10-8-2018

Business Intelligence and Data Analytics as a Driver of Dynamic Capability Strategic Approach

Maoloud Dabab
Portland State University

Charles Weber
Portland State University, webercm@pdx.edu

Citation Details

M. Dabab and C. Weber, "Business Intelligence and Data Analytics as a Driver of Dynamic Capability Strategic Approach," 2018 Portland International Conference on Management of Engineering and Technology (PICMET), Honolulu, HI, 2018, pp. 1-9.

Business Intelligence and Data Analytics as a Driver of Dynamic Capability Strategic Approach

Maoloud Dabab, Charles Weber
Dept. of Engineering and Technology Management, Portland State University, Portland, OR - USA

***Abstract*—Papers addressing the Dynamic Capability (DC) approach either support it as the best strategy or express its defects and impediments to implementation. However, this paper aims to promote the DC through the means of digital transformation from the angle of Business Intelligence and Data Analytics (BIDA). This article employs the logic of matching the essential components of the DC and BIDA to verify the extent of their conformity. A literature review methodology has been adopted since there are a considerable number of publications that focus on DC and BIDA. This paper posits that the main components of DC are sensing and exploring changes, seizing opportunities, and managing reconfiguration and transformation. Whereas, the features of knowledge discovery, decision support, predicting changes and risks are related to the BIDA. Additionally, this study found that the BIDA has a significant positive effect on the DC and helps to achieve a competitive advantage. By drawing the connection and demonstrating the impact of the essential elements of DC and BIDA, this article shows the vital framework of how the BIDA supports the DC. Finally, some limitations and gaps that provide suggestions for future research in this area are discussed.**

I. Introduction

Having a sound business strategy is vital to surviving in a competitive market, and many strategic approaches might help companies achieve the competitive advantage. However, companies should think about the components that help them to be decisive and the activities that are required of the firm's management if the company is to sustain itself as markets and technologies change. In the strategic world, managers always try to figure out many questions: How do businesses become great; how do the firms achieve their competitive advantage; what causes them to fail utterly and how to build a competitive advantage; and how do the companies administer a new strategy. Two of the most critical questions are: What elements determine the power of nations and the competitive advantage of businesses, and how do companies get to differentiate and to become better than the average? In order to answer the questions, this paper tries to find the most important strategy to achieve the competitive advantage.

Today, firms need to create differentiation uniqueness and achieve a competitive advantage by being different from everybody else, and since everybody has access to almost the same technologies, the extraordinary companies master building their tangible and intangible assets. Additionally, to sustain the competitive advantage, firms need to renew their stock of valuable resources as their external environment changes [1]. Teece and Pisano were one of the first researchers who wrote about the concepts of DC, which they defined as "the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments" [2]. Thus, Teece explained how firms could create value, and the DC framework goes beyond traditional approaches to understanding competitive advantage [3]. Additionally, Winter mentioned that "The concept of dynamic capability is a helpful addition to the toolkit of strategic analysis" [4].

In the organization management hierarchy, strategic management is on top followed by tactical and operations management. Successful strategic management is built on the right planning and decision-making of operational and tactical management. In order for this to happen, integration of Business Intelligence (BI) tools at all levels of management has to exist at all levels, and that is what formulates business performance management. "Business performance management (BPM) is a key business initiative that enables companies to align strategic and operational objectives with business activities in order to fully manage performance through better-informed decision-making and action. Effective business performance requires an organization to model and monitor not only its tactics but also its strategies and the assumption on which these strategies are built." [5]. Furthermore, data that is generated is increasing, and companies are competing to obtain and use a massive amount of data to be the leader in the market. Leveraging Big Data initiatives and Data Analytics to develop and sustain competitive advantage is a meaningful way that many companies try to achieve the highest efficiency [6] [7] [8] [9]. There are several ways that businesses can leverage their collected data when using it with BI technologies. This leveraging can be used to deliver significant marketing campaigns, customer-based promotions, and utilization in

978-1-890843-37-3 ©2018 PICMET

manufacturing and supply chain management as an aggressive asset resource [10]. In dynamic and turbulent environments, big data and business analytics is the primary source of a competitive edge for companies and reinforces their DC [11]. In other words, implementing big data analytics within a business strategy is one of the possibilities that helps to guide the understanding the internal and external enablers and inhibitors of DC. This leads to a sustained competitive advantage, which is the most crucial point that most firms try to achieve.

This paper aims to explore the Dynamic Capability Strategy surrounding the concept of Business Intelligence and Data Analytics. The rest of this article is organized as follows: Section 1, we start by addressing the historic changing of the concept for DC since the idea emerged from David Teece in 1990. Also, the capability elements will be explained for clarification. In Section 2, we describe why we focus on the concept of BIDA and what makes us think about connecting the two terms. In Section 3, we highlight the critical components of DC and BIDA. In Section 4, these elements are combined in the initially suggested framework. In Section 5, we identified some limitations that will lead to future research. The key points are displayed in Section 6 through showing the significance of the study, demonstrating the importance of our ideas, and introducing the finding.

