

Modeling Dynamic Capabilities in their Logical Sequence and Relation to Performance

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Abstract: Although, resource-based is a potential approach to the explanation of how firms use their idiosyncratic valuable intangible resources to conceive of and implement value-creating strategy, the perspective has lapsed on the explanation of how and why firms outperform others in rapid changing environments. This laid to the emergence of dynamic capabilities view as an extension of the former. Nevertheless, hitherto the concept of dynamic capabilities is yet to be well acquainted. Hence, this research has purposely reviewed the concept of dynamic capabilities and conceptually developed a model which hypothesized the possible relationships between various phases of dynamic capabilities (i.e., sensing, learning, integrating and coordinating capabilities) as well as their role as potential antecedents of performance. The study has concluded that there is a positive conceptual relationship between one capability to another in their logical sequence and also all capabilities positively relate to performance. Future, research may found this model important to investigate such relationships empirically.

Key words: Dynamic capabilities view, resource-based view, turbulent environment, performance, dynamic capabilities

INTRODUCTION

The current flux and turbulent business setting necessitate the need for scholars and organizational researchers to develop theories and frameworks that explain how firm can achieve competitive advantage and superior performance through the integration of its resources in such unpredictable environment. It is quite indisputable that resource-based approach is potential in explaining how firm uses its internal and external resources to conceive of and implement a valuable strategy to achieve and sustain competitive advantage (Barney, 1991). Nevertheless, this approach has lapsed in the explanation of how and why some firms outperform others under situations of rapid and unpredicted changes (Eisenhardt and Martin, 2000).

Consequently, the Resources-Based View (RBV) of the firm has been extended to Dynamic Capabilities View (DCV) that attempt to explain the greater ability of a firm to acclimatize to environmental demands by altering its resource base (Nieves and Haller, 2014). Nevertheless, due to the fact that research on dynamic capabilities is generally an emergent field (Sher and Lee, 2004; Teece, 2007), there is generally lack of understanding of dynamic capabilities processes and their relationships with firm performance (Li and Liu, 2014). Hence, this

study addresses this issue by conceptualizing dynamic capabilities' processes or dimensions in their logical sequence and their relationships with performance.

THEORETICAL BACKGROUND

Dynamic Capabilities View (DCV) was first developed by Teece *et al.* (1997) who defined the term as the ability of a firm to build, integrate and reconfigure its internal and external competences to address rapid changing environments. These researchers are also of the view that the Resource-Based View's (RBV) strategy of accumulating valuable assets often guided by the firm's aggressive intellectual property right is often not enough to support significant superior performance especially in rapid changing environments. In their earlier publication, Teece and Pisano (1994) noted that successful firms are those that can demonstrate response on time, rapid and flexible innovation along with the management capabilities to effectively coordinate and redeploy internal and external competences.

Unlike the RBV which was built on heterogeneous and inimitable resources, the DCV posits that the essence of competences and capabilities is rooted in organizational and managerial processes shaped by assets positions of a firm and molded by its paths. Firstly,

the managerial processes referred to the way and manner things are carried out in a firm. According to Teece *et al.* (1997), these processes are referred to routines or patterns of the current firm's practice and learning. Secondly, the positions of the firm's assets that shape organizational and managerial process in view by Teece *et al.* (1997) referred to specific assets which determine the firm's ability to compete advantageously and perform credibly at any point in time. Lastly, the notion of paths dependencies that molded those organizational and managerial processes are referred to the firm's specific history (Teece *et al.*, 1997). In this sense, the firm's previous investments and collection of its routines compose its future behavior, because learning opportunities is 'close in' to previous activities as it involves the process of trial, feedback and evaluation.

LITERATURE REVIEW

Concept of dynamic capabilities: Previous literature has acknowledged that the concept of dynamic capabilities originated from the spirit of the work of Schumpeter in 1934 (Camison and Monfort-Mir, 2012; Jiao *et al.*, 2013; Pavlou and El Sawy, 2011). The Schumpeterian view hypothesized that the routines and capabilities that comprise the fundamental structure of a firm and evolutionary that fit between environment and that firm is what determine its performance (Makkonen *et al.*, 2014). Moreover, the view suggested that the novel combination of the fast knowledge and the firm's existing resources into new operational capabilities constitutes the fundamental of DCs (Jiao *et al.*, 2013; Makkonen *et al.*, 2014; Pavlou and El Sawy, 2011).

