Global Scientific JOURNALS

GSJ: Volume 7, Issue 10, October 2019, Online: ISSN 2320-9186
www.globalscientificjournal.com

DYNAMIC CAPABILITIES AND TECHNOLOGICAL ORIENTATION: A CONCEPTUAL OVERVIEW

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Abstract

Debate emanating from management research and practice has been particularly on the development of a framework that will effectuate organizational performance while addressing external factors. Dynamic capabilities framework has been discussed widely since it incorporates the creation, modification and reconfiguration of assets in an environment characterised by technological advancements. Management capabilities in this case play an important role of recombination of resources and capabilities. Technology orientation is equally of great importance is it lays down ways in which organizations conduct their business activities especially towards customers' satisfaction, technological development, improvement through learning and entrepreneurial aspects like innovation and risk taking. External environment is critical in every decision making process especially the threat of new entrants if there is a weak intellectual property regime to guard the valuable assets. It is evident that there are a limited number of properly operationalised empirical studies that have been conducted on dynamic capabilities and investigations tend to be case-based and qualitative. Additionally, few studies have not been able to relate and distinguish technology orientation and dynamic capabilities. This study, therefore, seeks to critically examine the role of technology orientation in development of dynamic capabilities which encompass managerial and organizational processes, firm's endowments and its available strategic alternatives and its attractiveness *of opportunities which lie ahead and hence high organizational performance. The need to tighten the dynamic capabilities framework as a basis for extensive empirical research in strategic management has been addressed in this review as it shows a relationship with technology orientation in achieving superior firm performance.*

Key Words: *Dynamic Capabilities, Technology Orientation, Environmental dynamism, Path Dependency*

1.0 INTRODUCTION

Over the recent years, there has been a great interest in study of dynamic capabilities. According to Teece (2007), dynamic capabilities can be described as the capacity of an organization to create, integrate and reconfigure internal and external resources to give an organization sustainable competitive advantage in a volatile environment (technological advancements). Duan (2013) describe dynamic capabilities as a special kind of organizational capabilities that enable firms to systematically sense and seize sustainable development opportunities from the rapidly changing stakeholders' expectations, so as to simultaneously achieve economic, environmental and social benefits. Zollo and Winter (2002) concluded that a dynamic capability is a learned and stable pattern of collective activity through which the firm systematically generates and modifies its operating routines for improved and better effectiveness. Zahra *et al.* (2006) explained extensively that they are the abilities to reconfigure a firm's resources and routines in a manner envisioned and deemed appropriate by its principal decision makers.

Teece *et al.* (1997) describes dynamic capabilities framework as one that analyses the sources and methods of wealth creation and capture by private enterprise organizations operating in environments of rapid technological change. They suggested that competitive advantage of organizations is seen as resting on distinctive processes (ways of coordinating and combining), shaped by the organization's (specific) asset positions (such as the organization's portfolio of difficult-to-trade knowledge assets and complementary assets), and the evolution path(s) it has adopted or inherited.

The importance of path dependencies is amplified where conditions of increasing returns exist. Whether and how an organization's competitive advantage is eroded depends on the stability of market demand, and the ease of reliability (expanding internally) and imitatability (replication by competitors). Teece (1997) posits that a capability is a set of learned processes and activities that allow a company to produce a particular effect. Ordinary capabilities are like best practices. They normally start in one or two organizations and spread to the entire industry. Dynamic capabilities are distinctive and unique to each company and rooted in the company's history. They're captured not just in norms, but in business models that go back decades and that are difficult to imitate. Organizations opting for 'resource-based strategy' endeavour to accumulate valuable technology assets and employ an aggressive intellectual property stance. However, leaders in the global marketplace have been organizations exhibiting timely responsiveness and rapid and flexible product innovation, along with the management capability to effectively coordinate and redeploy internal and external competences (Eisenhardt & Martin 2000).

