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Triangle Relationship: A Review of Dynamic Capabilities, Strategic Foresight and Organizational Learning

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Abstract: This paper presents aliterature review that integrates a bibliometric analysis to assess the relationships among dynamic capabilities, strategic foresight, and organizational learning. The purpose of the SLR on Dynamic Capabilities (DC), Strategic Foresight (SF) and Organizational Learning (OL) is to advance the academic perspective on dynamic capabilities by analyzing how SF and OL can possibly integrate into the DC framework. This advancement is crucial since the pace of changes in an organization's environment is increasing, causing competitive pressure to rise. An organization needs to address such changes by adjusting existing capabilities or acquire new ones and thus strengthen their competitiveness. SF provides information and insights about future developments or changes in an organization's business environment. After which OL integrates the obtained information into the strategic planning process. It is important to include the concepts of SF and OL into the DC framework because an organization without learning cannot integrate information into the organizational decision-making process. The results of the review present a new approach to bridgelinkages between DC, SF, and OL that can help to operationalize the DC framework. A practical application of dynamic capabilities facilitates the long-term performance and sustainability of an organization.

Keywords: dynamic capabilities, strategic foresight, organizational learning, environmental changes

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Nonthapat Pulsiri received his PhD from Institute for Knowledge and Innovation South-East Asia (IKI-SEA), Bangkok University. He is currently a government consultant. His research focuses on strategic foresight, innovation management, technology management, and entrepreneurship.

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I. Introduction

Organizations are often interested in developing their dynamic capabilities to respond to environmental changes (Zollo and Winter, 2002; Wilhelm et al., 2015). Dynamic capabilities (DC), considered as the extension of the Resource-based View (RBV) (Ambrosini and Bowman, 2009), can support organizations to gain a sustainable competitive advantage by continually adjusting or renewing their resource base. However, organizations in the same industry generally compete to gain new resources and processes to improve their business. For example, most international hospitals in the period of the Covid-19 pandemic are eager to have resources, including technology, know-how, and expertise, to digitally transform their organization, manage business partnerships during crisis, and improve existing or creating new products and services to attract international patients (Pulsiri and Vatananan-Thesenvitz, 2020). However, some small and medium international hospitals may not be able to sustain their business from this situation with a decline in market shares and profits. Therefore, an organization needs to be ready to deal with the changing environment, explore new opportunities, and minimize risks that may arise. Strategic Foresight (SF) allows the organization to capture more opportunities (Amezcua-Martinez and Guemes-Castorena, 2010; Heger and Rohrbeck, 2011) and minimize risks (Rohrbeck and Bade, 2012; Dehmer et al., 2015) by anticipating the future and preparing them to respond at the right time (Hiltunen, 2008). Also, SF has long been applied, especially in large corporations (Rohrbeck and Gemünden, 2008) and global think-tanks (Leigh, 2003) to understand views of the future, locate essential resources to acquire, plan for the next strategic move, and even re-shape the business environment as a new trendsetter. Moreover, there are also various

foresight methods, such as scenario planning and roadmapping, that can be applied inside the organizations (Popper, 2008; Saritas and Aylen, 2010).

Both DC and SF cannot occur without Organizational Learning (OL), which involves processes to generate and integrate new information and knowledge into the organization. Learning can occur in relation to time, either in the past, present, or future (Brunelle, 2017). Learning in the past is to experience what was done previously and store the gained knowledge in the organization's memory. Organizations may use organizational memory to prevent more failures, document success stories, or even promote new value creation. While learning in the present is to gain more information and knowledge by being trained or collaborate with other stakeholders that can build more capacity to take actions and perform for outcomes. Organizations want to focus on learning in the present to show instant results and feedback for improvement (Zollo and Winter, 2002; Brunelle, 2017). Finally, learning for the future is the means of exploring the course of the future that no human knows by acquiring more insights from inside the organization or within the network. Although information and knowledge about the future do not exist in reality, the anticipating organization can still attempt to locate and reach vital future resources ahead of other organizations and use them for value creation to secure long-term performance and sustainability (Schaller et al., 2019).

