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Andersen, Torben Juul; Bering, Søren

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Forward Integration of Distribution, Sales, and Services in Manufacturing: A Comparative Case Study

Torben Juul Andersen
Department of International Economic, Government and Business
Copenhagen Business School
DK-2000 Frederiksberg
Denmark

Søren Bering
Department of Strategy and Innovation
Copenhagen Business School
DK-2000 Frederiksberg
Denmark

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Abstract

Purpose – The aim of this study is to gain important insights on integration oriented servitization identifying essential dimensions of effective structures, coordination approaches and management controls adopted by manufacturing firms that integrate forward towards distribution, sales and services.

Design/methodology/approach – The study adopts a theory-guided qualitative abductive methodology to conduct a comparative case-study of two manufacturing firms in the same industry integrating forward to enhance servitization but with significantly different performance outcomes. The findings are uncovered from a broad spectrum of primary and secondary data spanning two decades..

Findings – The consistently high-performing firm puts equal emphasis on production and downstream distribution, sales and services and motivate individuals to engage in entrepreneurial efforts to develop combined product-services offerings that are valued by customers. The underperforming firm prioritizes operating efficiency driven by engineering prowess and managed through planning, standardization, authority and central controls.

Research limitations/implications – The study is based on two representative firms operating in a specific industry context, which has ramifications for the generalizability of results and calls for replication studies to substantiate and extend findings.

Practical implications – Forward integration from manufacturing into distribution, sales and services represents a specific servitization strategy that needs structure and particular coordination approaches to be effective in complex dynamic product-markets. The characteristics of the outperforming case company provide useful insights on effective integrated servitization efforts.

Social implications – Forward integration is a commonly adopted strategy among manufacturing firms that constitute the backbone of modern economies and effective governance of these integration oriented servitization efforts has important implications for societal value creation.

Originality/value – This study builds on rationales from management science including economic theory, corporate strategy and different micro-foundational lenses and thereby hone recent calls for broader theoretical foundations to enlighten studies of the servitization puzzle.

Keywords Coordination, Forward integration, Governance structure, Incentives, Interdependencies, Servitization

Paper type Research paper

1. Introduction

When manufacturing firms move activities forward along the value-chain to integrate services in extended product offerings, it is a form of servitization intended to increase profitability and counteract pressures from global low-cost competition (e.g., Neely, 2008; Baines *et al*., 2009). It can enhance market power and form entry barriers beyond manufacturing superiority (Schmenner, 2009), create customer relations with long-term value in use (Brax and Jonsson, 2009), and gain competitive advantage (Baines *et al*., 2009).

Servitization is commonly perceived as a gradual iterative progression (Brax, 2005¸ Brax and Jonsson, 2009), an evolving staged process (Baines and Lightfoot, 2014; Baines *et al*., 2020), or transformation (Brax *et al*., 2021). Indeed, Dmitrijeva *et al.* (2022) refer to a servitization journey. However, this process is not straightforward and may be hazardous (Brax, 2005) as higher service content often fails to improve profits, which presents a servitization paradox (Gebaur *et al*., 2005). Hence, a cross-sectional study of manufacturing firms found profitability in servitized firms significantly lower (Neely, 2008). A study of subsidiaries in a global manufacturing firm found a u-shaped relationship between level of service activities and profitability hinting that learning and scale effects may require substantial commitments to materialize (Kastalli and Van Looy, 2013). Despite considerable efforts to understand this development process, the ability to make servitization profitable remains a 'black box' (Kamala *et al*., 2020) and scholars continue to refer to the 'puzzling' relationship between servitization and performance (Brax *et al*., 2021).