DCV introduces dynamic elements(when markets emerge, collide, divide, evolve and die) into theories on the process of the development of strategic assets and the formation of strategies and balances out the biases caused by studies based solely on the Resource Based View and the Knowledge Based View both on a theoretical level and in managerial practice (Barney, 2001). March (1991) described a firm as a continuous well-ordered flow of dynamic capabilities aiming at attaining strategic objectives. Therefore, it enables managers to arrive at more balanced decisions, affecting aspects such as resources, the firm's activities, present markets (exploitation) and any new opportunities which may arise in the future.

1.1 Dynamic Capabilities

Dynamic capabilities have been defined as an organization's ability to incorporate, build, and restructure internal and external competencies to address changing environments. Eisenhardt and Martin (2000) expanded the definition to include the ability of organizations to initiate change, defining dynamic capabilities as "the organization's processes that use resources to match and even create market change. These organization processes refer to practices that allow the integration, realignment, acquisition, and deployment of resources in response to changing markets (Eisenhardt & Martin, 2000). Helfat *et al.* (2007) describe dynamic capabilities as the capacity of an organization to purposefully create, extend or modify its resource base, and consists of patterned and somewhat practiced activity. Teece (2007) delineated dynamic capabilities into the capacity to sense and shape opportunities and threats, to seize opportunities and to maintain competitiveness through enhancing, combining, protecting and reconfiguring intangible and tangible assets.

Teece *et al.* (1997) categorized capabilities and competences into three. They are: processes (routines and practices), positions (endowments) and paths (past and future alternatives). They concluded that the framework encompassed organizational processes that are shaped by the firm's asset positions and molded by its evolutionary paths (Strategic alternatives available to the firm and attractiveness of opportunities which lie ahead. Organizational and managerial processes have three roles which are coordination, learning and reconfiguration. Various classes of assets have been identified to define an organizational position. These are: technological, complementary, financial, reputational, structural, institutional and market assets. Dynamic capabilities model emerged as a complement to Resource Based View (RBV) in an attempt to explain competitive advantage in rapidly changing environment. The theory draws its tenets from the work on organizational routine, core competence, core capability and rigidity, and absorptive capability. The dynamic capabilities-based view addresses this issue and focuses on the mechanisms of integrating, building, and reconfiguring internal and external competencies and resources. According to Eisenhardt and Martin (2000), dynamic capabilities are basically processes in terms of strategic or organizational practices through which organizations realign their resources to respond to or create market change. Dynamic capabilities are the subset of the capabilities which allow the organization to create new products and processes, and respond to changing market circumstances.

Dynamic capabilities can be differentiated from operational capabilities, which pertain to the current operations of an organization. Dynamic capabilities refer to "the capacity of an organization to purposefully create, expand, or modify its resource base" (Helfat *et al.*, 2007). The basic hypothesis of the dynamic capabilities framework is that core competencies should be used to transform short-term competitive positions into longer-term competitive advantage. Teece's idea of dynamic capabilities essentially says that what matters for business is corporate agility: the capacity to (1) sense and shape opportunities and threats, (2) seize opportunities, and (3) maintain competitiveness through enhancing, combining, protecting, and, when necessary, reconfiguring the business enterprise's intangible and tangible assets.

The common features of dynamic capabilities across organizations are identifiable and show the nature of commonalities in key features (Eisenhardt & Martin, 2000). Wang and Ahmed (2007) posit that it is possible to identify three main components of dynamic capabilities across studies, namely adaptive capability, absorptive capability and innovative capability. These competences underpin an organization's ability to integrate, reconfigure, renew and recreate its resources and capabilities in line with external changes. Adaptive capability stresses an organization's ability to adapt itself in a timely fashion through flexibility of resources and aligning resources and capabilities with environmental changes. Hence, the focus of adaptive capability is to align internal organizational factors with external environmental factors. Absorptive capability highlights the importance of taking external knowledge, combining it with internal knowledge and absorbing it for internal use. Innovative capability effectively links an organization's inherent innovativeness to marketplace-based advantage in terms of new products and markets. Therefore, innovative capability explains the linkages between an organization's resources and capabilities with its product markets. In building on this framework these three types of capabilities are described in more detail below and also linked to the context of commercialization (Wang and Ahmed, 2007). Teece (2007) concluded that dynamic capabilities is essential in organizational strategy, value creation and competitive advantage.