In conclusion, there is a relationship between DC, OL, and SF in the literature. However, few publications integrate these areas. Therefore, this paper attempts to explain the linkages and how to combine OL and SF into the DC framework.

II. Systematic Literature Review with Bibliometric Analysis

The five-step Systematic Literature Review (SLR) framework applied in this research is adapted from Pulsiri and Vatananan-Thesenvitz (2018a) andCaputo et al. (2018), as illustrated in Figure 1. The first step begins with planning and defining a scope for a review. The paper reviews the relationships of Dynamic Capabilities (DC), Organizational Learning (OL), and StrategicForesight (SF). Moreover, it aims to integrate OL and SF into the DC framework. Therefore, the mapping of the scope is in these three areas, as shown in Figure 2.

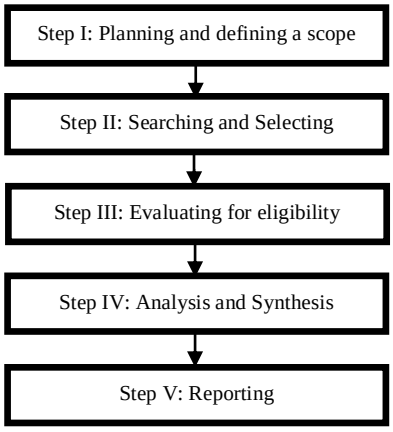

Figure 1: SLR framework
(adapted from Pulsiri and Vatananan-Thesenvitz, 2018a;Caputo et al., 2018)

The main research question with its three sub-questions are as follows:

RQ 1: How to integrate both SF and OL into the DC framework?
RQ 1.1 What is the relationship between DC and OL?
RQ 1.2 What is the relationship between DC and SF?
RQ 1.3 What is the relationship between OL and SF?

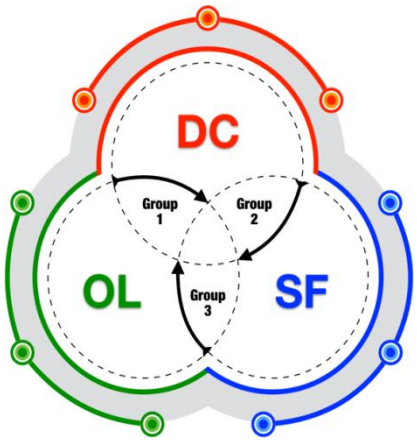

Figure 2: Mapping the scope of SLR

For the second step, the SCOPUS database was queried to retrieve publications into three groups. Group 1 are the publications in the intersection area of DC and OL (DC-OL), which were retrieved by using the search terminology ("dynamic capabilit*" AND "organi?ational learning"). Group 2 reflects the intersection area of DC and SF (DC-SF), and publications are extracted with the search terminology ("dynamic capabilit*" AND (foresight OR cognition)). Publications in Group 3 represent the intersection of OL and SF (OL-SF) and uses the search terminology ("organi?ational learning" AND (foresight OR cognition)) to extract documents. The inclusion criteria for the SCOPUS database are as follows:

- Include only articles and conference papers.
- Include only final stage papers.
- Include only English-written papers.

In the third step, all publications are critically reviewed by two experts to check the full-text details and evaluate their eligibility. Therefore, those papers must be conceptual papers or empirical studies, which are related to the concepts of DC-OL (Group 1), DC-SF (Group 2), OL-SF (Group 3). A third expert was consulted in case of a disagreement during the evaluation process. The Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) depicts the complete selection process (Figure 3) (Moher et al. 2009).