II. The Research Question

With regard to Winter's concern about how companies are using strategic analysis in a particular competitive context [12], in this paper we focus on analyzing BIDA In the era of Big Data, people argue that using BIDA can help to revolutionize the art of management. The resulting benefit will be a veritable source of competitive advantage as it allows firms to gain a superior understanding of their business in rapidly changing environments, which leads to improving their products and services accordingly. A specific question to ask is, does the Business Intelligent and Data Analytics (BIDA) aspect help to achieve the competitive advantage, or what is known as the Dynamic Capability (DC) concepts?

III. The History of Dynamic Capability of Use

Throughout the years, many strategy scholars continue to argue about the concept of dynamic capabilities and its value. The first contribution to DC theory was in 1990 when Teece, D.J., Pisano, G. & Shuen, A. explained DC concept as the firm's ability to integrate, build, and configure internal and external competencies to address expeditiously changing environment [13]. This working paper interpreted that DC theory was a focus on how the organization can improve its valuable resources over time through a value-creating process. Teece and Pisano kept working on and developing the explicit notion of DC, and they offered DC as an emerging paradigm [14]. They emphasized more division of the competencies and capabilities that allow firms to create new products and processes in order to respond to changing market circumstances efficiently. In 1997, Teece and his team demonstrated how a DC perspective focuses on the capacity an organization has to create new resources, and to renew or alter its resource mix within a rapidly changing environment. In other words, they highlighted the fact that DC is the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments [2].

Eisenhardt and Martin delved into DC concepts, and more generally the resource-based view (RBV). They argued that DC concepts dwell in the firm's processes that use resources, more specifically the identifiable processes to integrate, reconfigure, gain, and release resources such as product development and strategic decision-making. Additionally, the DC are the organizational and strategic routines by which firms achieve new resource configurations as markets [15]. In the same year, Teece published his article that emphasized knowledge assets and how to use them. He said "Dynamic capabilities will become more critical as the advantage from intellectual property weakens" as well as "Learning is key to staying competitive" [16]. In other words, the DC is the ability to sense and then shape the opportunities proficiently, and the competitive advantage relies on the creation and exploitation of non-tradable assets such as actions or processes. In 2002, Zollo and Winter argued that DC is shaped and influenced by the evolution of learning mechanisms in the organization [17]. Therefore, DC is a cultured and stabilized pattern of collective activities that the organization systematically generated, and then adjusted its operating routines in the follow-up of improved effectiveness. Thus, they highlighted that firms adopt a mix of learning behaviors constituted by two main factors, which are deliberate investments in knowledge and activities and a partially automatic accumulation of experience.

In 2003, Winter argued that companies can accomplish change without dependence on DC approach in some processes. Therefore, he specified DC as those that operate to extend, modify, or create ordinary capabilities or "zero-level" capabilities in the short term [12]. Zahra, Sapienza, & Davidsson offered a new definition of DC, which are the abilities to reconfigure a firm's resources and routines in the manner envisioned and deemed appropriate by its principal decision makers [18]. Additionally, they discussed more widely the relationship between substantive capabilities and DC, and how to become less extreme by organizational

knowledge and skills since that might affect the likely value of DC. Finally, they proposed a model of the various activities associated with the creation of DC, and how they might influence a company's performance.

Later, Teece added another requirement to maintain DC, which is entrepreneurial management. Entrepreneurial management helps to sense and understand opportunities as well as detect new and better ways of putting things together [3]. As a result, he separated the concept into its three parts, which are sensing and shaping opportunities and threats, seizing them, and reconfiguring the business enterprise's intangible and tangible assets. The reason behind this is that he found that there is a rapid technological change that influences the open economies. In a significant contribution to DC research, the leading scholars in this field published a book, where their perspectives and knowledge base provided more details to answer most of the remaining questions about DC. They offered a new definition "The capacity of an organization to purposefully create, extend, or modify its resource base" [19]. As a result, many of the critical features of DC were captured. In recent years, Teece settled on a comprehensive definition of DC, which is that there are higher-level competencies that determine the firm's ability to integrate, build, and reconfigure internal and external resources/competencies to address, and possibly shape, rapidly changing business environments" [20] [21]. The explanation gave a solid foundation for the DC concept to build frameworks. For instance, Pitelis and Teece addressed an integrated framework that developed an entrepreneurial and DC of the multinational enterprise [21]. This work aimed to determine a firm-level sustained competitive advantage to sustain superior enterprise performance.

IV. The Capability Elements

One of the conventional definitions of capability that the literature referred to as "a set of activities the firm performs in a semi-routinized fashion to enable a particular set of tasks to be accomplished" [22]. For a forward-looking perspective, companies need to highlight these activities. Eisenhardt and Martin highlighted that it is easy to find the main characteristics of DC within firms, and they explained the nature of "commonalities in key features" [15]. More specifically, Wang and Ahmed established highlighting the main components, and they stressed adaptive capability, absorptive capability, and innovative capability [23]. These components can be the essential starting point to guide firms to integrate, reconfigure, and transform their resources and capabilities in line with external environment changes.