1.2Technology Orientation

Grinstein (2008) describes technology orientation as an organization's inclination to introduce or utilise new technologies, products or innovations. Technology orientation implies that long term success and customer value is best created through new technological solutions, products and services or processes (Gatignon & Xuereb, 1997; Grinstein, 2008; Prahalad & Hamel, 1990). Berthon *et al.* (1999) describe a successful interlink between customers and technologies as the interact-mode. Gatignon and Xuereb (1997) further explained that product differentiation from the competition or cost advantages in production can be achieved by developing new technologies and adapting existing ones. Technological inventors actively develop and incorporate new technology in products, to aspire to a superior technological capability to their competitors and find customers that value the solutions they provide (Hakala & Kohtamäki, 2011)

Technology orientation can be equally explained through its alignment with the resource-based view of strategy. RBV suggests that technological resources, when uniquely combined, can enhance an organization's ability to achieve competitive advantage (Porter, 1991). A growing body of literature shows that technological innovation is the most important driver of competitive advantage in many industries. This has been brought about by many aspects which include but not limited to deregulation, globalization, rapid technological progress (advances in IT, biotechnology, and nanotechnology), and accelerating diffusion rates for technology-based products. These factors when integrated increase competition in many industries. All firms that are technologically oriented follow their mission and strive to achieve their vision. Therefore, the role of the top management in deciding the means of acquiring new technology from the market or build from the firm resources cannot be ignored (Antoniou & Ansoff, 2004).

Morone (1989) further explains that the top management is involved in research and development decisions while weighing on the extent of cooperating with other market players and determine the technological direction of the firm. Voudouris, Lioukas, Iatrelli & Caloghirou (2012) concluded that technological assets and the resulting combinations give a firm a competitive edge. This is because the products created with the help of these reosurces are unique and can be offered at a premium. Technological capabilities should therefore be created and nurtured by the top management. According to a survey done by Halac (2015) of 147 manufacturing firms in Izmir, technology orientation can be explained by the commitment to learning and change by the top management of a firm.

2.0 THEORETICAL FOUNDATION OF THE STUDY

2.1 Introduction

Dynamic capabilities theory emerged as a complement to Resource Based View (RBV) in an attempt to explain competitive advantage in rapidly changing environment. The theory draws its tenets from the work on organizational routine, core competence, core capability and rigidity, and absorptive capability. In the last decade a growing number of scholars consider dynamic capabilities to be at the heart of organization strategy, value creation and competitive advantage (Teece, 2007). The dynamic capabilities-based view addresses this issue and focuses on the mechanisms of integrating, building, and reconfiguring internal and external competencies and resources. According to Eisenhardt and Martin (2000), dynamic capabilities are basically processes in terms of strategic or organizational routines through which organizations mobilize their resources to respond to or create market change.

2.2 Theoretical Framework and foundation of Dynamic Capabilities

This section is concerned with the theoretical framework, an evaluation of dynamic capabilities and strategic orientation and environment, and the relationship between dynamic capabilities and organizational performance.

