Thematic analysis attributed such business approach to the costs of establishing different digital technologies. Costs of relevant equipments, software as well as the costs of installation and maintenance of such a system were noted to be quite deterring. In effect, most of the businesses were found to mainly adopt more analog-based processes, business systems and work methods. To leverage operational efficiency and capabilities to respond to the unfolding market dynamics, most of the businesses were found rely mainly on their corporate IT investments. As compared to digitisation, findings indicated most of the businesses to intensely use IT to leverage the operational efficiency in areas such as supply chain management, accounts and sales management, marketing and production management. However, some of the participants argued that such intense usage of IT applications implies most of the businesses are increasingly shifting towards digitisation and the utilisation of different digital technologies. Such a view is corroborated in the narratives of one of the IT managers from Delphi discussion groups who argued that:

"Digitisation is not an event, but a process. It starts gradually with significant investment in the required heavy corporate IT system and it moves gradually to digitisation. I think, we are moving towards that direction with time."

Such evidence of the increasing adoption of business digitisation was also echoed in the consensus in most of the discussions. In such responses, some of the participants argued that whereas in the retail sector, there is

increasing development and usage of digital retail outlets and digital marketing, in the manufacturing sector, there is increasing utilisation of digitally enabled automated processes. In such explanations, some of the participants revealed that most of the manufacturing businesses are increasingly integratingsemi-automated sensors and business intelligence systems in their manufacturing businesses. However, even in the midst of such changes, findings still indicated the level of digitisation to be quite low. Such a view was corroborated in the opinions of some of the IT managers who stated that most of the businesses still operate partially digitised and semi-automated businesses. The implications are latent in the fact that whereas some of the manufacturing processes are semi-automated and digitised, activities such as trends' analysis, forecasting and strategic planning are still often accomplished using mainly analog-based processes.

Even if in the event of the changes that are affecting a business' performance, some of the businesses were reiterated to use sophisticated IT systems such as enterprise resource planning systems to undertake relevant diagnosis, most of the IT managers still indicated that such reviews are often still analog-based. In most of the businesses, findings indicated that in case the business aims to revitalise its performance by lowering costs or improving quality, the analysis is often undertaken using analog-based methodologies such as sigma analysis and statistical analysis and quality controls. In such analog-based initiatives, most of the businesses were still found to use performance targets and evaluation charts that are pinned on the walls for employees to discern the business' expectations from them. As it emerged from the findings, this was attributable not only to the undigitisedorganisational culture, but also the fact that changing and transforming from analog to digitisation was found to be feared by some of the executives. Such fears were noted to arise from the fact that such change and transformation would certainly render most of the valuable analog heavy machineries redundant. Such a view was further corroborated in the opinions of one of the IT managers who stated that:

"It is not just a matter of digitising the manufacturing processes or the business. In heavy manufacturing plants, there are compatibility issues that can arise. Digitisation has just come recently. Hence, as the manufacturing equipment's manufacturers keep on phasing out the old one and introducing new ones, so, only then, we shall be able to get ditigised."

Even if that is not the challenge, some of the participants argued that the business thinking and approach may influence whether or not a business will digitised. In their explanations, they cited that there are mainly start-up businesses that focus on purchasing and using old machineries as a strategy for minimising start-up costs. In such situations, poor level of business digitisation is often a deliberate strategy in the beginning phase of the business' establishment. Yet, as some of the businesses adopt such approaches to business management, findings indicated other businesses to deliberately avoid digitisation because of the largely undigitised market.

4.2.2. Analog-Market

Even if some of the businesses were found to have the capabilities to digitise, the level of digitisation of the market was found to be quite low. In such analysis, some of the participants explained that the more digitised the market is, the more the business may also get more digitised. Such a finding corroborated the opinions of some of the IT managers who noted that most of the businesses tend to get digitised selectively by choosing and digitising in the areas where customers are digitised. As it emerged from the findings, this causes a duality where some of the areas such as marketing and distribution are digitised, as others such as the manufacturing processes tend to be less digitised. Most narratives indicated that although there is a general consensus that the population is increasingly getting connected to the internet or different mobile applications, in most of the cases, the extent to which the connectivity to such different mobile technologies are used for accomplishing serious business activities has been quite low. As most of the population tend to use such mobile communication technologies for leisure and social activities such as charting on social media, the initiatives to translate such social usage into serious commercial usage is yet a challenge that most of the businesses are facing. In respond to such a situation, one of the electronics engineers noted in the discussions that:

"It is difficult to digitise when it is quite clear that the market will not respond. Most of the customers are on social medial and internet, but they don't use them for serious business purposes."