This idea is further developed in the literature and consequently draws the attention of various researchers (Pavlou and El Sawy, 2011). However, the developmental contributions to dynamic capabilities includes some previous works such as architectural innovation (Henderson and Clark, 1990), configuration competences (Henderson and Cockburn, 1994) and combinative capabilities (Kogut and Zander, 1992). The extension of these studies by Teece and Pisano (1994) and Teece *et al.* (1997) developed the precise notion of dynamic capabilities and their antecedents (Pavlou and El Sawy, 2011). Moreover, the recent dynamic capabilities framework by Teece (2007) and the previous conceptualization of the paradigm by Teece *et al.* (1997) perceived competitive advantage in turbulent and unpredicted settings as a function of dynamic capabilities. In this sense, the performance of a firm operates in such an environment is subject to its ability to renew and reconfigure its competences and existing capabilities to face environmental changes.

Deferent perspectives on dynamic capabilities: The early approaches toward dynamic have associated the concept with the greater ability of a firm to address environmental changes by altering its resources (Nieves and Haller, 2014). For example, Grant (1996) acknowledged that the concept as mainly related to the solution of the problem in achieving competitive advantage under the hyper-competitive situation. Teece and Pisano (1994) associated the term with timely response to product innovation as well as management capability to efficiently and effectively redeploy and coordinate internal and external competences and Teece *et al.* (1997) noted that dynamics refers to the firm's ability in renewing competences to cope with changing business environment.

On the other hand, Zollo and Winter (2002) argued that the need for the existence of dynamic capabilities does not necessarily requires the presence of such "rapid changing environment". According to these researchers, firms obviously integrate, build and reconfigure their existing competences even in an environment where the occurrence of change is at very low rates. Hence, dynamic capabilities may refer to the willingness and ability of a firm to configure its resources and routines in a manner envisioned and considered more appropriate by its decision makers (Zahra *et al.*, 2006).

In sum, Nieves and Haller (2014) argued that even though, the earlier conceptualizations of dynamic capabilities have associated the concept with changing nature of environments (Teece and Pisano, 1994; Teece *et al.*, 1997), the later contributions maintain that the concept does not only relate to the changing environment but also the changes occurring in the resources and capacities of firms. In essence, nowadays the literature generally considers dynamic capabilities as the purposeful creation and renewal of the firm's resources to enable it to react to new circumstances. However, whether the application of dynamic capabilities by a firm or its managers is only necessary for turbulent environments may not be an issue of this study. What is crucial to this study is that dynamic capabilities represent an emerging and a potential concept of understanding new sources of firm competitive advantage (Wu, 2010).

Definition of dynamic capabilities: Teece *et al.* (1997) defined the term dynamic capabilities as the ability of a firm to build, integrate and reconfigure its internal and external competences in order to deal with the rapid changing environment. In this sense, the concept is a coordinative mechanism of firms which integrate and reconfigure the existing firms resources and competences in order to produce new capabilities and core competences. These core competences are what make a firm to outperform other competitors in a rapid

changing setting as they are difficult to replicate. On the other hand, dynamic capabilities have been defined as antecedents of the firm's strategic routines by which managers integrate, build and recombine resources and competences in order to generate and sustain superior performance (Eisenhardt and Martin, 2000). They are learned and stable pattern of collective activity by which a firm systematically creates and modifies operating routines in order to improve its effectiveness (Winter, 2003; Zollo and Winter, 2002). As such, these capabilities are the drivers of the creation, evolution and reconfiguration of existing resources to provide new sources of firm performance.

Although, both operational and dynamic capabilities are the collection of routines, dynamic capacities are explicitly referred to the ability of a firm to reconfigure and change whereas operational capabilities are described as the ability of a firm to make daily operations (Winter, 2003). From this understanding, Pavlou and El Sawy (2011) defined operational capability as the ability to execute day to day activities while dynamic capabilities concerned with the firm's ability of reconfiguring operational capabilities by sensing the environment needs and opportunities, integrating the existing capabilities with the knowledge and deploying resources and activities in reconfiguring capabilities that will address such needs.

Dimensions of dynamic capabilities: In addition to different perspectives on the concept of dynamic capabilities, some disputes also exist with regard to the phases or dimensions of dynamic capabilities as identified by various scholars (Nieves and Haller, 2014). Li and Liu (2014) categorized dynamic capabilities into three dimensions. These are strategic sense-making capacity, timely decision-making capacity as well as change

implementation capacity. Villar *et al.* (2014) on the other hand, proposed two dimensions of knowledge management dynamic capabilities which are external knowledge integration and internal knowledge development.