2.2.1 Resource-based View Theory

According to the resource-based view, valuable, rare and non-substitutable resources of the organization are significant for sustainable competitive advantages (Wernerfelt, 1984). The success of an organization in a competitive environment is dependent on the organization's resources. The resource-based view of organization mainly addresses the resources that contribute to organization competitive advantage and how these resources enable an organization to achieve superior performance and be competitive in its industry (Eisenhardt & Martin, 2000). By assuming resource heterogeneity and immobility, resource-based theory suggests resources which are rare, valuable, inimitable, and non-substitutable, can contribute to superior organization performance and sustained competitive advantage. RBV perspective regard the firm as a single unit and organized group of heterogeneous assets that is created, developed, renewed, evolved and improved with the passage of time. This concept of the firm as a unit of resources and capabilities has increased the need to identify the nature of these varying resources and in evaluating their potential for generating profits. The heterogeneity in the firm's assets is the main factor in explaining varying performance among firm. Therefore, the RBV emphasize the study of factors that cause resource differences to persist (Amit & Schoemaker, 1993). It does not, however, analyse their causes or the process which determines them; increasingly essential aspects of analysis in a dynamic context (Barney, 2001). The resource-based view of the organization provides a useful viewpoint for explaining organizational growth and sustainable competitive advantage (Mahoney, 1995).

Recently, the resource-based approach has begun to consider dynamic routines and processes, which are linked to the dynamic capabilities research literature (Eisenhardt &Martin 2000). This paper emphasizes an additional component concerning the sequencing of dynamic capabilities during periods of substantial environmental change brought about by deregulation (Pettus, 2003). This component can enhance our understanding of how organizations match their dynamic capabilities to changing environments (Wang & Ahmed, 2007).

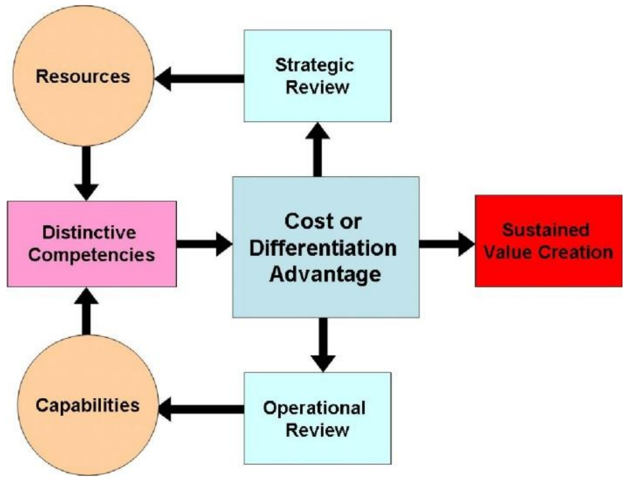

Figure 2.1: Resource and Capability Based View of the Firm (Source: Srivastava, 1995)

2.2.3 Knowledge based View

Knowledge based approach considers firms as bodies that generate, integrate and distribute knowledge for a better functioning of the organization (Grant, 1991). The ability to create value is not based as much upon physical or financial resources as on a set of intangible knowledge-based resources (Lopez, 2005). Firms that possess stocks of organizational knowledge associated with the creation of value that could be described as uncommon or idiosyncratic, had better chances of generating and sustaining high returns and sustainable competitive advantage. Knowledge is, therefore, considered as the key strategic asset for firms and a basic element of analysis. Research findings have supported the fact that the processes of generation, development and application of tacit knowledge is of great importance (Nonaka & Takeuchi, 1995).

Shrivastava (1995) emphasised the complementary nature of KBV and organizational learning. He argued that the part played by managers in their role as strategists and decision-makers (organization) is principally centred upon two knowledge-based business assets. Stocks of knowledge (both of a collective and individual nature), are resources possessed and controlled by the firm and to develop dynamic learning processes (collective and individual). There is growing evidence of the importance of knowledge, information and innovation. Organisations can achieve competitive advantage and this depends on employees' knowledge, experience, creative activity and qualification. This is also enhanced by continuous learning and research and development. (Senge, 2007).