A. Adaptive Capabilities:

The main idea behind adaptive capability is how firms can recognize the surrounding opportunities and capitalize on emerging opportunities [24] [25]. In other words, adaptive capability draws on a firm's ability to adapt and align its resources with environmental changes [26]. This concept is in line with the finding of several empirical studies that found that the capability of response to environment and the alignment of internal resources with external demand is crucial to firm evolution and survival [27] [28] [29]. Moreover, Oktemgil and Gordon connected the definition of adaptive capabilities to the market since they indicated the four main abilities, which are adapting product-market scope; scanning the market; monitoring customers and competitors;, and responding to changing the market environment [30].

B. Absorptive Capabilities:

The essential idea with absorptive capability is to connect how firms can acquire and integrate the external knowledge with internal knowledge. This ability helps to create new knowledge, which is an important factor of DC [31] [32] [33]. Furthermore, we can relate the definition of absorptive capability to these quotations "the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends", "the ability to evaluate and utilize outside knowledge is largely a function of the level of prior knowledge". [34]. Absorptive capacity is critical for learning processes from other industries such as those which are taking place in development. [26].

C. Innovative Capabilities:

Innovative capability should mainly fit into the firm's ability to develop new actions out of stratifying strategic innovative orientation with creative behaviors [35]. These activities are outlined by creating or developing new products, services, methods, identifying new markets, and seeking unusual and novel solutions [36] [37]. In terms of observational study, in 2012 a study found that it is crucial to that modern startup companies adopt the concept of innovation capability to create value in the market. Additionally, the undertaking by firms to produce new products and processes exhibits creative ability, and they should fully enforce the concept of innovative capability [26].

V. Why Business Intelligence and Data Analytics

We are entering into the big data era. New high-tech devices are introduced every day. The amount of data collected has increased by ten times every five years. There are many new types of data that we didn't see five years ago, such as enhanced sensor data (RFID tags, the location from GPS devices), social media data (Facebook, Twitter,

LinkedIn, etc.), and an increase in other public or government data. Therefore, industries are being injected with many new players, massive amounts of capital, and new exotic technology, and that is not all. It is obvious what the superior business model will look like for this next period. In order to develop the critical insights for decision-making and to build a high level of capabilities that can be converted to a decisive competitive advantage, managers should embrace the notion of business intelligence and analytics. This means that to be a leader in the market companies must realize the significance of the role of Big Data (BD) and Data Analytics (DA) in decision making and the outcome from the decisions made.

The world is linked together, and customers' preferences change constantly. Therefore, different communication channels can be checked, and tracking specific profiles or decision makers' behavior can be tracked and monitored [38]. Additionally, firms are rightly seeing data as assets that they are underwriting. Therefore, they seek to take advantage of this situation to get the maximum payoff for their investments. Thus, due to the changing nature of the external environment, we need to make some internal adjustment in order keep the business. Although most organizations understand that if they can capture the data that streams around their field they can improve their activities, the Big Data Analytics helps organizations harness their data and use it more strategically. The most significant reason to focus on Big Data and Data Analytics is the radical shift in a business context that has generated the necessity for a faster deployment of a digital transformation strategy. Also, a large number of firms and organizations are still in the early stages of evolving strategies and governance processes to leverage the new capabilities of Big Data and Business Analytics [39].

VI. Business Intelligence and Data Analytics

Throughout the years, the concepts of data, which describe the datasets and analytical techniques in applications, were developed from artificial data intelligence in the 1950s, and then to Business Intelligence within the business and IT communities in the 1990s. In the late 2000s, business analytics was introduced to serve as a key analytic component in Business Intelligence. Recently, Big Data Analytics has been used as a common term regarding data storage, management, analysis, and visualization technologies [40]. On the one hand, experts provided more definition and explanation about the term "intelligence". It consists firstly as the human intelligence scope, which is enforced in business affairs or activities and is related to the investigation of applications and the management of business problems that supports the decision-making. The secondly the term "intelligence" consists of information intelligence. The importance and value of information intelligence, is a result of efficiently combined technologies and applications concerned with gathering, facilitating access to, and analyzing data to help business users to make better business-related decisions [41]. In general terms, the support of Business Intelligence to strategic management is that will give a clear path of planning and execution of business objectives based on planning and budgeting and at the same monitoring the performance of all lower levels. Finally, the literature shows that many terms refer to Business Intelligence and Data Analytics:

A. Business Intelligence Analytics (BI&A):

The BI&A was developed in three stages. It started with BI&A 1.0 initiatives, which are described as a data-centric approach since companies launch to gain critical insights from the structured data collected through various legacy systems. They are also referred to as Business Intelligence and Reporting. Changes were then motivated by developments in web technologies, web intelligence, web analytics, and social media, which led to a new and exciting era of BI&A 2.0, or Big Data Analytics. Finally, with The Internet of Things (IoT) emerging and BI&A 2.0 still maturing, BI&A 3.0, will be replaced with the uncertainty of technologies and large data collected from multiple devices and objects [40].