The fourth step applies a bibliometric analysis to obtain an overview of the relationships between DC-OL, DC-SF, and OL-SF, by using VOSviewer software version 1.6.6 (Van Eck and Waltmann, 2017). The results from the bibliometric analysis will provide an overview and support for the triangle relationship of DC, SF, and OL. Therefore, co-citation analysis aims to detect authors, who are most frequently cited together and their relatedness (White and Griffith, 1981). Thus, it can identify the fundamental authors and their relatedness in each particular area for DC-OL, DC-SF, and OL-SF, respectively

III. Results

The results show the selected publications for Systematic Literature Review (SLR), the analysis of publications in the areas of DC-OL, DC-SF, OL-SF, and the triangle relationships between DC-OL-SF, as follows,

Selected publications for Systematic Literature Review

The SCOPUS database was queried on 30 September 2019, to retrieve a total of 423 publications in the areas of DC-OL (205 publications), DC-SF (75 publications), and OL-SF (143 publications). By applying the inclusion criteria, only journal articles and conference papers, final-stage papers, and English-written papers are selected. Therefore, 19 DC-OL, 11 DC-SF, and 26 OL-SF publications were excluded in this step, leaving a total of 367 publications. Next, a full-text scan was conducted to choose only the conceptual or empirical papers that are related to the concepts of either DC-OL, DC-SF, or OL-SF. Based on the scan another, 7 DC-OL, 2 DC-SF, and 17 OL-SF were excluded from the dataset. In conclusion, the screening process yielded a final dataset of 341 documents, which results in 179 DC-OL, 62 DC-SF, and 100 OL-SF publications.

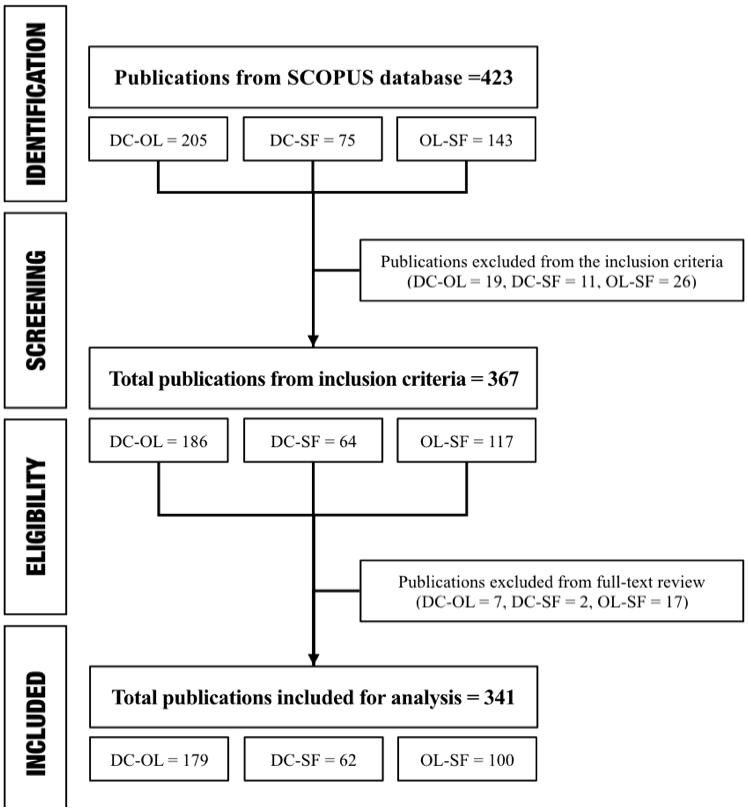

Figure 3: PRISMA flow diagram detailing steps in conducting the Systematic Literature Review (adapted from Moher et al. 2009)

Analysis of publications in the areas of DC-OL, DC-SF, and OL-SF

The final dataset of 341 publications is used for the bibliometric analysis to show the top ten authors and publications, author's network visualization, and keyword's network visualization, in the specified areas of DC-OL, DC-SF, and OL-SF.

