Towards an analytical framework for value configurations

Johansson, Magnus

2023

Towards an analytical framework for value configurations

Magnus Johansson[1*]

[1]*Lund School of Economics and Management, Lund University, Sweden*

**Corresponding author*

Abstract.

Based on Thompson's (1967) three technologies, Stabell and Fjeldstad (1998) proposed three value configurations; the value shop, the value chain and the value network. However, the technologies in Thompson has been recognized as being a variety rather than a typology and in contrast with Thompson's ambition to produce two-by-two classification schemes. Also, Johansson and Jonsson (2012) proposed a new value configuration: the package configuration after studies of industrial firms' value configurations. Thus, the question arises: in order to facilitate analysis of hybrid forms and changes between value configurations, how can value configurations be classified and along what dimensions? This paper expands on the current literature on value configurations to provide a deeper understanding of how they can be classified. A two-by-two matrix is proposed where the value configurations are positioned according to the application of capabilities and the level of co-creation of customers.

Keywords: value configurations, activities, technologies

1 Introduction

Based on Thompson's (1967) three technologies, Stabell and Fjeldstad (1998) proposed three value configurations; the value shop, the value chain and the value network. However, the threefold variety of technologies in Thompson has been recognized as being in contrast with Thompson's ambition to produce two-by-two classification schemes. Therefore, there may be important dimensions of the value configurations, and their links to Thompson's technologies, that could be useful for analysing organizations but have not been adequately addressed in previous research. And furthermore, such dimensions could also be useful for analysing hybrid forms of value configurations, which is an important research area of research (Stabell and Fjeldstad, 1998). Thus, the question arises: how can value configurations be classified and along what dimensions, in order to facilitate analysis of hybrid forms and value configurations changes?

This paper argues that there are four key points that need to be considered in relation to the set of value configurations proposed by Stabell and Fjeldstad (1998) in order to provide a deeper understanding of a set of dimensions that can be useful to classify value configurations. First, Stabell and Fjeldstad (1998) made an important contribution by challenging Porter's (1985) value chain. They argued that Porter's value chain was not the only generic value configuration. Instead, they proposed that the value chain should be complemented by the value network and the value shop, based on Thompson's (1967) long-linked, mediating, and intensive technologies. However, what has changed since Thompson (1967) in our economies and the way organizations strive to create value? Are there more cases today of organizations that follow different types of logics and rely on other types of

technologies? For instance, digital technologies in our society have advanced more rapidly than any other technology in history (UN, 2023) and have a profound impact on businesses and our world. Today, software enables us in both our personal and professional lives (Andriole, 2019). However, software and software development possess specific characteristics, relying primarily on the knowledge held by an organization's employees rather than manufacturing plants and machines (Bjørnson & Dingsøyr, 2008). Software product development can also differ in terms of customer characteristics, incorporating market analysis approaches as well as direct customer interaction (Regnell and Brinkkemper, 2005).

Second, Stabell and Fjeldstad rely on Thompson's technologies as a typology. However, this view of Thompson proposing a typology has been criticized by Barbiri and Neri (2017). They argue that Thompson explicitly stated that he introduced a variety rather than a typology, meaning that the set of technologies may not be exhaustive and new technologies could be added as new cases emerge (Barbiri and Neri, 2017). Moreover, as discussed in the previous section, new cases may be more prevalent and abundant today than when Thompson's "Organizations in Action" was published in 1967.

Third, Stabell and Fjeldstad's interpretation of Thompson's intensive technology may be limiting when considering how it provides the basis for value creation. In Stabell and Fjeldstad's framework, the focus is on how an organization solves unique problems associated with a specific customer or case. However, Thompson's work (1967) could be interpreted more broadly. For instance, he mentions research as a typical example where intensive technology is utilized.

Fourth, in line with this, research and development (R&D) activities have increased in relation to the total value produced by businesses in general (cf. Eurostat, 2022). Especially for industries such as Information and communication technologies (ICT), health and automotive, R&D investment has increased substantially and for the top R&D investors globally growth in R&D has been between five and thirteen percent from 2013 to 2021 (European Commission, 2022). There are examples of firms where development activities are central to the value creation of the firm but span across multiple customers and cases simultaneously (Johansson & Jonsson, 2012). Additionally, there has been a rise in the proportion of knowledge occupations across various professions and industries (cf. the case of Canada in Baldwin and Beckstead, 2003). Another perspective on the significance of development activities is how professional service firms, typically associated with a shop logic, create ready-made solutions (Løwendahl, 1997), resembling an R&D-like way of organizing. This led Johansson and Jonsson (2012) to propose a new value creation logic called the package logic.

