

Knowledge Management and Dynamic Capabilities: A Digital Embracing of Interrelated Processes

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Abstract: Exploration and exploitation are the main processes that work concurrently to achieve an organisation's evolution and success. Knowledge Management (KM) and Dynamic Capabilities (DCs) are significant fields that share these processes. The application of exploration and exploitation processes is still implicit in organisations, and it is not formally represented in technical configuration levels. Mapping these processes to Information technology (IT) creates an advanced robust translation of their use. It also identifies a tangible role for KM and DCs. The idea of deconstructing dynamic capabilities into three levels has been adopted in this mapping. Levels are high-order learning capabilities with the highest exploration learning activities, first-order ordinary capabilities with the highest exploitation learning activities, and lower-order functional capabilities, intermediate between both levels. The digital embracing of the exploration and exploitation model has been proposed to translate all levels of capabilities into different digital configurations. Automated functions of *search/browse*, *create/add*, *modify/update*, *remove/delete* and *read/revise* are utilised to present these digital configurations in this model. Search/browse and create/add reflect the higher-order level. Modify/update and remove/delete mirror the intermediate level. Read/revise matches the first-order level. These IT configurations are simple and would be sufficient to assess exploration and exploitation processes. It can also support a new vision for measuring organisational ambidexterity. A near-future case study of an educational institution will be accomplished to evaluate this model. Two main domains, which involve internal systems (strategies, policies, and regulations) and educational materials, will be assessed with their e-resources and the use of the proposed digital functions that represent exploration and exploitation. A quantitative approach using an online survey will be used in this evaluation. The survey will be distributed to academics with administrative positions in all institution departments. The findings of this evaluation would expect to assess the extent of using online search in finding and creating new e-resources which present the two nominated evaluation domains. It would also appraise updating, deleting, and reading available e-resources according to these domains' new requirements or traditional proceeded routines.

Keywords: knowledge management processes, dynamic capabilities, digital exploration and exploitation

1. Introduction

Different studies state the effects of Knowledge Management (KM) and Dynamic Capabilities (DCs) on Competitive Advantage (Mahdi, 2019; Ferreira, 2020). They also clarify the link between these two fields and identify knowledge-related processes in DCs studies as one of two main approaches (Eriksson, 2014). Furthermore, KM and DCs concepts share insights about organisational learning, and the contrast between them is related more to their terms than their essence (Vera, 2009).

An emerging shift in modern industry is using Digital Technologies (DTs). DTs are highly interconnected capacities that support and enhance the processing of information (Bican and Brem, A. 2020). DTs have played an important role in enabling service innovation and structural transformation, in addition to a reformulation of industry competition (Ardolino et al., 2018). Using technological functionalities to translate new types of processes in KM that overlap with a significant field such as DCs, can support the organisational learning domain and different research disciplines and achieve organisational ambidexterity (Soto-Acosta et al., 2018). It also engages KM and DCs disciplines in real application technology functions.

The application of Knowledge Management Processes (KMPs) concerning DTs still requires more research. Furthermore, specific KMPs such as knowledge sharing, application, and acquisition are the only standard processes in KM studies (Al-Emran, 2018). This paper aims to present a model that links the exploration and exploitation of interrelated processes of KM and DCs to DTs. This model will be applied at a university in Jordan to measure its internal system and educational materials using the corresponding digital services of exploration and exploitation.

2. Knowledge management

A Resource-Based View (RBV) considers knowledge a strategic asset for organisations. Knowledge implies different terms such as information, competencies, capabilities, experiences, and skills. KM definition is broad-ranging and can have different interpretations. One of the most cited definitions refers to KM as a strategy that

makes the right individuals reach the proper knowledge at the right time and support them to share information and place it into actions that achieve organisational performance (Girard and Girard, 2015). It is obviously about knowledge creation and capturing to utilise and make it available to decision-makers upon their request. Hislop and Others (2018) used two common perspectives in KM definitions; one as an object and the other as a process. The objectivist perspective regards knowledge as an asset pooled, stored, inspected, and accessed by individuals. The process perspective considers knowledge encapsulated in humans and requires social interaction to facilitate knowledge sharing and dissemination. Efficient utilisation, creation, development, and reuse of knowledge depends on organisational KM capabilities. KM capabilities are composed of Knowledge Management Enablers (KMEs) and KM processes (Gold et al., 2001).