Author's co-citation network visualization

Co-citation of authors occurs when someone cites some author's paper along with the other author's paper in their new document (White and Griffith, 1981). Authors whose papers are cited together are generally related and tend to cluster in the same schools of thought (White and Griffith, 1981). The more often two authors are cited together, the stronger is their co-citation relationship. Each node in the network visualization created by VOSviewer indicates an author. The size of the node represents the number of citations for an individual author and reflects the level of impact they have (Van Eck and Waltmann, 2017). The line between the two authors represents a co-citation link between the two authors (Van Eck and Waltmann, 2017). The thicker the link, the more often the two authors were cited together. The closer the nodes means the more relatedness of the items (Van Eck and Waltmann, 2017). The results of the author's network visualization by co-citation analysis in the areas of DC-OL, DC-SF, and OL-SF, are explained in Figures 4, 5, and 6, respectively.

In the area of DC-OL, there are three main clusters, as shown in Figure 4. Green is the most significant cluster, containing leading authors in the field of dynamic capabilities, with David J. Teece receiving the most (296) citations followed by Sidney G. Winter (178), Gary Pisano (139), Amy Shuen (118), Margaret A. Peteraf (108), Maurizio Zollo (104), and Constance E. Helfat (94). Based on this finding, the green cluster can be considered the foundation of DC-OL. Red represents the second-largest cluster in which Kathleen M. Eisenhardt is the most cited author (183), followed by other authors in the field of knowledge management and absorptive capacity. The last cluster in blue includes Shaker A. Zahra as the most cited author with 131 citations, followed by other authors in the field of entrepreneurship. Therefore,

the area of DC-OL, which has learning as the primary mechanism for DC, relates to other fields such as knowledge management, absorptive capacity, and entrepreneurship, as well.

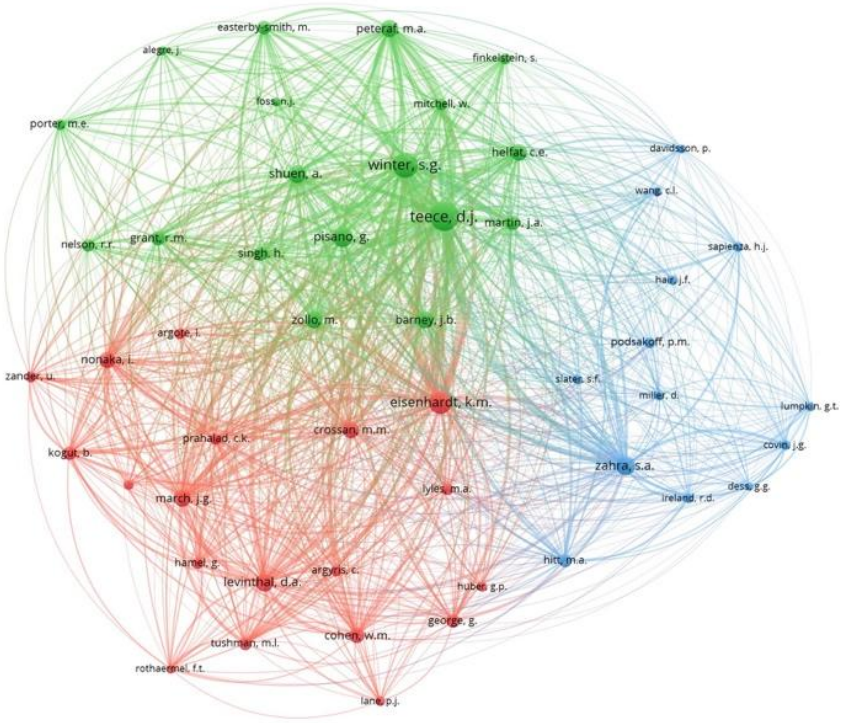

Figure 4: Author co-citation network visualization in the DC-OL area (Top 50 Authors).