However, several questions remain. For instance, what is the role of the package logic in relation to all the value creation logics underlying the value configurations proposed by Stabell and Fjeldstad (1998)? How does this relate to the variety proposed by Thompson (1967)? Furthermore, Fjeldstad and Snow (2018) discussed how value configurations affect the elements of a business model. Given the points mentioned above, how does the package logic relate to the elements of a business model? This paper aims to expand on the current literature on value configurations to provide a deeper understanding of how they can be classified, particularly in the context of organizations that utilize hybrid forms of value configurations or transition between them.

2 Value configurations and the Thompson origin

Stabell and Fjeldstad's (1998) exploration of value configurations is based on Porter's activity-based view and value chain. However, they propose two additional value configurations (shop and network) based on Thompson's (1967) technologies, which offer an alternative perspective to Porter's assertion that the value chain and its activity categories apply universally to all industries. This divergence reflects Stabell and Fjeldstad's critical stance towards the idea of a one-size-fits-all value chain and their recognition of the need to consider different value configurations for different types of organizations. Thompson's (1967) technologies are central to each of the configurations, with Stabell and Fjeldstad (1998) emphasizing the value creation logics associated with each value configuration. These configurations serve as activity-based models of businesses, providing a framework for understanding how organizations create value through their distinct modes of operation.

However, Barbiri and Neri (2017) raise an important point by challenging the characterization of Thompson's technologies as a typology. They argue that Thompson created a variety of technologies rather than a typology. This suggests the possibility of new technologies and value configurations emerging over time. This consequently calls for ongoing research into hybrid forms of value configurations that may go beyond the original three proposed by Stabell and Fjeldstad (1998). As organizations have undergone significant changes since Thompson's seminal work was published, it is essential to consider the evolving landscape of value creation and organizational activities. Contemporary concepts like mass customization and modularity have redefined the ways organizations operate, enabling greater flexibility in design and knowledge exchange. These alternative processes challenge the traditional binary distinction between sequential and iterative value creation logics. Moreover, the growing importance of knowledge workers and the role of software in various industries introduce new dimensions that may not be fully captured by Stabell and Fjeldstad's (1998) value configurations.

Thus, it is essential to revisit and expand the current understanding of value configurations to account for the changing organizational landscape and emerging technologies. Future research should explore additional dimensions and perspectives to create a more comprehensive framework that better aligns with the complexities of contemporary businesses. By doing so, we can gain deeper insights into how organizations create value, adapt to changing environments, and embrace innovative approaches to meet the demands of an ever-evolving world. This paper aims to take the first step towards such a comprehensive examination by reexamining Stabell and Fjeldstad's (1998) value configurations, exploring their connections to Thompson (1967), and providing examples that illustrate new ways of looking at value configurations beyond the existing models.

3 Three and one more

3.1 Value chain

According to Porter (1985), value chains are business unit collections of activities aimed at designing, producing, marketing, delivering, and supporting a firm's product. Activities can be categorized into primary and support activities, with primary activities split into inbound logistics, operations, outbound logistics, marketing & sales, and service. Porter suggests this subdivision to identify technologies and economics, with the flow of products aiding in this process, highlighting the sequential nature of the chain. Mass production's goal is consistent,

repetitive manufacturing of a standardized product. Customers obtain the product representing the value created by the firm's transformation process within the value chain (Ramirez, 1999). The assembly line has significantly influenced management thinking and value creation concepts (Ramirez, 1999). Value is added through sequential steps in the value chain (Ramirez, 1999), which uses long-linked technologies associated with mass production (Stabell and Fjeldstad, 1998). Protecting value involves incorporating technology into the product or manufacturing process (Teece, 2010). In the value chain configuration, products act as vehicles to transfer value to customers. Raw materials and intermediate products are transformed into goods at the production plant and then distributed to customers. Marketing provides product specifications, volume projections, and stimulates demand. Post-purchase service ensures proper product usage, addresses flaws, and extends product lifespan. The assembly line aims to produce standard products with economies of scale (Stabell and Fjeldstad, 1998).