Findings indicated a strong culture of the use of the face-to-face initiatives in the accomplishment of

different serious commercial transactions. This is latent in the fact that even after viewing advertisements from the internet or websites, most of the customers still often go physically to the physical retail outlets even if there are options for ordering the same products on line. Besides fear of the online security related issues, some of the participants noted other issues to arise from lack of trust and confidence that the general market has in the businesses to deliver the required quantities and quality. The implications are latent in the fact that the increasing population's usage of the internet has only rendered it easy for businesses to undertake digital marketing rather than intense digitisation to induce other values of business digitisation. In contrast, one of the IT managers noted that especially in the manufacturing sector it is difficult to digitise when the other business partners have not digitised. Some of the manufacturing businesses are supplied by small scale businesses that do not possess the necessary financial capabilities to digitise. In such situations, some of the participants argued that even if a business was to digitise, it would still not induce enormous values. Such a view is accentuated in the opinions of one of the IT consultants who stated that:

"It is easy to digitise and get results on improved value chain efficiency if the other networks of businesses have also digitised. But in most of the cases, apart from the institutions such as banks that may have digitised, the others may still be using analog approaches. So what is the value of digitisation? Digitisation is a complex thing."

Certainly, it seems evident from the findings that despite the increasing recognition of the values of digitisation as a critical antecedent for leveraging a business' capabilities, deeply entrenched analog-based business systems as well as largely analog market seem yet to be the major hindrances. The implications are latent in the fact that even if the motive of digital innovation is usually to leverage the development and modifications of the existing product components, evidence of most businesses' engagement in such initiatives was not easily discernible from the findings.

5. Discussion

Digital innovation's generativity edifies organisational capabilities' re-invention. Even if it is not entailing new product development, digital innovation still catalyses the review and the extraction of novel business models from the existing business practices (Nambisan, 2017:1029) [43]. As it involves intense use of business intelligence and big data analytics, digital innovation enhances the executives' understanding of their existing capabilities vis-à-vis the unfolding environmental trends. In the event of internal capabilities' deficiencies, it is through such analysis that digital innovations enhance the review of how the existing business approaches and models can be reconstructed to unlock new capabilities. It is often through such capabilities' re-invention that digital innovation aids the creation of a state of equilibrium or disequilibrium in which a firm gains an advantage through its leveraged capabilities. Such a view is at tandem with Teece's (2007:1319) [6] notion of "Explicating Dynamic Capabilities" that imply a firm'sinformation technology catalyses its capabilities to constantly analyse and modify its capabilities to respond to the unfolding new market and industry changes.

Even if digital innovation does enhance the extraction and the creation of novel business concepts, it can still instigate intense process diagnosis to unlock cost, efficiency and quality enhancement advantages. As firms engage in more creative destructive activities in the Schumpeterian environment of creative destruction, it is often the re-invention of such new cost, efficiency and quality enhancement capabilities that bolster a firm's capabilities to respond to the proliferation of an array disruptive innovations (Hui, 2014:5) [9].

Yet, if the re-invention of such superior cost, efficiency and quality enhancement capabilities is not able to induce the desired outcomes, digital innovation's generativity may still offer superior product development capabilities. Using an array of customer data as well as critical information that offer significant insights on the overall market dynamics, digital innovationspawns precision of new product innovation and development (Lee & Ho, 2010:37) [44]. It is often such precision of new product innovation and development that catalysethe improvement of a firm's capabilities to create new differential values to respond to the unfolding customer needs and demands in the way that rivals are unable to match.