The DC-SF area represented in Figure 5 consists of four clusters. Red, green, and blue clusters are the three main clusters, where each cluster includes highly cited authors from the field of dynamic capabilities, which are David J. Teece (133), Kathleen M. Eisenhardt (102), and Constance E. Helfat (98), respectively. Moreover, these authors are closely linked to each other and stand in the center of the co-citation network. The yellow cluster with Giovanni Gavetti (39) and Gerard P. Hodgkinson (37) as the two primary authors, separates itself a bit from the three main clusters. A reason for this separation can be that their school of thought is more focused on managerial cognition and strategy. In short, the main field of DC-SF is framed around the concepts from David J. Teece, Kathleen M. Eisenhardt, or Constance E. Helfat. Also, these authors are closely related to each other, focusing on the micro-foundations of dynamic capabilities in the DC-SF area.

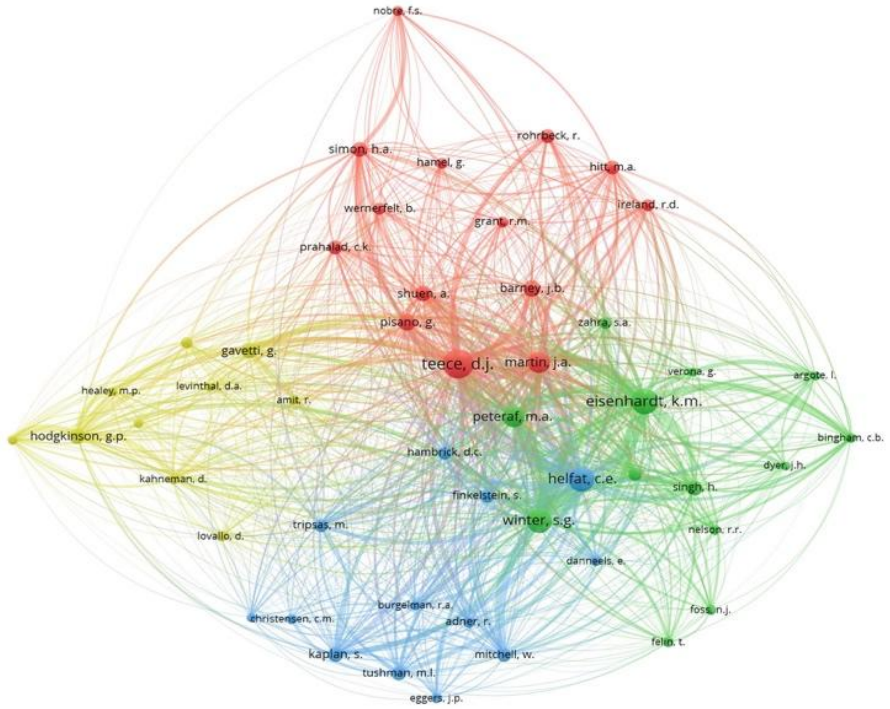

Figure 5: Author co-citation network visualization in the DC-SF area (Top 50 Authors).

The area of OL-SF is represented by four clusters, green, red, purple, and blue (Figure 6). The three clusters of green, red, and purple are closely related to each other, with James G. March (55), Karl E. Weick (62), and Chris Argyris (50), as the most cited authors. These three clusters represent the organization theory as the foundation for OL-SF, as opposed to the blue cluster which represents dynamic capabilities with René Rohrbeck (35), Sidney G. Winter (33), David J. Teece (31), and Kathleen M. Eisenhardt (29) as their most-cited authors. The top authors of the blue clusters are closely linked with each other, and thus can be considered as a basis to integrate OL and SF into the DC framework. Interestingly, the work of other authors in the blue cluster, including Riccardo Vecchiato, Jan O. Schwarz, Kee Van der Heijden, George Burt, and George S. Day, is also related to strategic foresight as well. Thus, their publications are also meaningful for the integrated DC-OL-SF area.