3.2 Value shop

A value shop (Stabell and Fjeldstad, 1998) is a type of firm that utilizes intensive technology (Thompson, 1967) to tackle customer or client problems, tailoring the selection, combination, and application of resources and activities to address the specific requirements at hand. This approach finds relevance in diverse professional services such as medicine, law, architecture, and engineering (Stabell and Fjeldstad, 1998). In a value shop, each client problem is treated on an individual basis, and clients often actively take part in the process of crafting solutions. The value shop concept fosters a system of linked entities, including referring, sub-contracting, and collaborating firms, that pool their knowledge to develop desired solutions (Fjeldstad and Snow, 2018). Stabell and Fjeldstad's primary emphasis lies in the connection between the unique problems presented by customers and the specialized functions of value shops, which involve tailored resource allocation (Stabell and Fjeldstad, 1998).

The size of value shop firms indicates the limited advantages in scale and a critical focus on location (Stabell and Fjeldstad, 1998). This is due to the relative value of exceptional professionals, the challenges of coordinating large groups of specialists, and the need for effective communication in problem-finding and problem-solving. Nevertheless, certain scale advantages may arise from the size of the client's problem and its geographical distribution. For instance, large consulting firms serving global clients could capitalize on scale and location benefits (Stabell and Fjeldstad, 1998). This perspective diverges from Löwendahl's (1997) description of an R&D-like function in professional service firms, wherein scalability becomes more feasible through specific practices enabling growth, a topic that will be further explored in the section on the package configuration.

Stabell and Fjeldstad's value shop concept closely aligns with Thompson's (1967) description of intensive technology, although some variations arise depending on the context of discussion. Thompson broadly defines intensive technology as one that employs various techniques to bring about a change in a specific object, with the selection, combination, and order of application guided by feedback from the object itself (Thompson, 1967). Thompson's examples include the construction industry and research, in addition to human-related applications. Customization stands out as a significant aspect of the technology's success, necessitating a tailored combination of capacities for each individual case or project (Thompson, 1967). This custom application refers to the utilization of capacities and is linked to individual cases or projects, emphasizing resource utilization rather than being tied solely

to an external organizational entity like a customer. The concept of capacity in Thompson encompasses not only the magnitude of organizational abilities but also indicating a resource-based perspective, suggesting that capacities comprise capabilities that are more or less enduring, mobile, and disposable (Thompson, 1967). This perspective resembles themes from the resource-based view of the firm (Wernerfelt, 1984; Barney, 1991) and implies that capacities are constructed from resources, wherein capacities are more complex and akin to higher-order constructs, such as capabilities, compared to basic resources (Henderson and Cockburn, 1994). While Stabell and Fjeldstad (1998) primarily concentrate on unique customer problems, Thompson's (1967) central theme revolves around the effective application of resources.

3.3 Value network

Value networks (Afuah and Tucci, 2000) encompass transportation, banking, finance, and various internet enterprises. They connect nodes like customers, objects, and locations, facilitating exchanges and co-production of value. The network's size and composition benefit the client's value proposition and cost economies of scale contribute to winner-takes-all marketplaces (Fjeldstad and Snow, 2018; Shapiro and Varian, 1999).

Mediating technology links interdependent customers in value networks (Stabell and Fjeldstad, 1998). This allows geographically dispersed customers to engage in exchange relationships. Value creation involves mediating exchanges through direct or indirect linking, with mediators acting as club managers, fostering relationships among members. Service value relies on positive network externalities, where more customers enhance the service's value for others (Stabell and Fjeldstad, 1998). Mediators charge for linking opportunities and usage, requiring coordination at multiple levels, often driven by standards to ensure compatibility (Stabell and Fjeldstad, 1998). The explicit focus on network externalities highlights the type of value creation in this configuration (Stabell and Fjeldstad, 1998).

3.4 Value package

Johansson & Jonsson (2012) introduced the concept of the package logic and its associated value configuration, which emerged from a study of industrial firms. These firms demonstrated similar value creation logics found in consulting firms, while also incorporating chain-like manufacturing processes and the development of innovative concepts and solutions that could generate value across multiple customers. The package configuration excels at solving generic problems and achieves scalability advantages through forward and reverse knowledge flows (Johansson & Jonsson, 2012).