However, Pavlou and El Sawy (2011) introduced and applied a dynamic capabilities model which comprise four basic dimensions (i.e., sensing, learning, integrating and coordinating). These dimensions comprise a pool of capabilities and their interaction in a logical sequence so as to reconfigure existing firm's operational capabilities to new ones that better match its environment (Nieves and Haller, 2014). Pavlou and El Sawy (2011) argued that their operationalization of dynamic capabilities was basically based on the research by Teece *et al.* (1997) on organizational and managerial processes roles (i.e., coordination/integration, learning, and reconfiguration) and Teece (2007)'s framework (i.e., sensing environment to seize opportunities). Moreover, Pavlou and El Sawy (2011) model relied on the definition and view by Eisenhardt and Martin (2000) (i.e., dynamic capabilities consist of specific, identifiable routines and processes which are intended to integrate, build and reconfigure new capabilities) to proposed these set of capabilities.

MODEL DEVELOPMENT AND PROPOSITIONS

This study has drawn on Pavlou and El Sawy (2011)'s dimensions of dynamic capabilities to proposed possible interaction of these logical processes and their role as antecedents of performance in turbulent environments. In Fig. 1, the logical sequence of the phases of dynamic capabilities is presented whereas Fig. 2 represents the hypothesized possible relationships between a set of capabilities as well as between capabilities and performance.

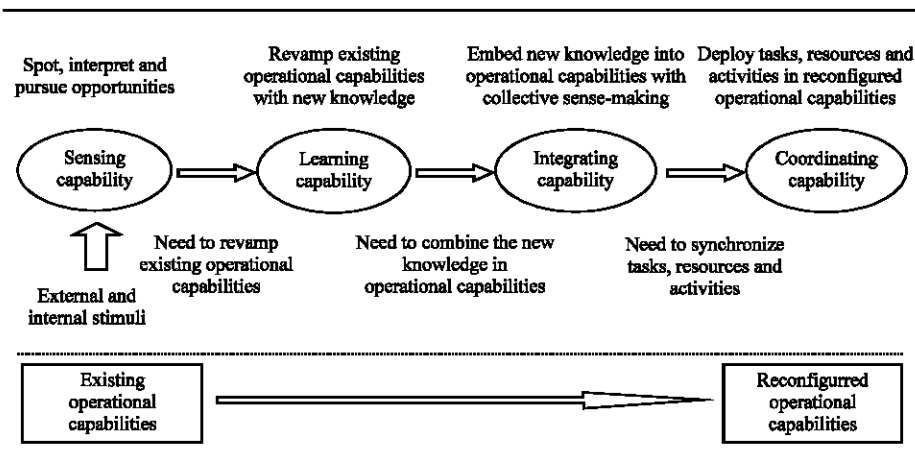


Fig. 1: Framework for representing the proposed measurable model of dynamic capabilities (Pavlou and El Sawy, 2011)

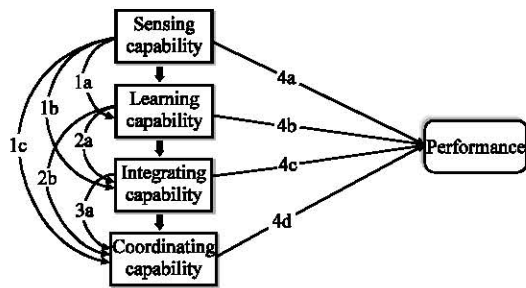


Fig. 2: The conceptualized model with propositions

Sensing capability: Due to today’s rapid and constant flux in global business environment, technological opportunities, change in consumer needs and fiercely competitive activities, opportunities open up for both incumbent and new enterprises, thus, putting profits of incumbent at risk (Teece, 2007). Hence, sensing new opportunities is now very much necessary for scanning, learning, creation and integrative activity. Moreover, investment in research and activities related to this activity is usually necessarily important.

By definition, sensing refers to the firm’s ability to spot, interpret and pursue environmental opportunities (Nieves and Haller, 2014; Pavlou and El Sawy, 2011). Teece (2007) acknowledged two major factors by which firms detect opportunities in their environments. Firstly, entrepreneurs usually have different access to available existing information. This entrepreneurial function take the advantage of any recognizes disequilibrium. It is the mechanism that underlines the continuous process of evolution and revolution. Secondly, new knowledge and information (i.e., both exogenous and endogenous) create opportunities. In other words, the application of new knowledge can sense opportunities to the firm. Moreover, Teece (2007) argued that to identify and shape opportunities, firms must continually search, scan and explore across markets and technologies both within the local and distance environments. They also argued that this activity is not only limited to research, probing and reprobng technological possibilities and customer needs. But also to understand the talent demand, structural evolution of firms/industries and markets as well as the supplier and competitor responses.