B. Big Data:

Big data does not have a single agreed-upon definition in the literature, but in some articles, it is characterized by its volume, velocity, variety, variability, and complexity [42]. In other models, the characteristics are related mainly to volume, variety, and velocity. Recently, three characteristics have been introduced: Variability (complexity), value, and veracity [43]. However, in terms of Big Data (BD), many articles discuss the importance of leveraging business value from the big data concept in the emergency service environments and complex enterprise. In fact, Big Data has significant roles in improving the decision-making process within organizations [44]. Additionally, one of the studies found that Big Data provides deeper insights into achieving business value through Big Data strategy and implementation. The authors pointed out that organizational performance is inextricably interlinked with these insights, which help to ensure the competitive advantage and business results in the marketplace [44][62]. Data analysis using Big Data deals with the issue of different types of data such as structured, semi-structured, and unstructured. BD also deals with the larger amount of data that is produced from unlimited data sources, the qualities, different tools, and methods, as well as how can BD extract more useful information for the decision makers.

C. Internet of Things (IoT):

Over the last few years, the rapid expansion of the Internet of Things (IoT) has introduced internet-connected devices into homes and businesses around the world, such as wireless media players, thermostats, and sensors. All of which can be controlled wirelessly via phones, computers, microphones (e.g., Amazon Echo or Google Home), and other inputs. Within dynamic and competitive environments, recent research found that IoT supports the productivity of business processes with regards to building dynamic data and information processing capabilities, and enhancing organizational and operational agility [45]. We can conclude that the IoT is an intelligent connection among all machines through the internet. Machines are controlling each other, and could be minimizing the influence of human reactions in making decisions or actions that result in the improvement of quality of life and productivity.

D. Data Analytics and Methods:

Companies are starting to implement data analytics through collecting, storing, managing, and analyzing large datasets from a variety of sources to determine the key business insights that can be exploited to support better decision making [46]. The main function of analytical methods is to detect patterns and trends from a large volume of data to gain its value and interactions [47]. The main stages of the big data analytics process are data acquisition, data extraction, data collation, data structuring, data visualization, and data interpretation. Additionally, the main methods have been described in the following terms: Descriptive, diagnostic, discovery, predictive, and prescriptive.

VII. How Business Intelligent and Data Analytics as a Driver of Dynamic Capability Strategy

To answer the research question "Does the Business Intelligent and Data Analytics (BIDA) aspect help to achieve the Dynamic Capability (DC) concept" from the literature review we need to summarize the main assets of the DC and BIDA to see if there are relationships, and to understand how we can connect them.

A. Dynamic Capability:

1) Sensing and Explore Changes:

In 2008, Teece explained that the aspect of DC that he inspected explored the surrounding changes that subsequently generate changes in business firms including the ability to shape environments and improve capabilities. As a result, executives can shape outcomes without being trapped by prior decisions and investments that help the business enterprise to escape the zero-profit trap [48]. Therefore, the needs of some processes and analytical systems in this element will help them to understand opportunities and calibrate opportunities.

2) Seizing Opportunities:

The business model, decision making, enterprise structures, and so on are the incentives for seizing opportunities. The DC approach is a value added to resource selection through strategic resource deployment [49]. One way to seize opportunities and threats is by configuring both tangible and intangible assets that help to overcome the business challenges. Therefore, the capability of companies to seize opportunities and threats will depend on skills and experiences that they have.

3) Managing Reconfiguration and Transformation:

Due to the difficulty of accumulation and multiple uses of both inputs and outputs of business activities, the intangible assets are counted as a critical to and a real source for competitive strength [50]. Therefore, reconfiguring the intangible asset of business enterprise, which is mainly knowledge management, is the critical point of top management. In the 1990s, knowledge management was established. It was focused on the nature of knowledge [51], and it was examined from a capability perspective [52]. Then around 2000, it was switched to contextual sensitivity [53] and knowledge-based systems [54], and some authors inspected the concept regarding strategy [55] as well as organization point of view [56].

B. Business Intelligence and Data Analytics:

1) Knowledge Discovery:

Knowledge has received increased awareness as the essential element to explain differences in companies' performance. We hope that the BI&A knowledge landscape will help to contribute to future sources of knowledge. The authors of the article "Challenges of Big Data Analysis" emphasized that Business Intelligence brings a declaration or assurance to the new levels of scientific discovery and economic value for the business and organizations [46]. Data analytics can be applied to discover hidden patterns within databases. Fraud detection, customer profiling, and targeted advertising are examples of where knowledge discovery takes place.