In view of this, we contend that other perspectives may help us understand the complexity of the servitization process. Stonebraker and Liao (2004) argue that the strategy field links supply-chain integration to vertical integration strategies, where forward integration provides access to

customer-related activities. Based on economic and financial rationales, they argue that forward integration implies "*minimization of costs and maximization of services*" (Stonebraker and Liao, 2004, p. 1037). Lightfoot *et al.* (2013) observe how different research communities provide diverse insights to servitization studies and note that "*researchers from a management science discipline approach research practice in a different manner to engineers*" (p. 1429). Hence, Baines and Lightfoot (2014, p. 26) suggest "*broader and more diverse studies*" of the servitization challenge.

Heeding these calls to consider other perspectives, we propose that theoretical rationales from management science can provide useful insights about organizational structure and behavioral conditions in studies of the servitization puzzle. This resonates with the recent literature. Servitization is seen as more than extended product offerings, it requires a re-focus of the organization (Brax, 2005) with supporting structures, service-oriented values (Gebaur *et al*., 2005), and information sharing in "*a more integrated operations strategy*" (Baines *et al*., 2009, p. 500). The development of integrated customer solutions, where a combined product-service experience fulfills valuable end-user needs, extends beyond technology applications and embrace collaborative business model designs (Rajala *et al*., 2019). In short, many aspects of organizational structure, coordination, and values influence integration of mutually dependent activities and related servitization efforts.

The empirical evidence suggests that positive performance effects from forward integration to enhance customer-related services in pursuit of servitization often fail to materialize. This motivates a number of relevant and timely research questions. What characterizes a manufacturing firm that is successful in its forward integrated servitization efforts compared to a competitor that is less successful? Why does one manufacturing firm underperform when it integrates forward to extend services whereas another firm in the same industry consistently

outperforms on its integrated servitization efforts? This study attempts to address these questions conducting a comparative case analysis thereby adding new insights on successful servitization in manufacturing through forward integration.

Forward integration is common among manufacturing firms observed in North America and Europe (e.g., Chandler, 1977; Bucheli *et al*., 2010). Economic theories analyzed and guided these corporate strategy decisions (e.g., Williamson, 1971; Klein *et al*., 1978; Harrigan, 1985; Stonebraker and Liao, 2004). More recently, it was noted as a 'new' approach towards servitization (Neely, 2008). So, even though forward integration has been a corporate phenomenon for decades it is an under-researched approach to servitization. To fill this void, the current study investigates servitization as forward integration adding theoretical lenses from management science to consider important governance and micro-foundational aspects that contribute with new insights to the servitization performance puzzle.

The study contributes with a deeper theoretical understanding of servitization achieved through forward integration strategies in manufacturing, which is a very relevant but understudied topic. It incorporates management science perspectives in the analysis to uncover how corporate structure, management control systems, and core values induce important individual behaviors. It presents theoretical arguments for forward integration that motivate executive choices showing how different economic theories form a conundrum between alternative prescriptions. It adds a micro-foundational perspective interpreted through lenses of complexity theory, dynamic knowledge creation, and corporate culture to show how values-based management can circumvent the economic conundrum.

The following sections review literatures on forward integration, servitization, and related management fields as theoretical underpinnings for the study. This presents a contextual frame around complex distribution garnered with micro-foundational considerations to guide the

collection of empirical data in a comparative case study. The methodology is outlined and analytical findings presented providing details on the cases. These results and their implications for servitization through forward integration are discussed pointing to future research.

2. Theoretical framework

The analysis of forward value-chains can benefit from a deeper understanding of the roles assumed by sales, services, and distribution and their relationships to production where physical products are designed, engineered, and manufactured. The sales function refers to activities pursued to sell products (and services) moving (potential) customers through the selling process, setting marketing strategies, executing market plans, tracking sales, etc. The services function implicates ways to assist, help, and advise customers with auxiliary features that create value in use for the customers including after-sale support. The distribution function refers to supply and placement of goods and services across dispersed markets making them available to a (large) number and (wide) range of customers. These activities can be performed directly by forward integrated manufacturing firms, or indirectly through distributors as intermediaries and independent service providers operating in open markets.