To sum, sensing is a crucial phase of dynamic capabilities because reconfiguration requires a surveillance of new technologies and the market trend to sense and seize environmental opportunities (Pavlou and El Sawy, 2011). Teece *et al.* (1997) noted that the ability of a firm to integrate and build requirements for change and make necessary adjustment largely depend on its ability to scan the environment, evaluate markets and

competitors and accomplish reconfiguration quickly ahead of competition. Therefore, sensing capabilities gives life to other phases/processes of dynamic capabilities as such this research has developed the following propositions:

- 1a, b, c: sensing capability positively affects the development of learning, integrating and coordinating capabilities

Learning capability: Once market opportunity has been identified through sensing, the firm must address it with new products, services or processes which are consequently require decisions to revamp and renew existing firm capabilities with learning new knowledge and skills (Pavlou and El Sawy, 2011; Teece, 2007). Teece (2007) further maintained that to address sensed opportunity, the firm should involve in the maintenance of and improving its technological competences and complementary assets to ripe such opportunity. Similarly, Pavlou and El Sawy (2011) suggested that to take advantage of market opportunities in rapid changing environments, a firm must engage in learning in order to find new solutions, build new knowledge and reconfigure existing operational capabilities. They also recommended that there is a two-way reciprocal relationship between sensing capability and learning capability. This is because apart from the role of learning to revamp existing knowledge to seized a sensed opportunity, learning capability also enhances the firm’s ability to detect new opportunities (Zollo and Winter, 2002).

Nevertheless, sensing and learning are distinct capabilities while sensing focuses on how firms gather new market intelligence, learning on the other hand, focuses on how to use market intelligence to create new knowledge (Pavlou and El Sawy, 2011). Precisely, learning capability has been defined as the firm’s ability to revamp its existing operational capabilities with new knowledge (Nieves and Haller, 2014). Pavlou and El Sawy (2011) noted that absorptive capacity (i.e., learning) as a form of dynamic capabilities has been earlier developed comprising four routines (i.e., acquiring, assimilating, transforming and exploiting knowledge). Therefore, the new learning capability dimension or process proposed by Pavlou and El Sawy (2011) built on this conceptualization (i.e., absorptive capacity) as earlier developed by Zahra and George (2002) and other scholars (Eisenhardt and Martin, 2000; Grant, 1996; Henderson and Cockburn, 1994; Teece, 2007).

In the first place, Pavlou and El Sawy (2011) related acquiring knowledge to obtaining new knowledge. Secondly, assimilating knowledge is related

to knowledge brokering and knowledge articulation. Thirdly, transforming knowledge concerns with innovative problem-solving, brainstorming and creative new thinking. And finally, exploiting knowledge consist of activities such as pursuing new initiatives, seizing opportunities with learning and revamping operational capabilities. Based on the above, learning has been conceptualized as an enabler of reconfiguration thereby helping to revamp existing firm's operational capabilities (Zollo and Winter, 2002). Consequently, learning gives life to other dynamic capabilities processes in their logical order. Hence, this study has conceptualized the following propositions:

- 2a, b: learning capability positively affects the development of integrating and coordinating capabilities

Integrating capability: Pavlou and El Sawy (2011) noted that reconfiguration relies on the firm's integration of new resources and assets. This is because a collective logic and shared interaction patterns are required for the reconfiguration of existing operational capabilities. It is however held that as new knowledge created through learning and mostly owned by an individual, therefore, it must be integrated into a collective level. Moreover, as these operational capabilities are supra-individual (i.e., do not reside within or belong to single individual), the individual knowledge and patterns of interaction must be integrated into a collective system so as to deploy the new configurations of operational capabilities.

Integration capability is the ability of a firm to combine knowledge of different individuals into unit's new operational capabilities (Nieves and Haller, 2014). Pavlou and El Sawy (2011) maintained that routines contribution, representation and interrelation of individual inputs into the collective business unit are closely related to the literature on dynamic capabilities. In essence, the literature associated contribution to disseminating individuals inputs within the business unit whereas representation concerns with visualizing how individuals fit in how other individuals react and how activities of business unit fit together. And lastly, interrelation is more of integrating inputs from different individuals within a business unit to sharpen reconfigured operational capabilities thereby executing a collective activity.