One argument for considering an additional type of value creation logic pertains to value creation traits found in firms typically associated with the shop logic, such as professional service firms. By connecting Löwendahl's (1997) description of an R&D-like function in these service firms with the package logic, a clear link between the R&D function of manufacturing firms and the package configuration becomes evident. The package logic involves preemptively addressing universal issues shared by prospective clients, tightly integrating attributes from both chain and shop configurations (Johansson & Jonsson, 2012). The output of a package configuration's underlying solution can be marketed both internally and externally.

A key characteristic of solutions or products produced by the package logic is their generic nature, allowing for repetitive use and transformational processes. The scalability advantages

derived from the package logic are contingent upon how businesses utilize their development resources. Porter (1985) briefly acknowledges the importance of scope and scale impacts related to cost drivers in R&D. However, for businesses that primarily generate value through intangible outputs, such as tacit knowledge and human resources used in customer interactions, the scale effects on development become a defining feature of the value creation logic within the package configuration.

An illustrative example of the package logic in action can be found within the ICT sector. Companies known as fabless firms in this sector strive to leverage their human capital, central to their development activities, to create solutions that appeal to a wide range of original equipment manufacturers (OEMs) (Johansson & Jonsson, 2012). These firms lack in-house manufacturing capacity and thus rely on economies of scale based on their development efforts. Given the high level of innovative pressure and the continuous demand for new solutions in such markets, leveraging economies of scale through the package logic is essential for cost-effectiveness. The package logic enables scale benefits when the value created by development resources is made available to multiple customers (Johansson & Jonsson, 2012). While these organizations may have local activities that resemble a shop logic due to their iterative nature, they require a certain level of coordination in relation to environmental conditions (Thompson, 1967). However, in contrast to value chain configurations, the package logic relies on parallel processes of problem-solving that are coordinated both in time and via modularity (Johansson, 2008). The value package configuration hinges on intensive technology, as it deals with achieving change in a specific object. However, unlike the value shop, which focuses on solving customer or client problems, the package configuration targets common problems identified across a market.

Sanchez and Mahoney (1998) demonstrated how modular product architectures offer opportunities for concurrent or parallel product development, which has been shown to positively affect new product development time performance (Danese & Filippini, 2010). In such organizations, work processes rely on sequential planning and the planning of architecture and interfaces to enable parallel execution, directly linked to organizational efficiency. The package configuration, knowledge, and the example of software products play essential roles in this context.

4 Intensive technology, knowledge and the example of software products

Whether the existence of a new configuration also means that there must be a new technology is less apparent. Thompson's definition of the intensive technology is slightly more open in relation to the *object* that organizations interact with. For instance, Thompson includes research as an example of application of intensive technology. He also deals with incorporation in association with the intensive technology, but the target is the object, which is a rather wide concept. Stabell and Fjeldstad (1998) more explicitly relate the shop logic to the iterative problem solving towards customer or client related problems that can be considered as unique cases. The external nature of the object is thus more explicit in Stabell and Fjeldstad.

Among the prime examples of firms that rely on an intensive technology Stabell and Fjeldstad (1998) mention professional services. They are closely associated with knowledge intensiveness (cf. Alvesson, 2004; Morris & Empson, 1998). In many parts of the world there is a growing incidence of knowledge-based occupations across various professions and industries (cf. Baldwin and Beckstead, 2003) and growth of the knowledge-based economy

has been part of policy on a wider scale for at least two decades (cf. OECD 2001, World Bank 2002, DTI 2004). At the same time there has been an increased interest in organizational learning that can be seen as fuelled by the social and economic challenges that organizations face including shorter development cycles, globalization and more competition (Maier, Prange, and von Rosenstiel (2001). The knowledge-based view of the firm has emerged that recognizes knowledge as an important source of value (cf. Boisot, 1998; Spender, 1994) and knowledge is a basis for competitiveness (Aranda & Molina-Fernandez, 2002; Davenport & Prusak, 1998; Grant, 1996; Spender, 1996). (Grant (1996) relies heavily on Thompson's (1967) ideas of interdependence when discussing coordination and the integration of knowledge.) Knowledge intensiveness is likely to now permeate many parts of the organizational landscape and knowledge workers can be seen as including software engineers. In software engineering the main asset is the knowledge held by the orgnization's employees rather than plants and machines (Bjørnson & Dingsøyr, 2008). Software development is in turn a significant business sector with a significant impact on employment (Jaakkola, 2009). Software companies are also interesting examples when it comes to value configurations, which will be discussed later.