If the manufactured product(s) cannot be sold directly in the market(s) without modifications, extended services efforts must be engaged closer to the end-users (downstream along the value-chain) to develop valuable up-graded market offerings. This requires effective communication between production, sales, services, and distribution to coordinate interrelated activities along the value-chain and generate operating efficiencies for sustained performance.

Forward integration from production towards distribution, sales, and services requires that the corporation can deal with (potentially) complex interdependencies across long-linked value-chain activities (Figure 1). In a forward integrated manufacturing firm production is a core

function where headquarters (typically in the home country) manages sales and marketing with extended sales and services functions in geographically dispersed (local country) entities. In an open market setting, the coordination of related business activities is carried out through spot market transactions (or forward agreements) between independent firms operating for own profit. When these value-chain activities come under corporate ownership, the corporation must be able to coordinate the (now) internalized activities, so they generate more attractive product offerings with higher operating efficiency. That is, it must exploit the implied scale and scope economies and develop integrated product-service offerings that provide value to customers at premium prices. However, these dual aims are not easy to achieve. Responding to customer needs requires entrepreneurial efforts across production, sales, services, and distribution with information and knowledge exchanged in open feedback/feedforward loops, which contravenes attempts to gain efficiencies through standardization.

--- Insert Figure 1 about here ---

To ascertain the rationales of effective product-service integration with entrepreneurial efforts and their (potential) trade-offs, the following probes literatures on servitization, forward integration, distribution contexts, and micro-foundational conditions.

The servitization concept

The concept of servitization stems from the idea of making manufactured products more valuable to customers by adding services in extended market offerings. Its origin is often ascribed to Vandermerwe and Rada (1988) who refer to "*bundles of customer-focused combinations of goods, services, support, self-service, and knowledge*" (p. 316). Volvo is used to exemplify a manufacturing firm where the product (automobile) is extended across the entire transportation experience including financing, insurance, roadside assistance, on-site repairs, service networks, etc. They emphasize the importance of knowledge beyond analysis of

customer data as "*the brain-intensive and more creative aspects ... enriched information like individual consumer problem solving*" (Vandermerwe and Rada, 1988, p. 316). In other words, it requires motivated knowledgeable individuals (employees) close to the end-users to note emerging customer needs and find ways to respond to them.

Gebauer *et al*. (2005) talk about manufacturing firms "*extending their service business*" (p. 15) where servitization constitutes a shift from product-centered towards more complex combined product-service offerings that create customer value for the products in use. Neely (2008) presents four related concepts: (i) product–service systems (PSS), where customers buy the product and additional related services, (ii) servitization, where capabilities and processes are developed to support the PSS, (iii) servitized organization, that effectuates the PSS, and (iv) global value system, the network of suppliers and partners that supports the PSS. He identifies two additional (new) concepts: (v) integration oriented PSS, where manufacturing firms add services through downstream vertical integration, and (vi) service oriented PSS, where firms incorporate services within the product, e.g., intelligent monitoring (Neely, 2008). The integration oriented PSS represents forward integration strategies to advance servitization. Hence, the term servitization refers to a development process that enables the PSS, where PSS, servitized organization, and global value system constitute its content. The integration and service oriented PSSs reflect processes to establish the PSS, where downstream vertical integration towards servitization is central to this study.

These views are condoned by Baines *et al*. (2009) arguing that "*servitization is now widely recognized as the process of creating value by adding services to products*" (p. 494) and PSS is "*an integrated product and service offering that delivers value-in-use*" (p. 497). They claim that successful servitization in manufacturing requires structures and processes configured to deliver services that support the use of the product. It is noted that "*employees will have high*

levels of product knowledge, blended with customer management and relationship development skills" (Baines *et al*., 2009, p. 513). In other words, the importance of engaging knowledge around customer-focused employees is emphasized.