2) Decision Support:

Since BIDA is a fact-based system, the information and data can be explored, accessed, and analyzed to produce more tangible and useful information. This leads to improvements in the facts, which helps decision makers make decisions more effectively and faster. Recently, a study found that relying on Big Data Analytics when making strategic or operational decisions leads to superior

performance [57]. Regarding decision-support, the BIDA has emerged as a supereminent solution since it is offering data integration and analytical capabilities at various organizational levels with valuable insights for their decision-making [58]. To conclude, the essential goal of BIDA is to help managers transform data into information and knowledge, which helps to support management control and strategic, planning activities, and decision making.

3) Predicting Changes and Risks:

It is important to analyze the impact of changes that help to predict alternative scenarios to establish and achieve business goals. One of the benefits of BIDA is predicting changes, thus the prediction of the future [40] [59]. For example, when applying one of the data mining techniques to historical data, this technique can identify a certain trend that is frequently occurring and gives an indication of certain changes that can happen in later years. At the same time at the systemic level modeling, it is important to monitor and mitigate risks by fully comprehending the risk scenario in the sound business. Analyzing the big data will help to measure firms' risks. This step requires professional resources who are familiar with advanced statistical techniques regarding portfolio management, securities regulation, proprietary trading, financial consulting, and risk management [46]. BIDA can be applied to scenarios and processes in order to describe the concepts of systematic risk analysis to improve the management controls based on a causal analysis of business exceptions [60]. Reducing risks in business by using the predicted information in business processes can help to evaluate and re-design the existing controls for the improvement of management.

VIII. Discussion and Framework

It seems that the advantages of BIDA are related to the needs of the DC approach. In the regulatory environment in which the company competes with other businesses, the BIDA increases the capabilities of the firm, which makes it easy to implement the DC approach. In addition, it is clear that if we do not have the ability to interpret and utilize BIDA approach, it will be a complicated problem to use the DC approach since the BIDA is used to understand the capabilities available in the companies. From the literature, we can summarize the relationship between the DC and BIDA in an initial framework. We have created three wheels in the framework that present the DC elements, which are driven by BIDA that are displayed as arrows. Figure 1 shows the framework, which includes the main components for both approaches and how they are operated.

The first part of the framework connects sensing and exploring changes with predicting changes and risks. Basically, one of the primary objectives of BIDA is the ability to predict environmental changes including markets and technologies. The concept is precisely what the first element in the DC is. This means that in order to drive the first wheel of the DC approach, which is sensing and exploring changes, companies have to have a valuable system and tools for predicting the changes. If they do not have the ability to predict the surrounding environment, competitors might take some steps forward. Additionally, companies should adopt the data-driven approach to conduct more services such as scanning and searching for various alternatives to new technology, to reduce risks, and improve performance.

The second part of the framework bridges seizingopportunities with decision support. The literature emphasizes the significant impact of the information provided to the decision-making system, especially in highly competitive environments. The BIDA feeds managers with the information to make better decisions. These decisions help companies to shape opportunities and address threats. Firms want such information and knowledge to contribute to their success, and it must be used within business processes to improve decision-making. This provides the decision maker with the ability to manage the assets and quickly respond to opportunities. Additionally, the advantage of analyzing data is not just in quick decision making, but includes sensing and seizing threats in order to combine and reconfigure the assets to meet the changes in customer needs, and to sustain competitive advantage.

The last part of the framework relates to managing the reconfiguration and transformation of knowledge discovery. With the explosive growth of data, companies need to convert previously unknown and un-processable information into useful knowledge. This process is known as knowledge discovery, which is one of the features of BIDA. Companies can use these pieces of knowledge to enhance, combine, and reconfigure their organizational assets. DC with transformation and reconfiguration enable firms to create new products. new processes, and respond to changing market conditions. Additionally, companies need to implement activates that help companies continuously reconfigure their resource-base by adjusting internal/external resources and operating capabilities as required. These reconfigurations can also benefit from having a significant knowledge discovery system through the BIDA.

By fusing the main elements of DC and BIDA in our initial framework, we can see that by giving useful business intelligence tools to predict the changes and risks around the business that companies can quickly sense and explore the changes in the uncertain environment and help the company to be more flexible. Once the most critical wheel is turned, companies can use the information that BIDA provides to be able to measure opportunities and threats with better decision support. Finally, with these actions, knowledge will undoubtedly be discovered that leads to efficiently managing the required transformation and reconfiguration of the assets. The final mechanism of this framework leads to efficiently implementing the DC approach.