Stabell and Fjeldstad in association with the shop value configuration recognize problem decomposition, although not explicitly in reference to modular approaches. Modular approaches and common problem solving (Johansson and Jonsson, 2012) rely on the search for scale benefits, i.e. the ability of the organization to gather, prioritize and decompose problems that are relevant for multiple customers. Sanchez and Mahoney (1998) discuss this from the perspective of knowledge management and the emergence and increased importance of architectural learning and key component learning. The way that common problem solving can be organized, i.e. through modular architectures can explain the increased importance of this type of value configuration. While Stabell and Fjeldstad (1998) would most likely argue that this type of value creation can be described by a value shop playing a central role but linked to a value chain, this fails to highlight the scale advantages of applying resources in order to solve a problem that is common to many customers. It would also fail to recognize that for instance for software products and services the chain-like way of creating value is very limited, partly due to the intangible nature of deliveries.

Also, compared to Thompson's definition of intensive technology, and his inclusion of research as an example, the package logic and its associated configuration is in line with the idea of applying techniques to achieve a change in an object that depends on feedback from the object. But for the package logic the object can also be internal, such as for instance technical components, hardware, software etc. And, as the discussion around modularity shows, the iterative problem solving sequences may take place on several levels, such as on an architectural as well as on component level. Although the iterative nature may be more prominent on component level, the complexity of for instance software system development could involve iterative processes at the architectural level as architecture and requirements co-evolve (Whalen, Gacek, Cofer, Murugesan, Heimdahl and Rayadurgam, 2012). However, if the development of software is market driven, requirements innovation evolves in combination with market analysis rather than through direct interaction with single customers (Regnell and Brinkkemper, 2005). Thus, requirements are generalized across markets or segments for market driven software products. Regnell and Brinkkemper (2005) identify market driven software as products that are fully generic or where they include some customization in the form of adaptation to a customer's needs. As examples of pure software

products that are market driven Regnell and Brinkkemper (2005) mention firewalls, generic, or enterprise resource planning (ERP) systems, customized.

User participation in software product development can involve multiple users in the development process (or post launch during maintenance, cf. Bragge & Merisalo-Rantanen, 2002) in various ways and to a varying degree (Abelein & Paech, 2013). See for instance multiple customer involvement in development in off-the shelf software products (Hansson, Dittrich & Randall, 2006) or the use of workshops or customer working groups (Regnell and Brinkkemper, 2005). Such user participation is thus relevant for multiple user or consumer software products which means that organizations in the examples above are working with involving multiple consumers in more or less iterative processes. Thus, to sum up, the value creation that occurs revolves mainly about applying the knowledge of employees to an object, a software product, to non-unique customer problems. It can be based on market analysis, or it can include involving users, among that consumer groups, in development. Thus, software development, and especially software product development on consumer markets has core value creation characteristics that are hard align with either of the value configurations as outlined by Stabell and Fjeldstad (1998). It is hard to argue that this type of value creation consists of a value shop complemented by a value chain as in this instance there are limited long-linked activities internally as well as few examples of activities that we may associate with the value chain, apart from possibly marketing. The package configuration (Johansson & Jonsson, 2012) on the other hand highlights the main characteristics described, including the strong reliance on knowledge.

When firms, such as software development companies, go beyond a focus on their custom application of internal resources towards generic sets of customer problems and realize network effects through for instance platform technologies, the value creation focus shifts toward the mediating technology and the network value creation logic. I.e., it is in line with the idea of whether such development is firm centric or network centric (cf. Paolocci, 2014; Nambisan & Sawheny, 2011). Similarly, a shift from working with generic software products via partial customization to customer specific indicates a move from relying on custom application of internal resources for generic problems towards unique problems.