Brax and Johnson (2009) introduce the concept of *"integrated solutions*" as complex customized offerings beyond bundles of services and products. It is debatable if this (truly) extends the description by Vandermerwe and Rada (1988) that also considers "*support, self-service, and knowledge*". Yet, the focus on customized solutions accentuates the importance of 'brain-driven' knowledge among engaged employees. Kastalli and Van Looy (2013) propose that service-oriented manufacturing firms adopt an integrated product-service business model with practices to generate customer proximity. Likewise, Baines and Lightfoot (2014) argue that "*servitization is the term given to a transformation where manufacturers increasingly offer services that are tightly coupled to their products*" (p. 4). They state that advanced services manufacturers integrate forward to access a wider range of customer-related activities. Yet, they do not analyze the integration oriented PSS approach to servitization.

Benedittini *et al*. (2015) describe servitization as "*a growing propensity for manufacturing firms to develop service offerings that extend beyond their traditional core product offerings*" (p. 946). Baines *et al*. (2017) talk about manufacturers building revenue streams from services in the form of (1) base services like spare parts, 2) intermediate services like repairs, maintenance, overhauls, etc. and 3) advanced services like customer support agreements, outcome contracts, etc.

Kamal *et al.* (2020) refer to this as "*bundled product/service offering by manufacturing*" (p. 1) where "*transformation towards a services-led business model is collectively referred to as 'Servitization'*" (p. 2). Brax *et al*. (2021) describe servitization as "*service-based strategies and their growing business implementation in manufacturing and other traditionally product-based*

industries" (p. 517). Similarly, Dmitrijeva *et al.* (2022) write that "*the literature defines servitization as the transformation process manufacturers undergo when shifting from being a product provider to becoming a provider of outcome-based services*" (p. 142). In short, the servitization concept reflects a process towards integrated product-service offerings delivered through a network, or ecosystem, of internal actors and partners orchestrated to enable servitization in a forward integrated manufacturing firm.

However, research on integration oriented servitization has not analyzed the governance of forward integration towards downstream distribution, sales, and services. Some studies analyze service-focused corporate subunits (e.g., Baines and Lightfoot, 2013, 2014), and others analyze specific effects of service-orientation (Benedettini *et al*., 2015), bundled product/service offerings (Kamala *et al*., 2020), or outcome-based services (Dmitrijeva *et al*., 2022). Yet, there is no focus on the governance aspects of forward integrated services in manufacturing. A few articles focus on Neely's (2008) PSS classifications. One studies technologies in modular services (Mario *et al*., 2019) another business models for enhanced PSS offerings (Mariusz and Kraslawski, 2020). A recent study analyzes integration oriented PSS in international manufacturing firms finding positive performance effects only in BRIC countries (Andrea and Supino, 2022). This suggests that servitization through forward integration fails to generate profits among European manufacturing firms, which is the focus of this study.

Forward integration perspectives

Forward integration reflects the development, or acquisition, of value-chain activities downstream from production, where post-integration requires effective governance of intra-firm and market-based relationships. It depicts downstream vertical integration towards final end-users in the product-markets as a specific servitization approach observed in manufacturing industries (e.g., Neely, 2008). Forward integration has been analyzed from economic rationales,

e.g., transactions, contracts, moral hazards, incentives, industrial organization, and evolution (e.g., Anderson and Schmittlein, 1984; Anderson, 1985; Brickley and Dark, 1987; Shepard, 1993; Slade, 1996; Kedia *et al*., 2001; Woodruff, 2002; Baker and Hubbard, 2004; Fan and Goyal, 2006; Kosová *et al*., 2013).