Pavlou and El Sawy (2011) proposed integrating capability from the aforementioned three basic routines (i.e., contribution, representation and interrelation of individual input) to facilitate reconfiguration. Firstly, contribution to business units to facilitate, collect and combine inputs of individuals. Secondly, representation

creates shared understanding and builds common ground and develops new perceptual schema. Thirdly, since reconfiguration requires a new logical collective interaction, therefore, interrelation facilitates routinization of reconfigured operational capabilities. Moreover, Teece (2007) referred dynamic knowledge integration as a foundation and basis for dynamic capabilities. Hence, this capability leads to the final stage of new capability reconfiguration and thus this conceptualization has proposed that:

- 3a: integrating capability positively affects the development of coordinating capabilities

Coordinating capability: Pavlou and El Sawy (2011) noted that since new operational capabilities' reconfiguration requires effective coordination of resources, tasks and synchronization of activities, coordinating capability administer resources task and activities to deploy the reconfigured operational capabilities. In essence, coordinating capabilities deploy resources, task and activities to enable reconfigured capabilities in order to face environmental issues and source and maintain superior firm performance. By definition, the coordinating capability has been defined as the ability of a firm to coordinate and deploy its tasks, resources and activities in the new operational capabilities (Nieves and Haller, 2014). However, Pavlou and El Sawy (2011) noted that coordinating capability's basic routines also drawn upon the literature of dynamic capabilities. These include assigning resources to the task, appointing the right person to the right task, identifying complementarities and synergies among tasks and resources as well as orchestrating collective activities.

Even though, Pavlou and El Sawy (2011) argued that coordinating capability is positively associated with integrating capability as coordination is enhanced by shared language. Kogut and Zander (1996) held that integrating capability and coordinating capability are theoretically and empirically distinct. In essence, while integration concerns with building an overall collective sense-making and understanding, coordination has to do with orchestrating individual tasks and activities. Moreover, Pavlou and El Sawy (2011) observed that dynamic capabilities are embedded in distinct ways of coordinating. In a nutshell, both reconfiguration and innovation may necessitate management to combine co-specialized assets in order for systematic innovation to occur. These researchers further noted that coordination is the process by which firm use to create, adapt and recreate organizations. Consequently, coordinating capability helps to implement and deploy new configured operational capabilities.

Dynamic capabilities and performance: In light of the above discussion of dynamic capabilities, it is enough to say that all these dimensions or stages are interacting with one another in a logical sequence in order to reconfigure existing firm's operational capabilities to new ones that better match its environment (Nieves and Haller, 2014) and subsequently sources superior firm performance. In this regards, dynamic capabilities are willingness and ability of a firm to configure its resources and routines in a manner envisioned and considered more appropriate by decision makers to influence performance (Zahra *et al.*, 2006). As such, successful firms are those that are able to demonstrate response time, rapid and flexible innovation along with the management capabilities to effectively coordinate and redeploy internal and external competences (Teece *et al.*, 1997).

Jiao *et al.* (2013) argued that effective dynamic capabilities enable firms to transform intangible resources into innovative products, services and processes that will in turn give firms superior outcomes. Lee *et al.* (2002) acknowledged that dynamic capabilities are sources of firm superior performance. Moreover, there are increasing empirical evidence of dynamic capabilities as sources of performance (Lin and Wu, 2014; Villar *et al.*, 2014; Zott, 2003). For example, Walter *et al.* (2006) attested that network capability has a positive relationship with spin-offs performance whereas Wu (2006) established that dynamic capabilities affect IT enterprises performance positively. Similarly, Wu (2007) affirmed that there is a positive relationship between start-up dynamic capabilities and start-up performance of high-tech firms. Consequently, there is a good anticipation that:

- 4a, b, c, d: dynamic capabilities of sensing, learning, integrating and coordinating are positively related to firm superior performance

CONCLUSION

In summary, this research hypothesized ten propositions, six of which are concerned with the relationships between forms or phases of dynamic capabilities and the last four concerned with the relationships between these dynamic capabilities processes and performance. However, the study has concluded that there is a possible effect on the development of any phase of dynamic capabilities by its predecessor(s) in their sequential order. Even though, these capabilities are distinct, yet achieving a particular capability is a roadmap to the attainment of another. In other words, all dimensions or stages are interacting with one another in a logical sequence in order to reconfigure existing firm's operational capabilities to new ones that better match its environment.

Similarly, as postulated by both dynamic capabilities theory and framework that in such a turbulent environment, superior firm performance relies on dynamic capabilities, this research has also reaffirmed this relationship conceptually. Even though, this study has not established this analogy empirically, it so reasonable that this relationship exist as previous studies have established the relationship although with a different set of capabilities and different context. However, this could guide the direction of both scholars and research students intending to conduct empirical studies in similar fields. Hence, future research may consider investigating both the relationships between these set of dynamic capabilities and in their relation to performance empirically.

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