3.0 CONCEPTUAL AND EMPERICAL RELATIONSHIP OF VARIABLES

Dynamic Capabilities and Technology Orientation

Zahra *et al.* (2006) argue that the mere existence of dynamic capabilities in an organization does not result in competitive advantages or high performance. The relationship results from the idea that dynamic capabilities originate and define the organization's individual resource configuration, which shapes the organization's competitiveness and therefore performance. An organization usually adopts a particular orientation to address the external environment. Technology-oriented organizations change and shape the environment and are willing to commit resources to exploit uncertain opportunities. They explore new and creative ideas that may lead to changes in the marketplace and do so proactively ahead of the competition in anticipation of future demand. This kind of better adjustment and shaping of the environment should have positive effects on organization performance (Keh *et al.*, 2007).

Customers are unlikely to wish for things they are not aware of (Prahalad & Hamel 1991), therefore product differentiation from the competition or cost advantages in production can be achieved by developing new technologies and adapting existing ones (Gatignon & Xuereb 1997).This will address the issue of new entrants in the market. Zhu (2004) views e-commerce as higher-order capability that requires alignment among organizational factors, changing technology and business environments. Consistent with IT-related RBV literature, e-business serves as a resource enabler or catalyst that supports organizations in reconfiguring resources and capitalizing on opportunities to adapt to the fast-changing environment. Technology orientation implies that long term success and customer value is best created through new technological solutions, products and services or processes (Gatignon & Xuereb, 1997; Grinstein, 2008; Hamel & Prahalad, 1991). Berthon *et al.* (1999) describe a successful interlink between customers and technologies as the interact-mode. Gatignon and Xuereb (1997) further explained that product differentiation from the competition or cost advantages in production can be achieved by developing new technologies and adapting existing ones. Technological inventors actively develop and incorporate new technology in products, to aspire to a superior technological capability to their competitors and find customers that value the solutions they provide (Hakala & Kohtamäki, 2011)

4.0 RESEARCH AND KNOWLEDGE GAPS

4.1 Knowledge Gaps in Dynamic Capabilities

From the review of empirical literature, it is evident that few studies have addressed and used multidimensional constructs of dynamic capabilities. Most researchers have employed simple proxies or constructs for investigating organizations in general. Many empirical articles tend to use the theoretical perspective of dynamic capabilities only as an explanation approach and not as a model that can guide decision making process in the quest to achieve and sustain competitive advantage. Zahra *et al.,* (2006) concluded that dynamic capabilities framework involves various processes and has failed to provide clear constructs. Teece *et al.* (1997) recommended further research and theoretical work on dynamic capabilities so as to tighten the framework. According to these authors, empirical research is critical in the understanding of how firms get to be good, how they sometimes stay that way, why and how they improve, and why they sometimes decline. The aspect of dynamic capabilities and how it can help a firm gain and sustain competitive advantage represent a clear research gap. Strategy should also be a battle for sustained development of the organization's organizational capabilities (Teece *et al.*, 1997) and not just a battle for strong market positions.

As an emerging area of research, several calls for how to develop a theory of dynamic capabilities have been issued. First, the concept of dynamic capabilities has been criticised for being tautological in nature and for not being operational (Mosakowski & McKelvey, 1997; Priem &Butler, 2000). Thus, this study follows recent calls for enhancing conceptual models of dynamic capabilities (Wang &Ahmed, 2007) by exploring possible antecedents of dynamic capabilities. Second, scholars agree that the field lacks empirical studies of new organizations (Zahra *et al.,* 2006), as new organizations are likely to have fewer initial resources to the development of dynamic capabilities. Third, research needs to frame micro-questions concerning of how and why managers use dynamic capabilities, what dynamic capabilities look like in organizations, and how they are deployed (Ambrosini & Bowman, 2009). Following this call an empirical study of the experience of managers in entrepreneurial organizations is necessary. Lastly, there is need to determining the moderating function of technology orientation in dynamic capabilities-performance relationship. Zahra (2007) points out that few studies relate dynamic capabilities to an organization's innovation hence a link to entrepreneurial aspect of strategic orientation. Thus the framework contains the context of dynamic capabilities, technology orientation in a rapidly changing environment and how an organization can achieve superior firm performance.