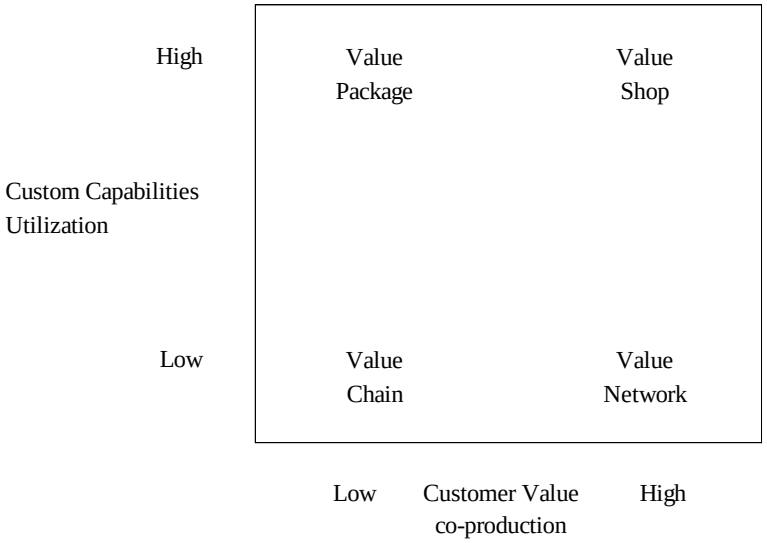
5 Value Configurations and Business Models

Value configurations (Stabell and Fjeldstad, 1998) can be seen as parts of business models for firms (cf. Christensen et al., 2009). Fjeldstad and Snow (2018) view value configuration as a contingency variable that affects the properties of all business model elements (cf. also Christensen et al., 2009). The original three configurations plus the package configuration can be summarized with the focus of their roles in relation to business models, building on Fjeldstad and Snow (2018). Of particular interest when doing so is the role of customers and value creation mechanisms. For the value network and the value shop, the co-creation of value is central. For the value package and the value shop the solving of problems, and as a result the custom application of resources (cf. Thompson, 1967) stand out. Thus, when considering the role of the three configurations as proposed by Stabell and Fjeldstad (1998) and complemented by Johansson and Jonsson (2012) it is possible to plot these in relation to two variables: One being the reliance on customer value co-production and the other being the reliance on custom combination of capacities (Thompson, 1967), what can be interpreted as capabilities (see figure 1). Thompson (1967:45) sees resources as “incorporated” in capacities. A key distinction here is between custom capability combination towards an object and the

scalability of the outcome. The value shop is typically limited in its scalability, i.e. the supplying firm at least does not have direct access to the market where the outcome can be scaled up. The typical examples of the value shop are related to unique customer cases, i.e. a unique customer and most often a unique case for the customer. For the value package configuration on the other hand, the firm has access to the market where a solution can be scaled and can thus gain scale benefits from the outcome of combining resources in a custom fashion to an object, such as a software system.

Thompson's variety of technologies should thereby be interpreted slightly differently from a value configuration perspective. This paper proposes an interpretation where the intensive technology can play a key role in two different but important value configurations in today's organizational landscape, i.e. the intensive technology can substantiate the shop as well as the package configuration with the difference of the object to which capabilities are applied in a custom fashion.

Figure 1: Value configuration analysis matrix



6 The role of knowledge and skills in value configurations

Knowledge is increasingly important as a concept in association with value configurations. For instance, knowledge as a concept in relation to network effects is highly relevant through learning network economies in addition to direct and indirect network economies (Torrent-Sellens, 2015). Johansson and Jonsson (2012) emphasize the importance of knowledge as a source of value in relation to value configurations and value creation logics. Johansson and Jonsson (2012) also show that by applying a knowledge perspective to the intersection of the value shop and value chain can help us understand more about value creation logics at play in firms that rely heavily on the development of knowledge in association with value creation. The importance of recognizing knowledge organizations and knowledge workers in relation to the value configurations as outlined by Stabell and Fjeldstad (1996) has been further discussed by for instance Gottschalk (2007).