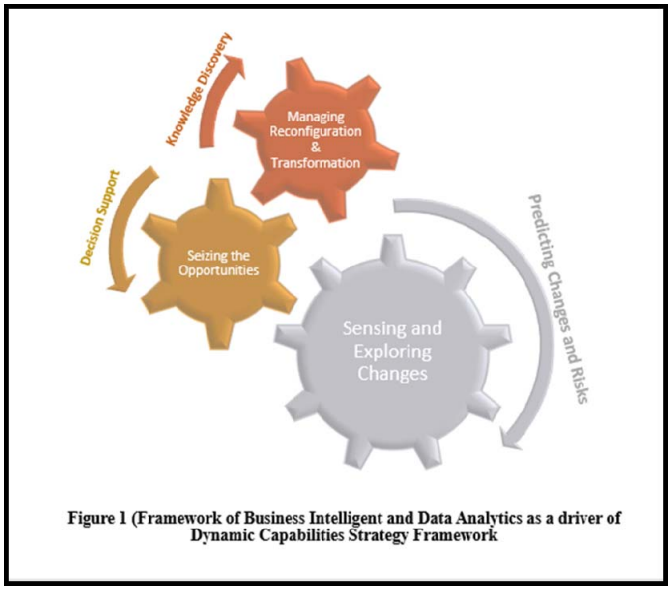

Figure 1 (Framework of Business Intelligent and Data Analytics as a driver of Dynamic Capabilities Strategy Framework

IX. Limitation and Future Research

This paper presents findings of a systematic review of the two vital concepts Dynamic Capability (DC) and Business Intelligent and Data Analytics (BIDA). However, we need to acknowledge some of the limitations in this paper. First, we did not use actual data, interviews, or a case study to build a framework. In order to provide more details of how we can use BIDA to support the DC it would be beneficial to focus on a specific industry. For instance, another article provides a framework that has an appropriate basis for internal corporate strategy discussions within Big Data investments. The authors offered guidance on how to make companies derive their capabilities from data strategy aspirations in order to be on the right track and stay ahead of the curve on innovation, competition, and productivity [61]. Second, we do not go deeply into evaluating the effectiveness of BIDA, and which data analytics are useful to help with the reconfiguration and translation of the resources. Nor did we go deeply into the application and the tools of the BIDA. Finally, we need to validate the framework, which provides an opportunity for future work to enhance the initial framework, and find the value of each element and how they work. This next work needs some practical cases.

X. Conclusion

We don't claim to exaggerate the importance and benefits of BIDA, but we try to fit DC for the real world. In conclusion, in order to achieve DC, firms should focus on the essential elements. These are: Sensing, which means the ability of the company to identify and assess the internal and external opportunities; seizing, which captures value from the motivation of the resources around the opportunities; and. transforming and reconfiguring, which is the ability to make a thorough or dramatic change in the organization. In the same way, BIDA helps firms with knowledge discovery, decision support, and helps to predict changes and risks. Therefore, it is better for the businesses that need to apply the DC strategy to focus on adapting the concept of Big Data, and to start thinking about adding analytics components. The initially suggested framework explains the nature of the relationship, and it highlights the robust correlation between the BIDA and DC, and how the essential elements of DC are driven by central characteristics of BIDA. From another perspective, the findings are substantial for both industry and academia, and they give a more precise picture for the managers and researchers of where they need to focus. The objective of this paper is to explain how firms create value through the two approaches. Finally, to embed the DC strategy organizations have to be smart and taking advantage of using BIDA to derive insights.

References

[1] Ambrosini, Véronique, and Cliff Bowman. "What are dynamic capabilities and are they a useful construct in strategic management?" International journal of management reviews 11.1, pp. 29-49, 2009.

[2] D. J. Teece, G. Pisano, and A. Shuen, “Dynamic capabilities and strategic management,” Strategic Management Journal, vol. 18, no. 7, pp. 509–533, 1997.

[3] D. J. Teece, “Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance,” Strategic Management Journal, vol. 28, no. 13, pp. 1319–1350, 2007.

[4] S. G. Winter, “The Satisficing Principle in Capability Learning,” Strategic Management Journal, vol. 21, no. 10-11, pp. 981–996, 2000.

[5] Bogdana, Pugna Irina, Albescu Felicia, and Babeanu Delia. "The role of business intelligence in business performance management." Annals of Faculty of Economics 4.1, pp 1025-1029, 2009.

[6] “Big data: changing the way businesses compete and operate.” [Online]. Available: http:// http://www.ey.com/Publication/vwLUAssets/EY_-_Big_data:_changing_the_way_businesses_ operate/%24FILE/EY-Insights-on-GRC-Big-data.pdf. [Accessed: 19-Oct-2017].

[7] Bell, P. "Creating Competitive Advantage Using Big Data". Ivey Business Journal, May/June 2013.

[8] V. Charles and T. Gherman, “Achieving Competitive Advantage Through Big Data. Strategic Implications,” Middle-East Journal of Scientific Research, vol. 16, no. 8, pp. 1069-1074, 2013.

[9] H. Barham, “Achieving Competitive Advantage Through Big Data: A LiteratureReview,” Portland International Conference on Management of Engineering and Technology (PICMET), 2017.

[10] Chaudhuri, Surajit, Umeshwar Dayal, and Vivek Narasayya. "An overview of business intelligence technology." Communications of the ACM 54.8, pp. 88-98, 2011.