2.1 Knowledge management enablers

KMEs are motivational factors that facilitate the launching and encouragement of KM activities (Yasir and Majid, 2017). These factors develop knowledge creation and sharing besides affecting other organisational knowledge processes. Critical Success Factors and Infrastructure Capabilities were also referred to KMEs in different studies (Gold et al., 2001; Migdadi, 2009). Arthur Anderson and the American Productivity and Quality Centre (APQC) defined four main KMEs: culture, leadership, performance measurement, and IT (Andersen et al., 1996). The organisation structure was also addressed along with leadership and IT to be the pillars for KM Implementation (Bixler, 2002). A semantic representation of these pillars, including significant KMEs such as culture, business repository, and knowledge context, was implemented using ontologies (Sabri et al., 2017). This approach has defined a formal representation of KMEs in the KM domain and supported a dynamic and knowledge-based business process architecture modelling (Sabri and Odeh, 2019).

2.2 Knowledge management processes

KM processes are a sequence of activities that an organisation applies to facilitate the utilisation of knowledge (Igbinovia and Ikenwe, 2017). Jafari and Maleki (2013) reviewed KM process models developed for two decades. These models were applied to improve the efficiency of operations and the organisation's competitive advantage. They are also related to three basic KM processes; creation, sharing, and application of knowledge which appeared to be crucial to the KM implementation program. On the other hand, Martelo-Landroguez and Cepeda-Carrión (2016) also identified four main KM processes related to the previous review. These processes are; creation, transfer, storage, retrieval, and application.

3. Dynamic capabilities

A Dynamic Capability appeared as a criterion and extension to the resource-based view to define the organisation's processes, skills, decisions, rules, and abilities to sense and capture the value and new opportunities. In addition, it would reform and secure its knowledge base, competencies, and technology to sustain a competitive advantage. These criteria determine the capacity of the enterprise to reproduce, merge, and utilise its external and internal resources in a rapidly changing environment (Teece, 2010) and consequently change the organisation's resource base (Helfat et al., 2007). DCs are strategic and differ from ordinary capabilities related to current activities; they promote the organisation's ability to position the right product in the right market to address customers' needs and set up the enterprise's systematic methods to modify operating routines (Teece, 2012). In so doing, they become successful and exhibit leadership among their competitors.

Applying KM capabilities concurrently with dynamic capabilities is recommended to respond to environmental changes and thus enhance performance and competitive advantage (Tseng and Lee, 2014). Easterby-Smith and Prieto (2008) identified overlapping fields in KM and DCs. These fields include learning underpinning KM and DCs, exploration and exploitation, and knowledge infrastructure. Learning capabilities provide a source of DCs and can be presented in KM processes such as creating, sharing, and applying knowledge. Exploration and exploitation lead to knowledge evolution that dynamic capabilities depend on. The exploration process is the generator of the new ideas, while exploitation concerns merging existing methods in new condition(s) or context(s). Thus, DCs are obvious in organisations where exploration and exploitation of knowledge and competencies occur concurrently. Lastly, knowledge infrastructure, which implies knowledge, individuals' skills, technical and managerial systems, and culture, are crucial cornerstones in setting up DCs. According to this identified relationship between KM and DCs, Easterby-Smith and Prieto (2008) built their model, which employs learning as the central mediating element between KM and DCs. It also links two essential learning processes: exploration and exploitation. These are considered crucial learning processes (Zollo & Winter, 2002). Learning

should also be balanced between exploration and exploitation and utilised in a model to reconfigure resources and operational routines and thus achieve sustained performance.

4. Exploration and exploitation

The capability to run both exploration and exploitation activities concurrently involves organisational success (Easterby-Smith and Prieto, 2008). In addition, exploration and exploitation are the main processes in the organisational knowledge evolution cycle (Zollo and Winter, 2002). The exploration covers search, discovery, risk-taking, observation, and innovation, whilst exploitation involves procedures and assessments such as implementation, selection, productivity, efficiency, and execution (March, 1991). Specifically, exploration depends on new knowledge, technologies, and products with uncertain needs, whereas exploitation is associated with using and refining existing knowledge (Guisado-González et al., 2017). Therefore, sustaining a balance between exploring the capabilities that might need to be known and exploiting the capabilities that an organisation already knows is necessary to reach an intelligent adaptation (March, 2003).