The integration of interdependent activities introduces costs when information exchanges along the value-chain are imperfect, or unaligned, and leave room for self-interested actions. Hence, effective coordination of long-linked interrelated activities rely on an ability to engage individuals that perform the operating functions. A transaction cost perspective identifies the adverse effects imposed by economic haggling between interdependent individual actors along linked (open market) transactions (Williamson, 1971, 1979, 1985; Grossman and Hart, 1986; Hart and Moore, 1990). Haggling can also arise when linked business activities are integrated in a corporation (Alchian and Woodward, 1988; Masten *et al.*, 1991; Rosen, 1991; Kaplan and Atkinson; 1998; Woodruff, 2002; Gibbons, 2005, 2010). Transaction costs arise when contractual incentives and priorities diverge across individuals and lead to suboptimal behaviors (Alchian and Demsetz, 1972; Jensen and Meckling, 1976; Eisenhardt, 1989; Holmström and Milgrom, 1991). These rationales are applied in strategy studies on vertical integration (e.g., Harrigan, 1985; Williamson, 1991).

It is argued that forward integration may eliminate transaction costs and increase economic efficiencies (Bain, 1968; Williamson, 1971, 1991; Alchian and Demsetz, 1972; Porter, 1980; Anderson and Schmittlein, 1984). However, when individual contributions are difficult to measure in the integrated firm, it can create moral hazards, where individuals act for own advantage (Brickley and Dark, 1987; Lafontaine, 1992; Shepard, 1993; Slade, 1996; Woodruff, 2002; Lafontaine and Slade, 2007; Kalnins and Lafontaine, 2013; Kosová *et al*., 2013). These

are the fundamental theoretical issues a manufacturing firm must consider when deciding whether or not to integrate forward.

The analyses of forward integration have typically adopted a moral hazard perspective as production in the integrated firm depends on market-related knowledge held by individuals in downstream distribution, sales, and services functions (Anderson and Schmittlein, 1984; Anderson, 1985; Brickley and Dark, 1987; Lafontaine and Slade, 2007; Kalnins and Lafontaine, 2013). The dependency on downstream activities is different from dependencies on upstream supplies where manufacturing is the point of revenue collection with accounting control (Eccles, 1985). The potential to haggle over earnings (quasi-rents) also depends on the flexible use of resources (their plasticity) and the ease of monitoring their use and effect (Alchian and Woodward, 1988). If alternative use is limited and monitoring easy, it is straightforward to detect situations of moral hazard. However, when it is difficult to monitor, the vulnerability to moral hazards increases.

Empirical studies suggest that forward integration is favored when it improves the ability to monitor distribution and sales efforts that reduce moral hazards (Anderson and Schmittlein, 1984; Anderson, 1985; Brickley and Dark, 1987; Woodruff, 2002). Yet, when the integrated firm adopts internal transfer prices on transactions between sequential business entities, the moral hazard issue reappears (Jensen and Meckling, 1976; Fama, 1980; Williamson, 1985; Kaplan and Atkinson, 1998; Gibbons, 2005, 2010). If the manufactured products are traded internally at cost, the consolidated profits are registered at the last point of sales, which creates moral hazards when the downstream resources are unique and flexible in use. If manufacturing dictates a higher price to extract profits from downstream distribution, sales, and services, it disfavors entrepreneurial engagement of individuals close to the end-users (Eccles, 1985; Grossman and Hart, 1986; Holmström and Tirole, 1991). So, forward integration in

manufacturing towards downstream distribution, sales, and services presents a tension between management controls to reduce moral hazards against incentives for entrepreneurial efforts to develop extended product-service offerings.

Theories of industrial organization analyze scale and scope economies from integrated production as sources of competitive advantages (e.g., Bain, 1968; Riordan, 2008; Pindyck and Rubinfeldt, 2013). Forward integration can increase market power, restrict output, and raise prices (e.g., Porter, 1980) where integration of value-chain activities may reduce processing costs and develop better market offerings (Hoopes *et al*., 2003). This perspective is rooted in evolutionary economics (Nelson and Winter, 1982; Winter, 1991) where value derives from deployment of unique resources (Barney, 1991; Peteraf, 1993). These rationales emphasize the value of idiosyncratic resources in the integrated firm (Demsetz, 1988; Connor, 1991; Teece *et al*., 1997; Barney, 1999). The advantages do not derive from lower transaction costs or scale economies, but from valuable, rare, and inimitable resources (Nooteboom, 2004; Teece, 2010; Spring and Araujo, 2013; Story *et al*., 2017).