[11] Mikalef, P., Pappas, I. O., Giannakos, M. N., Krogstie, J., & Lekakos, G. "Big Data and Strategy: A research Framework." MCIS, pp. 50, 2016.

[12] S. G. Winter, “Understanding dynamic capabilities,” Strategic Management Journal, vol. 24, no. 10, pp. 991–995, 2003.

[13] Jorde, Thomas M., and David J. Teece, "Innovation and Cooperation: Implications for Competition and Antitrust." Journal of Economic Perspectives, 4(3): pp 75-96, 1990.

[14] D. Teece and G. Pisano, “The Dynamic Capabilities of Firms: an Introduction,” Industrial and Corporate Change, vol. 3, no. 3, pp. 537–556, 1994.

[15] K. M. Eisenhardt and J. A. Martin, “Dynamic capabilities: what are they?,” Strategic Management Journal, vol. 21, no. 10-11, pp. 1105–1121, 2000.

[16] D. J. Teece, “Strategies for Managing Knowledge Assets: the Role of Firm Structure and Industrial Context,” Long Range Planning 33, pp. 35-54, 2000.

[17] M. Zollo and S. G. Winter, “Deliberate Learning and the Evolution of Dynamic Capabilities,” Organization Science, vol. 13, no. 3, pp. 339–351, 2002.

[18] S. A. Zahra, H. J. Sapienza, and P. Davidsson, “Entrepreneurship and Dynamic Capabilities: A Review, Model and Research Agenda,” Journal of Management Studies, vol. 43, no. 4, pp. 917–955, 2006.

[19] C. E. Helfat, Dynamic capabilities: understanding strategic change in organizations. Oxford: Blackwell, 2007.

[20] D. J. Teece, “Dynamic Capabilities: Routines versus Entrepreneurial Action,” Journal of Management Studies, vol. 49, no. 8, pp. 1395–1401, 2012.

[21] Pitelis, Christos N. and Teece, David, Dynamic Capabilities, the Multinational Corporation, and (Capturing Co-Created Value from) Innovation (December 21, 2015). Forthcoming in Clarke, T., O'Brien, J. and O'Kelley, C. (eds.), Oxford Handbook of the Corporation, Oxford University Press. Available at SSRN: https://ssrn.com/abstract=2706426

[22] Teece, David, and Sohvi Leih. "Uncertainty, Innovation, and Dynamic Capabilities." California Management Review 58.4, pp. 5-12, 2016.

[23] Wang, C. L. and Ahmed, P. K., "Dynamic capabilities: a review and research agenda. " The International Journal of Management Reviews, 9(1): pp. 31-51, 2007.

[24] Chakravarthy, Balaji S. "Adaptation: A promising metaphor for strategic management." Academy of management review 7.1, pp. 35-44, 1982.

[25] Hooley, G. J., Lynch, J. E. and Jobber, D. "Generic marketing strategies." International Journal of Research in Marketing, 9, pp. 75-89, 1992.

[26] Foss, Lene, et al. The role of microfoundations in explicating dynamic capabilities: A case study of commercializing discontinuous innovation in the Norwegian petroleum sector. working Paper. Available at: www. uis. no/getfile. php/…/FossIakovlevaKickulOftedalSolheim. docx (accessed 25 August 2017), 2012.

[27] Alvarez, V. S. and Merino, T. G. "The history of organizational renewal: Evolutionary models of Spanish savings and loans institutions.", Organization Studies, 24(9), pp. 1437-1461, 2003.

[28] Camuffo, Arnaldo, and Giuseppe Volpato. "Dynamic capabilities and manufacturing automation: organizational learning in the Italian automobile industry." Industrial and Corporate Change 5.3, pp. 813-838, 1996.

[29] Forrant, Robert, and Erin Flynn. "Skills, shop-floor participation and the transformation of Brimfield Precision: lessons for the revitalization of the metal-working sector." Industrial and Corporate Change 8.1, pp. 167-188, 1999.

[30] Oktemgil, Mehmet, and Gordon Greenley. "Consequences of high and low adaptive capability in UK companies." European Journal of Marketing 31.7, pp. 445-466, 1997.

[31] George, Alexander L., and Andrew Bennett. Case studies and theory development in the social sciences. mit Press, 2005.

[32] Salvato, Joseph A., Nelson L. Nemerow, and Franklin J. Agardy. Environmental engineering. John Wiley & Sons, 2003.

[33] Verona, Gianmario, and Davide Ravasi. "Unbundling dynamic capabilities: an exploratory study of continuous product innovation." Industrial and corporate change 12.3, pp. 577-606, 2003.

[34] Cohen, Wesley M., and Daniel A. Levinthal. "Absorptive capacity: A new perspective on learning and innovation." Administrative science quarterly, pp. 128-152, 1990.

[35] Wang, C. L. & Ahmed, P. K., "The development and validation of the organisational innovativeness construct using confirmatory factor analysis." European Journal of Innovation Management, 7 (4), pp. 303-313, 2004.