In Thompson the concept of knowledge is mainly discussed on an organizational level. The closest one may get to a more detailed discussion on knowledge in relation to technologies lies in the distinction between knowledge and skills in relation to long-linked technologies

versus intensive technologies. The routinized jobs associated with long-linked technologies require skills that are commonly available and thus the technical knowledge is complete, whereas intensive technologies require specialized skills and career opportunities require for the individual to further develop skills and knowledge and exposing it. In Thompson (1967) the jobs associated with mediating technologies in protected portions are also routinized. Thompson mentions the reasons for routinization for long-linked and portions of mediating technologies as dependent on the removal of environmental contingencies and fixed patterns of jobs. Thus, long-linked technologies and intensive technologies, and as a consequence the chain and shop configurations, should be seen as opposites when it comes to knowledge and skills characteristics. Mediating technologies, and as a consequence the network configuration, can be seen as an intermediate to these opposites. This paper would argue that the package configuration will have similar characteristics concerning skills and knowledge as the network configuration due to the fact that the package configuration includes attempts of the organization to limit the environmental contingencies, and routinize to some extent, but at the same time still face complex and novel problems that require custom application of capabilities to reach a desired state of an object. Therefore, figure 1 also reveals insights into the skills and knowledge characteristics of organizations with different value configurations where the opposites can be found in the top right versus the bottom left corner of the matrix.

7 Conclusion

A main contribution of this paper is the categorization of Stabell and Fjeldstad's original three configurations alongside the one proposed by Johansson and Jonsson (2012). The use of two main dimensions to categorize the configurations provides additional understanding of the differences between them but also of the similarities and how organizations can position themselves alongside the dimensions in the matrix in figure 1. The findings carry with them a number of implications for further research as well as for practitioners. Further research should be directed at providing more detailed insights into the distinctions between the configurations, for instance regarding other dimensions besides customer value co-creation, custom application of resources, and skills and knowledge. I.e. how do other dimensions change when moving across the matrix as proposed by this paper and what are the implications for organizations? Future research should try to study the occurrence of each of the value configurations quantitatively. Historical studies with this focus to track changes should also be highly relevant.

For practitioners, especially the matrix in this paper should be a relevant tool to analyze their own organizations, competing organizations and in helping understand current positions and potential changes and their implications. However, it should be noted as discussed above that further research should be directed at clarifying other types of variables in the context of the matrix, which in turn can provide additional detail and usefulness of the model for practitioners. If applying the perspective in Fjeldstad and Snow (2018) that value configurations are contingency variables for business models the proposed matrix should also provide additional clarity for practitioners in relation to business models.

One important difference between the two-by-two scheme as proposed by this paper and Fjeldstad and Snow (2018) is the perspective on resources. This paper argues that the core aspect of Thompson's intensive technology from a resource perspective, is its custom application of the organization's capacities. Thus, a key distinction is the difference between high custom application of capabilities versus low custom application of capabilities.

Another key point of this paper is the relevance of analyzing knowledge flows to provide further understanding of the underpinnings of value configurations. One of the founding papers of the knowledge-based view, Grant (1996), took Thompson's ideas as a key starting point for discussion on coordination and integration of knowledge. And especially for the distinction between the shop and the package configuration, with its knowledge intensiveness, applying a knowledge perspective can provide additional understanding of why activities are organized the way that they are in today's organizations. While the focus of Porter (1985) was on product and paper trails to identify the value of activities, focusing on knowledge can provide additional understanding of value configurations in a knowledge intensive and R&D intensive business landscape.

References

Abelein, U., & Paech, B. (2015). Understanding the influence of user participation and involvement on system success–a systematic mapping study. Empirical Software Engineering, 20, 28-81.

Andriole, S. 2019. Software Rules the World – & Its Kingdom is growing. Forbes. https://www.forbes.com/sites/steveandriole/2019/10/23/software-rules-the-world---its-kingdom-is-growing/ . Retrieved 2023-05-30

Aranda, D. A., & Molina-Ferna´ndez, L. (2002). Determinants of innovation through a knowledge-based theory lens. Industrial Management and Data Systems, 102(5), 289–296.

Baldwin, J. R., & Beckstead, D. (2003). Knowledge Workers in Canada's Economy, 1971 to 2001. Insights on the Canadian Economy.

Barney, J. (1991). Firm resources and sustained competitive advantage. Journal of management, 17(1), 99-120.

Bjørnson, F. O., & Dingsøyr, T. (2008). Knowledge management in software engineering: A systematic review of studied concepts, findings and research methods used. Information and software technology, 50(11), 1055-1068.

Bragge, J., & Merisalo-Rantanen, H. (2002). Engineering e-collaboration processes to obtain innovative end-user feedback on advanced web-based information systems. Journal of the Association for Information Systems, 10(3), 4.