In the situations where product modifications and not new product development is necessary to respond to the unfolding market trends, digital innovationleverages a firm's capabilities to analyse and create new

components or layers from the existing products. This spawns the enrichment of the existing product's features, attributes and functionality to re-create a firm's new capabilities to deliver a bundle of new superior value offerings to respond to the unfolding market dynamics (Wirtz, Schilke & Ullrich, 2010:272) [10]. That implies in the constantly changing business environment, digital innovation is certainly a critical prerequisite for reshaping such unfolding business terrain to a firm's advantages. It enables businesses stay ahead of competitors to gain first-mover advantages by taping new opportunities in the relatively new global digital markets before competitors are able to do so.

Even if it does not catalyse the creation of new products or the enrichment of the existing product's components, digital innovation can still enable businesses extract and develop superior business approaches for delivering superior quality customer services. Combined with superior product offerings, this leverages the re-invention of new capabilities for a business to attain the desired level of competitive edge even in the midst of intense industry competition (Kalyanam, Lal & Wolfram, 2010:5) [45]. Yet, as the business confronts rivals with such superior bundles of value offerings, digital innovation still catalyses the re-invention and application of superior marketing capabilities. It augments not only the quality of marketing communications, but also strategies to reposition a business quite differently from its rivals. It is often through such initiatives that a firm's gains new capabilities to re-invent its brand image to tackle the emerging new market dynamics in a relatively new way.

In the context of such findings, it is quite discernible that the study was able to respond to its fundamental research question which was to explore whether the generativity of digital innovation instigates organisational capabilities' re-invention. However, as most of the businesses are still constrained by the use of deeply entrenched analog-business system as well as a largely analog-based market andmanagement ideologies, it is unlikely that most of the businesses will be able to gain from such enormous digital innovation values in as the nearest future as possible. Certainly, that also implies this research raises a number of managerial implication issues on how the contemporary managers can consider adopting digital innovation technologies to not only create differential values that reposition them differently, but also to extract and re-invent new capabilities that would minimise risks of vulnerability in the midst of the increasingly volatile Schumpeterian environment of creative destruction.

Cost related challenges also emerged from the findings as one of the factors explaining the low level of business digitisation as well as digital innovation's optimisation to influence the achievement of the desired values. However, to respond to generally low level of digital technologies' optimisation, this research offers the digital organisational capabilities' re-invention model. The replication of such a model will not only spawn capabilities' re-invention, but also improved level of product as well as service digital innovations.

6. Managerial Implications

To accomplish that, it is argued in the digital organisational capabilities' re-invention model that businesses must consider using four processes that encompass optimisation of corporate IT and investment in digital technologies, business digitisation, the use of incentives and rewards to digitise the analog market, and optimisation of digital innovations. The details of how this can be applied are as follows.

6.1. Optimisation of Corporate IT and Investment in Digital Technologies

Businesses will have to engage in the improvement of the overall level of corporate IT optimisation. This can be accomplished by introducing advanced information technologies such as cloud computing and enterprise resource planning systems. The introduction of such advanced information technologies must be accompanied by the integration of information technology usage in all the business' internal key functions as well as the linkage with the partners in the business' ecosystem such as suppliers, distributors, business customers and industry collaborators. As the business introduces a strong culture of information technologies' usage, it must also encourage the development of a culture for the optimisation of the existing data from different information technologies to undertake relevant analysis and make relevant decisions. It is the introduction of such organisational system and culture that will create the foundation for the business to digitise. Intense usage of

relevant IT technologies will render most of the business' IT systems more compatible and supportive of the digital technologies that are to be introduced later. To accomplish that, the business will have to invest in the establishment of relevant digital technologies such as 3D printing, cloud computing, data analytics and mobile computing. The costs of the investment and establishment of relevant digital technologies will certainly be enormous. However, once established, the values will certainly exceed the incurred costs. Completion of the establishment of relevant digital technologies must be accompanied by business digitisation.

6.2. Business Digitisation

Business digitisation will require the digitisation of all the internal key processes such as sourcing, inventory management, operations, marketing, finance and sales management, planning, maintenance, management and executive decision making as well as distribution. It must also be undertaken in conjunction with the initiatives forthedigitisation of the transactions with the external partners such as advertisers and marketers, consultants, product developers, financial institutions and other networks of industry collaborators. The establishment of such a digital business system must also be accompanied by the evaluation of how it would aid automatic acquisition and processing of structured and unstructured data such as images, text, GPS, RFID, metadata and event logs. Sources of such data and information may constitute of information on the unfolding product searches, e-commerce sites, opinions from product review sites, news media, internal transactions, business websites and the emerging new usage of digital technologies. As the business digitises, it must also take the initiatives to get the market transformed from analog to digital transactions.