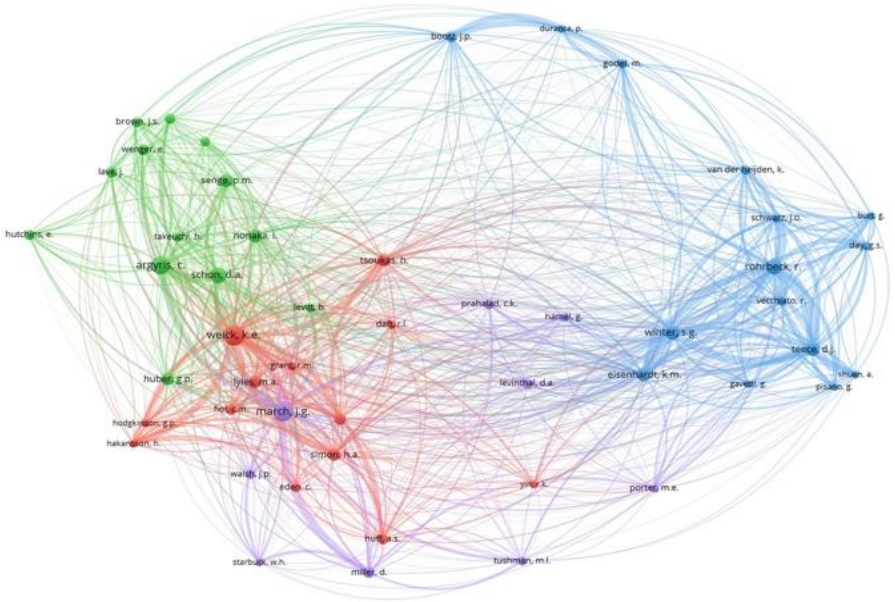

Figure 6: Author co-citation network visualization in the OL-SF area (Top 50 Authors).

The triangle relationship between dynamic capabilities, strategic foresight, and organizational learning

The bibliometric analysis clarifies that there is a close relationship between Dynamic Capabilities (DC), Strategic Foresight (SF), and Organizational Learning (OL). The author co-citation network maps (Figure 4-6), show that David J. Teece, Kathleen M. Eisenhardt, and Sydney G. Winter, are the three primary authors that appear in all three areas. The OL-SF co-citation network (Figure 9), displays a group of researchers from the field of dynamic capabilities who connect closely to those in strategic foresight, including Riccardo Vecchiato, Jan O. Schwarz, Kee Van der Heijden, George Burt, and George S. Day.

However, there are still very few publications that can clarify the integration of OL and SF into the DC framework. Therefore, this paper proposes a framework that integrates OL and SF into the DC framework. The proposed framework divides into two main stages, as follows.

Stage I: From environmental change to the memory of the future

Organizations need to face the challenges of environmental changes and should use strategic foresight to collectively build memories of the future as the evolution of human minds (Popper, 1978; Ingvar, 1985). Environmental changes can be divided into a business environment and a general environment that can cause environmental uncertainty (Vecchiato, 2015). The business environment involves the key factors that govern competitions such as competitors, customers, suppliers, new entrants, and the providers of substitute products (Vecchiato, 2015). The general environment consists of the factors that indirectly affect the business landscape, such as political, economic, socio-cultural, technological, legal, and ecological factors (Pulsiri and Vatananan-Thesenvitz, 2018b). Furthermore, the increasingly rapid changes of these factors in both the business environment and the general environment can cause more challenges for an organization to maintain in the market (Pulsiri and Vatananan-Thesenvitz, 2018b).