Danese, P., & Filippini, R. (2010). Modularity and the impact on new product development time performance: Investigating the moderating effects of supplier involvement and interfunctional integration. International Journal of Operations & Production Management.

Davenport, T., & Prusak, L. (1998). Working knowledge. Boston: HBS Press.

Department for Trade and Industry (DTI), (2004). Creating wealth from knowledge. London: DTI.

European Commission, Joint Research Centre, Grassano, N., Hernández Guevara, H., Fako, P., et al., The 2022 EU industrial R&D investment scoreboard: extended summary of key findings and policy implications, Publications Office of the European Union, 2022, https://data.europa.eu/doi/10.2760/08410

Eurostat. 2022. R&D expenditure. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=R%26D_expenditure#R.26D_expenditure_by_sector_of_performance. Retrieved 2023-04-26.

Fernandez, D. J., & Fernandez, J. D. (2008). Agile project management—agilism versus traditional approaches. Journal of Computer Information Systems, 49(2), 10-17.

Fjeldstad, Ø. D., & Snow, C. C. (2018). Business models and organization design. Long range planning, 51(1), 32-39.

Gottschalk, P. (2007). How knowledge organisations work: the value shop configuration. International Journal of Services and Standards, 3(4), 402-412.

Grant, R. M. (1996). Toward a knowledge-based theory of the firm. Strategic Management Journal, 17(Winter special issue), 109–122.

Hansson, C., Dittrich, Y., & Randall, D. (2006, January). How to include users in the development of off-the-shelf software: a case for complementing participatory design with agile development. In Proceedings of the 39th Annual Hawaii International Conference on System Sciences (HICSS'06) (Vol. 8, pp. 175c-175c). IEEE.

Henderson, R. M. and I. Cockburn (1994). 'Measuring competence: Exploring firm effects in pharmaceutical research,' Strategic Management Journal, Winter Special Issue, 15.

Jaakkola, H. (2009). Towards a globalized software industry. Acta Polytechnica Hungarica, 6(5), 69-84.

Johansson, M., & Jonsson, A. (2012). The package logic: A study on value creation and knowledge flows. European Management Journal, 30(6), 535-551.

Maier, G. W., Prange, C., & von Rosenstiel, L. (2001). Psychological perspectives of organizational learning. In M. Dierkes, A. Berthoin Antal, J. Child, & I. Nonaka (Eds.), Handbook of organizational learning and knowledge. Oxford: Oxford University Press.

Nambisan, S., & Sawhney, M. (2011). Orchestration processes in network-centric innovation: Evidence from the field. Academy of management perspectives, 25(3), 40-57.

Nonaka, I. (1990). Redundant, overlapping organization: A Japanese approach to managing the innovation process. California management review, 32(3), 27-38.

OECD, (2001). Science, technology and industry scoreboard: towards a knowledge-based economy. Paris: OECD.

Paolocci, E. (2014). Digital Strategies of Consumer Involvement and Innovation Dynamics: A Cross-Sector Explorative Study. International Journal of Marketing Studies, 6(5), 21.

Ramirez, R. (1999). Value co-production: intellectual origins and implications for practice and research. Strategic management journal, 20(1), 49-65.

Regnell, B., & Brinkkemper, S. (2005). Market-driven requirements engineering for software products. Engineering and managing software requirements, 287-308.

Spender, J.-C. (1996). Making knowledge the basis of a dynamic theory of the firm. Strategic Management Journal, 17, 45–62.

Torrent-Sellens, J. (2015). Knowledge products and network externalities: Implications for the business strategy. Journal of the Knowledge Economy, 6, 138-156.

UN. 2023. The impact of digital technologies. https://www.un.org/en/un75/impact-digital-technologies. Retrieved 2023-05-30.

Wernerfelt, B. (1984). A resource-based view of the firm. Strategic management journal, 5(2), 171-180.

Whalen, M. W., Gacek, A., Cofer, D., Murugesan, A., Heimdahl, M. P., & Rayadurgam, S. (2012). Your" what" is my" how": Iteration and hierarchy in system design. IEEE software, 30(2), 54-60.

World Bank, (2002). Building knowledge economies: opportunities and challenges for EU accession countries. Paris: World Bank.