Studies that link organisational factors or KMEs to exploration and exploitation are not remarkable. Gonzalez and de Melo (2018) studied several organisational context factors that impact innovation through KM exploration and exploitation. Exploration was more affected by factors such as IT systems, autonomy, and learning culture, while exploitation is related to factors of supportive leadership and learning culture. This paper highlights the connection between IT KME and exploration and exploitation processes using digital services. A model is developed and will be demonstrated later on at a university in Jordan.

5. Deconstruction of dynamic capabilities

Higher-order capabilities impact corporation strategy; however, success and achievement depend on managing lower-order and ordinary capabilities to run processes effectively. Dynamic capabilities can be deconstructed into high-order dynamic learning capabilities with high levels of knowledge exploration, lower-order dynamic functional capabilities with high levels of knowledge exploitation, and first-order ordinary capabilities with routine activities. Dynamic learning capabilities include an in-depth inspection view that supports an organisation to capture essential values of outside resources. Dynamic functional capabilities are change-focused and described as using less-patterned routines, becoming more patterned over time. Ordinary capabilities present a normal situation and cause no change in an organisation (Hine et al., 2014).

According to previous division and based on the definition of dynamic capabilities that implies sensing, creating, extending, and modifying the organisation's primary resources (Helfat et al., 2007), in addition to the role of functional capabilities in organisation processes development through product improvement and repeated processes (Hine et al., 2014), exploration and exploitation processes can be translated into specific services in the digital technology field. High knowledge exploration or sensing levels are implemented through *searching* or *browsing* online to *create* or *add* new automated resources, ideas, innovations, and alternatives. High levels of knowledge exploitation are applied by *modifying* or *updating* existing automated resources or even *removing* or *deleting* them. In addition to exploration and exploitation levels, we also have a first-order level which includes *reading* or *revising* the use of automated resources of an organisation. These suggested digital services are the main techniques in changing organisational automated resources, such as files, folders, tools, shared platforms, and disruptive and enabling technologies. However, e-resources affected by these services should improve capturing and extending value-added services to effectively develop the value cycle (Porter and Heppelmann, 2014). Subsequently, the proposed model that combines all these elements and translates exploration and exploitation processes is presented in figure 1.