The occurrence of environmental changes results in the uncertainty. Many organizations fail to cope with uncertainty, which results in bankruptcy. Three main criteria cause failure in response to uncertainty, which is a high rate of change, ignorance, and inertia (Rohrbeck, 2010a). A high rate of change comes from key factors including shortening life-cycle, increasing changes of technologies and customer's demand, accelerating speed of innovation, and its diffusion. Ignorance comes mainly from the inability of an organization to perceive radical changes. This inability generally arises from internal organizational structure, culture, and process that inhibit the perception of changes. Inertia is the inability to define a plan and implement actions for the response to changes. Therefore, it requires top-management engagement and employees' collaboration to overcome the inertia. To summarize, environmental uncertainty makes it difficult for decision-makers to address the events or changes in their industry (Vecchiato, 2015, Rohrbeck, 2010b). Organizations that are sufficiently prepared for changes in their environments will perform better than the rest (Rohrbeck et al. 2015).

"Strategic foresight" can also enable the organization to get the views of the future and to gain more key resources. This approach involves the interpretation of signals, trends, and other drivers, and then communicate insights among colleagues to integrate them into the organization's operations (Pulsiri, 2020). The most crucial part of strategic foresight is to see and locate future sources of competitive advantage in order to acquire them (Pulsiri, 2020). This study defines the sources of competitive advantage as "*the resources that the organization can use for value creationand pioneer the market changes which can result in higher profits, market sharesor financial gains*" (Pulsiri and Vatananan-Thesenvitz, 2018b). Furthermore, the sources of competitive advantage must result in rendering the organization to be able to compete or outperform other players in the same market (Pulsiri and Vatananan-Thesenvitz, 2018b). Some of them can even allow the organization to create a new market. For example, the discovery of new technologies such as a platform-based ecosystem can create a paradigm shift that results in a new way of doing business. Moreover, a change in laws and regulations can allow some biotech firms to do research testing with stem cells in order to find the fountain of youth. Henceforth, a critical role of strategic foresight is to gain the sources of competitive advantage for further use in strategic planning (Pulsiri, 2020).

Ingvar (1985) mentioned that the primary role of SF is to allow the organization to build its memory of the future that can complement the memory of the past. Vecchiato (2015) explains the differences between the 'memory of the future' and the 'memory of the past' on an individual and organization level, according to the sources of information and building process. The memory of the future involves four stages of learning and knowledge creation process that consist of socialization, articulation, combination, and internalization (Vecchiato, 2015; Nonaka, 1994). As mentioned earlier (Figure 3), it is essential to utilize SF methods such as environmental scanning, scenario planning, roadmapping, and visioning (Popper, 2008), for a future-oriented knowledge creation process and then store the new insights inside an

organization as a memory of the future (Pulsiri and Vatananan-Thesenvitz, 2018b). Therefore, it is necessary to integrate the memory of the future into the learning mechanisms of an organization.

Stage II: From learning mechanism to sustainable competitive advantage

Helfat et al. (2007) defined DC as "*…the capacity of an organization to purposefully create, extend, or modify its resource base*" in order to operationalize the DC framework in the context of changing environment. Therefore, the organization needs to trigger the learning mechanism to learn and capture the valuable sources of competitive advantage as stored in the memory of the future (Pulsiri and Vatananan-Thesenvitz, 2018b). After deciding to select and investing these new resources, it follows with their implementation into operational capabilities (Pulsiri and Vatananan-Thesenvitz, 2018b). As the employees learn how to use them in their daily works, it will be institutionalized into routines (Jones and Macpherson, 2006). The selected resources must be valuable, rare, imitable, and non-substitutable in order to gain a sustainable competitive advantage (Barney, 1991). In conclusion, operational capabilities contribute directly to a sustainable competitive advantage, whereas DC is the higher order of operational capabilities and indirectly links to sustainable competitive advantage. Figure 7 illustrates the integration of OL and SF into the DC framework.