6.3. Use Incentives and Rewards to Digitise the Analog Market

Transformation of the market from analog to digital is critical for the business to gain the desired values from its business digitisation process. To accomplish that, the business will have to develop and use incentives and rewards for customers that use digital channels to accomplish different transactions. Such rewards and incentives may comprise of price discounts, the use of coupons and loyalty programmes for digital customers. As such incentives and rewards are being undertaken, the business must also develop a system for addressing and resolving all complaints from digital customers quite promptly. In case the digitally ordered product is not liked by customers, they must be allowed to easily return the product and take replacements or even seek for refunds. Such benefits must be offered to only digital customers that are using digital transactions. To build trust and confidence in the digital business system, the business will also have to ensure that it is only products of the right quantity and quality that are delivered to the customers. Such initiatives would lure more digital customers to have trust and confidence in the digital business system. Combined with the development of the mechanisms for minimising online security risks, it is such values of digital transactions that will lure most of the customers to change from analog to digital transactions. Even if such initiatives catalyse a business' competitiveness, it is still often critical that the emerging data are optimised to undertake relevant capabilities' re-invention to respond to the changes in market and industry trends.

6.4. Optimisation of Digital Innovation

It is through the optimisation of big data analytics that the business will be able to optimise its digital innovation systems to achieve the desired outcomes. As it collects an array of structured and unstructured data such as images, text, GPS, RFID, metadata and event logs, digital innovation utilises big data analytics to analyse the unfolding heterogeneous and high velocity data to understand the dynamics surrounding a firm's products, services, customers, competitors, business partners and the unfolding industry and market dynamics. This will improve decisions on the strategies that can be undertaken to counter the unfolding industry trends. Digital innovations will also enable the business optimise digital product innovations to extract new components that enrich the features and functionality of the existing products. It will also enhance process analysis and diagnosis to unlock new cost, efficiency and quality advantages that would spawn a firm's performance. It also through digital innovations that the business would be able to extract and use new advertisement and marketing

concepts to reposition the business differently. Combined with the capabilities to develop new business models that can easily disrupt the existing industry boundaries, it is such arguments that illustrate how digital innovations would spawn capabilities' re-invention to catalyse a firm's effective response to the unfolding market trends.

7. Area for Future Research

It is implicitly discernible from the findings that the study was able to respond to its fundamental research question which was to explore whether the generativity of digital innovation instigates organisational capabilities' re-invention. It was evident so far that digital innovation has influenced the emergence of different digital retail business models as well as marketing approaches. However, it was also still easily discernible that through the introduction of such new business models as well as marketing and advertisement approaches, most of the businesses have been able to re-invent new capabilities to tackle the emerging market challenges inways that create new differential values. Given time, it is also apparent that most businesses will certainly be utilising an array of digital innovation technologies to not only engage in different digital product and service innovations, but also process diagnosis.

As businesses seek to optimise their digital innovation technologies to develop new digital products or services to survive in the Schumpeterian environment of intense volatilities, it also lures businesses to adopt better data management and optimisation approaches. It is in the diagnosis of such data that a firm may also be able to identify other process, structural or equipments' inhibitors of its performance. As such analysis instigates the need for exploration and adoption of new business practices; it also tends to unlock new capabilities for a business to counter the emerging market dynamics. It is during such situations that digital innovation not only aids digital product or service innovations, but also organisational capabilities' re-invention.

Organisational capabilities' re-invention introduces new capabilities that influence how a firm organises, combines and applies a bundle of its strategic value creating resources to create a bundle of new differential values that offer new competitive edge. However, given the fact that there is still a greater preponderance of most of the businesses to use mainly analog-based business approaches, it is unlikely that such values will be realised by most of the businesses in as the nearest future as possible. To address such a challenge, this study uses the digital organisational capabilities' re-invention model to agitate the need for most businesses to adopt digital business approaches as antecedents for leveraging the optimisation of digital innovation's generativity to not only create new products or services, but also to re-invent new capabilities. However, future research can still explore skills and competencies that are critical for digital innovation's optimisation.

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