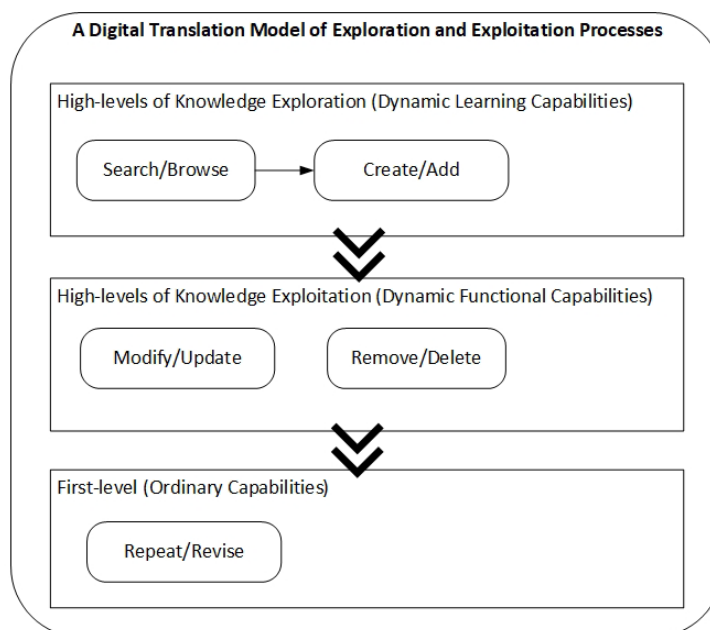


Figure 1: A digital translation model of exploration and exploitation processes

6. Research Methodology

Evaluation of the previous model requires an empirical case study of an institution that has clear evidence of dependency on IT to complete its work. The educational sector in Jordan, especially after the Covid-19 dilemma, has shown a significant shift towards IT. This trend was also promoted by regulations from the ministry of higher education regarding e-learning. Therefore, a demonstration of this paper model using a university in Jordan could be sufficient to address this evaluation. Two main domains of the university were chosen to achieve the proposed model evaluation; the internal system that includes uploaded e-documents of strategies, policies, regulations, and the online educational materials and documents which the instructors are using in the educational process. A quantitative method is the main approach in this evaluation. An online questionnaire will be distributed using email to administrative academics in the university, including 13 faculties and 37 departments. The main sections of the questionnaire are suggested to include the paragraphs in Table 1. Likert scale of five-point type will be used to assess these paragraphs, which reflect the digital variables of the model (search/browse, create/add, modify/update, remove/delete, read/revise), knowledge exploration and exploitation regarding the case study domains, and ordinary routines.

Table 1: Suggested paragraphs for evaluating the digital translation model of exploration and exploitation

Paragraph No.	Paragraph	Variable
Digital Knowledge Exploration		
1.	New strategic orientations and policies of the world's universities are often discovered through the received online information.	Search/Browse
2.	Regulations of other competitors' universities are learned and explored by browsing and inspecting their websites and online announcements.	Search/Browse
3.	The internet and the official online announcements of the ministry of education are one of the primary sources for creating e-documents for new regulations in the university.	Search/Browse + Create/Add
4.	Any new strategies, policies, or regulations will be e-documented once the faculty agrees.	Create/Add
5.	Academics mainly use the internet to find new resources for their educational materials.	Search/Browse
6.	E-documents of different materials generally depend on internet resources that lecturers develop.	Search/Browse + Create/Add
7.	The electronic folder is created for each subject taught to students in the department.	Create/Add

Paragraph No.	Paragraph	Variable
Digital Knowledge Exploitation		
8.	Every change made to strategies, policies, or regulations is reflected on the e-documents where these elements are stored.	Modify/Update
9.	E-documents of no more extended used policies and regulations are deleted or archived.	Remove/Delete
11.	Any updates on educational materials are aligned with changes on their e-documents	Modify/Update
12.	The excluded educational materials are followed by the removal or archiving of their e-documents stored in the internal system.	Remove/Delete
Digital Ordinary Routines		
13.	Staff usually read and revise existing e-documents of policies and regulations to apply them accurately.	Read/Revise
14.	Existing online educational materials are the leading resource for reading and revising before lectures and exams.	Read/Revise
Knowledge Exploration		
15.	The faculty management is flexible to learn and adopt new strategies, policies, or regulations.	
16.	The academic staff considers new subjects' materials and adds to their course plan if they are necessary.	
Knowledge Exploitation		
19.	The faculty management welcomes any changes to its current strategies, policies, or regulations if they find them better.	
20.	The academic staff does not resist the development and updates on subjects' existing materials whenever required.	
Ordinary Routines		
21.	Strategies, policies, and regulations become common and a daily practice after the faculty management applies after a while time.	
22.	The existing educational materials of a subject are taught in a straightforward common practice by academics after teaching them more than one time.	

7. Conclusion and future work

Adoption of digital services in translating KM processes is a priority request that facilitates the engagement of KM in a natural working environment. Exploration and exploitation are two crucial processes of KM that require to be identified by these services and technologically simulated to assess their impacts on organisations. Deconstructing dynamic capabilities into three levels where exploration and exploitation processes exist can support this simulation and identify exploration and exploitation roles in their levels. Search or browse online followed by creating automated resources are performed at the dynamic learning capabilities level, including knowledge exploration. Modifying or removing automated resources is applied at the dynamic functional capabilities level with knowledge exploitation. This distribution of digital functions between exploration and exploitation has led to a digital translation model embracing both processes.

The digital translation model of exploration and exploitation processes is the main contribution of this paper. An evaluation of this model demands demonstration using an empirical case study. A future case study of a university in Jordan is proposed to proceed with this evaluation and extend this work. Further studies are suggested to identify different knowledge processes using other digital services or IT practices.

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