In our interpretation, the application of strategic foresight thinking and practices by an organization allows the decision-makers to broaden their views of the future and create "strategy" to take action in a timely manner. In contrast, dynamic capabilities with a "learning" mechanism can render the capacity to perform according to the plan, to securea sustainable competitive advantage. There are also various foresight methods to prepare for future changes(Popper, 2008). Future-prepared organizations with strategic foresight gain more insights and have a greater potential to survive than the rest (Rohrbeck and Kum, 2018). Nonetheless, organizations should also have dynamic capabilities and learning mechanisms to capture opportunities or even minimize risks. Opportunities can come from the awareness of sources of competitive advantage, and their integration inside the organizations (Pulsiri and Vatananan-Thesenvitz, 2018b). These sources of competitive advantages are also essential to make a successful implementation based on the strategic planIn this direction, it is expected that more researchers and practitioners will pay attention to these three fields of research.

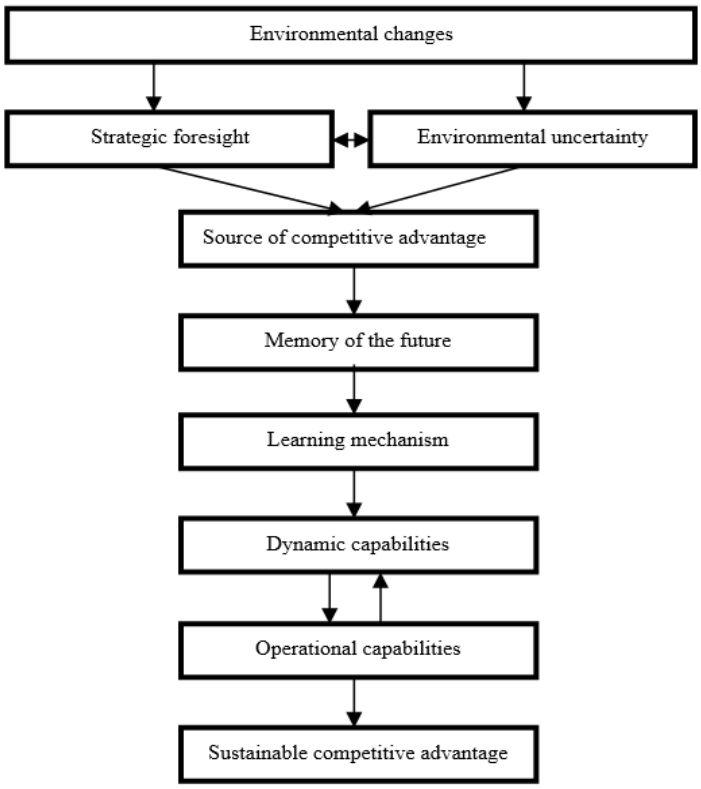

Figure 7: The integration of OL and SF into the DC framework

(Pulsiri and Vatananan-Thesenvitz, 2018b)

IV. Conclusion

This paper offers a specific justification, based on a particular functional logic, for integrating Strategic Foresight and Organizational Learning into the Dynamic Capabilities framework by reviewing the literature in the areas of DC-OL, DC-SF, and OL-SF. The bibliometric SLR approach used in this paper clarifies their relationship and how to integrate OL and SF into the DC framework. The bibliometric analysis and SLR offer ample evidence that a strong relationship exists between the three fields. However, there are still very few publications that discuss the integration of OL and SF into the DC framework.

An integrated framework should start with SF and OL by addressing the environmental changes that cause uncertainty. SF is applied to manage uncertainty by identifying the sources of competitive advantage that can be used for value creation and minimize risks. Therefore, an organization can apply the concept of memory of the future to store those views inside the organization and prepare for the right time to implement them. After which the learning mechanism will integrate those critical resources into the DC, which the organization can use to adjust or renew the operational capabilities. Thus, this framework clarifies the relationship of DC-OL-SF to achieve a sustainable competitive advantage. Finally, the future development of this framework is to test the factors in each step with the empirical study that can contribute to the success of its implementation. Moreover, the empirical study should not be limited only to the large corporations and public organizations, but also the small and medium enterprises (SME).

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