[36] Schumpeter, Joseph A. "The theory of economic development. Cambridge." MA: Harvard (1934).

[37] Miller, Danny, and Peter H. Friesen. "Strategy-making and environment: the third link." Strategic management journal 4.3, pp. 221-235, 1983.

[38] Poleto, Thiago, Victor Diogho Heuer de Carvalho, and Ana Paula Cabral Seixas Costa. "The roles of big data in the decision-support process: an empirical investigation." International Conference on Decision Support System Technology. Springer, Cham, 2015.

[39] Mithas, Sunil, et al. "Leveraging Big Data and Business Analytics [Guest editors' introduction]." IT professional 15.6, pp. 18-20, 2013.

[40] Chen, Hsinchun, Roger HL Chiang, and Veda C. Storey. "Business intelligence and analytics: From big data to big impact." MIS quarterly 36.4, 2012.

[41] Ranjan, Jayanthi. "Business intelligence: Concepts, components, techniques and benefits." Journal of Theoretical and Applied Information Technology 9.1, pp 60-70, 2009.

[42] Kshetri, N. “Big data’s impact on privacy, security and consumer welfare.” Telecommunications Policy 38(11): pp 1134-1145, 2014.

[43] Chen, Jinchuan, et al. "Big data challenge: a data management perspective." Frontiers of Computer Science 7.2, pp. 157-164, 2013.

[44] Wamba, S. F., Akter, S., Edwards, A., Chopin, G., & Gnanzou, D. "How ‘big data’can make big impact: Findings from a systematic review and a longitudinal case study." International Journal of Production Economics 165, pp. 234-246, 2015.

[45] Akhtar, P., Khan, Z., Tarba, S., & Jayawickrama, U. "The Internet of Things, dynamic data and information processing capabilities, and operational agility." Technological Forecasting and Social Change (2017).

[46] Fan, Jianqing, Fang Han, and Han Liu. "Challenges of big data analysis." National science review 1.2, pp. 293-314, 2014.

[47] Zulkarnain, Novan, and Muhammad Anshari. "Big data: Concept, applications, & challenges." Information Management and Technology (ICIMTech), International Conference on. IEEE, 2016.

[48] M. Augier and D. J. Teece, “Strategy as Evolution with Design: The Foundations of Dynamic Capabilities and the Role of Managers in the Economic System,” Organization Studies, vol. 29, no. 8-9, pp. 1187–1208, 2008.

[49] Mudavadi, C., Madani, F., Gilliland, G. and White, C., Topic: “Dynamics Capabilities.” Class Presentation,ETM 526/626, Portland State University, Portland , OR USA, 2012.

[50] Itami, H., and T. Roehl. "Mobilizing intangible assets." Cambridge (Mass.), 1987.

[51] Nonaka, Ikujiro, and Hirotaka Takeuchi. "The knowledge creation company: how Japanese companies create the dynamics of innovation.", 1995.

[52] Kogut, Bruce, and Udo Zander. "Knowledge of the firm, combinative capabilities, and the replication of technology." Organization science 3.3, pp. 383-397, 1992.

[53] Lam, Alice. "Tacit knowledge, organizational learning and societal institutions: An integrated framework." Organization studies 21.3, pp. 487-513, 2000.

[54] Davenport, Thomas H., and Laurence Prusak. Working knowledge: How organizations manage what they know. Harvard Business Press, 1998.

[55] Barney, Jay B. "Resource-based theories of competitive advantage: A ten-year retrospective on the resource-based view." Journal of management 27.6, pp. 643-650, 2001.

[56] Choo, Chun Wei. "The knowing organization: How organizations use information to construct meaning, create knowledge and make decisions." International journal of information management 16.5, pp. 329-340, 1996.

[57] Wieder, B., and M. L. Ossimitz. "Impact of Big Data Analytics on Decision Making and Performance." In International Conference on Enterprise Systems, Accounting and Logistics. 2017.

[58] E. Turban, R. Sharda, D. Delen, "Decision Support and Business Intelligence Systems, 9th ed. Prentice Hall Press, Upper Saddle River, NJ, 2010.

[59] Corte Real, N., Oliveira, T. and Ruivo, P.,"Understanding the hidden value of business intelligence and analytics (BI&A)," Twentieth Americas Conference on Information Systems, Savannah, 2014.

[60] L. Liu, H. Daniels, and W. Hofman, "Business Intelligence for Improving Supply Chain Risk Management," Enterprise Information Systems Lecture Notes in Business Information Processing, pp. 190–205, 2014.

[61] Mazzei, Matthew J., and David Noble. "Big data dreams: A framework for corporate strategy." Business Horizons 60.3, pp. 405-414, 2017.

[62] H. Barham, "Achieving Competitive Advantage Through Big Data: A Literature Review," presented at the PICMET 2017, Portland, USA, 2017.