4.2 Conceptual Overview

Achieving superior performance in the face of dynamic environment is the main concern of an organizations. Rapid environmental changes (both external and internal) have led to most organisational failures as core competences and capabilities easily become obsolete. As a result, the concept of dynamic capabilities was coined so as to address these issues. Dynamic capabilities have been defined as an organization's ability to incorporate, build, and restructure internal and external competencies to address changing environments. Teece *et al.* (1997) categorized capabilities and competences into three. They are: processes (routines and practices), positions (endowments) and paths (past and future alternatives). They concluded that the framework encompassed organizational processes that are shaped by the firm's asset positions and molded by its evolutionary paths (Strategic alternatives available to the firm and attractiveness of opportunities which lie ahead.

Organizational and managerial processes have three roles which are coordination, learning and reconfiguration. From the literature, it is evident that rapid technological advancements contribute to environmental dynamism. Therefore, an organization with a strong propensity to technology creation, adoption and use will outdo its rivals. Technology orientation implies that long term success and customer value is best created through new technological solutions, products and services or processes (Gatignon & Xuereb, 1997; Grinstein, 2008; Hamel & Prahalad, 1991).Technology orientation equally has a moderating effect of dynamic capabilities-competitive advantage relationship. The need to separate technology orientation and innovation constructs have been emphasised in literature. It is, therefore, important to study technology orientation concept and establish its relationship with dynamic capabilities. This will enhance a firm’s ability to earn excess economic rents (Collis, 1994)

4.3 Conclusion

It is necessary to focus on the identification of dynamic capabilities in a rapidly changing environments for the existence of dynamic capabilities. An analysis of the most important definitions of dynamic capabilities reveals fundamental contradictions. Expanding the analysis to more articles leads to the identification of further inconsistencies will be important. Eisenhardt and Martin (2000) posit that dynamic capabilities are specific and identifiable processes and rather embedded in an organization’s routines. Zollo and winter (2002) emphasise that they are a group of activities that can be analysed in a patterned way.

Researchers like Anand and Vassolo, (2002) tend to link the organization’s possession of dynamic capabilities to organization success. If this is the case, it would mean that unsuccessful organizations do not have any dynamic capabilities and considers this understanding as unsatisfactory and tautological. Dynamic capabilities have often been criticized for being repetitive vague and not operational. Furthermore, while organizational performance has been a core issue in the research on dynamic capabilities the question of whether and how they affect performance is still open (Helfat *et al.,* 2007).

4.4 Implications of the Study

This literature review aimed at exploring the joint relationship between dynamic capabilities and technology orientation in determining superior organizational performance. This review will be of great interest to both academics and practitioners, particularly the top management teams. It is evident from the review of literature that dynamic capabilities have impact on organizational performance. Some studies explain the indirect link between dynamic capabilities and firm performance indicating that they cannot in themselves is a source of sustainable competitive advantage; rather they contribute to the achievement of superior firm performance by combining and renewing functional competences which, in turn, affect performance. The identification of dynamic capabilities as processes that shape the firm's resource reservoir, addresses the tautology problem arising when they are directly related to firm performance. Therefore, managers should recognise the significant payoffs of building and developing dynamic capabilities.

Dynamic capability helps a firm transfer the benefits of operational capabilities from alliances partners to superior firm performance. Further, dynamic capability also effectively updates and renews a firm's operational capabilities that lead to an enhanced firm performance. Managers can use dynamic capabilities as tools to manipulate, integrate and recombine their firms' functional and organizational competences and resources in achieving and sustaining competitive advantage. The need to tighten the dynamic capabilities framework as a basis for extensive empirical research in strategic management has been addressed in this review as it shows a joint relationship with technology orientation in achieving high performance. This will enhance the delineation of dynamic capabilities construct in academics and research particularly in the quest of analyzing the sources and methods of wealth creation and capture by firms operating in environments of rapid technological change as recommended by Teece *et al.*, (1997)

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