In short, forward integration presents important trade-offs between central management controls to secure production efficiency and incentives to engage in entrepreneurial efforts that develop market-offerings valued by the end-users. These theoretical rationales are taught in business schools and provide the foundation for executive decision-makers as they structure the integrated manufacturing firms and are, therefore, important to understand the logic that underpins their governance choices.

Distribution contexts

The complexity of manufacturing, selling, and distributing products and services to end-users affects the ability to describe and codify market information, operating processes, and product knowledge (Gereffi *et al*., 2005) required to coordinate interrelated value-chain activities.

When the product requires few alterations to be sold and the product offering is specified, the manufacturing firm can plan investments, standardize operations, and organize downstream efforts as *directional distribution*. Corporate activities adopt standardized product-service features with efficient operations that resemble captive governance with formal contracts (Gereffi *et al*., 2005). The required product-service features can be codified making it easy to monitor distribution, sales, and services where manufacturing coordinates interdependent value-chain activities through standardization and planning (Thompson, 1967) with an official market price that offers a premium to compensate sales and distribution (Klein, 1995). The premium emanates from superior products and creates moral hazards if individuals in downstream sales and distribution freeride on effort (Anderson and Schmittlein, 1984; Brickley and Dark, 1987; Lazear and Gibbs, 2009). Hence, contractual arrangements are used to govern the sales and distribution efforts where the premium is foregone if conditions are not met (Klein, 1995; Lafontaine and Raynaud, 2000).

When market conditions and product offerings increase in complexity, it becomes difficult to standardize and control operating procedures along the value-chain (Bering, 2021). This means that sales of manufactured products require extended market offerings to satisfy changing end-user demands organized as *complex distribution* (Mathieu, 2001; Woodruff, 2002; Gereffi *et al*., 2005; Lightfoot *et al*., 2013). This entails specialized versions of the core product with extended services that create value-in-use for customers. The coordination of value-chain activities is challenged because it must engage specialized resources and competences dispersed across individuals in production, distribution, sales, and services. The production function in manufacturing has special product, operating, and technology knowhow whereas detailed market and end-user insights reside with individuals in the downstream functions that

must be engaged to respond to complex and changing customer needs (Neu and Brown, 2005; Gereffi *et al*., 2005; Lafontaine and Slade, 2007).

As unique information is located in specialized functions along the value-chain, it is difficult to incorporate reliable measures in formal contracts that govern the interdependent business activities. The capabilities contributed by downstream market-focused functions are unique and should interact with production expertise in complex multitasking structures to develop sophisticated market offerings (Holmström and Milgrom, 1991; Shepard, 1993; Slade, 1996). It is difficult to manage complex structures in dynamic and rapidly changing market contexts (e.g., Teece, *et al*., 1997; Woodruff, 2002; Nooteboom, 2004; Gebauer *et al*., 2005; Lafontaine and Slade, 2007; Kosová, *et al*., 2013). It requires engagement of entrepreneurial efforts among individuals in production, distribution, sales, and services to secure effective resource deployment with market offerings valued by the end-users. Updated information about market conditions resides with employees in distribution, sales, and services, which makes it untenable for manufacturing to coordinate through central planning (Williamson, 1979; Grossman and Hart, 1986). Instead, there is a need for ownership-like incentives to motivate individuals in the downstream market-related functions (Grossman and Hart, 1986; Lafontaine and Raynaud, 2002; Gibbons, 2010). That is, forward integration under high product-market complexity must balance central management controls with flexibility where mutual dependencies are resolved through incentivized behaviors of individual managers and employees.

If sequential mutually dependent business activities establish equilibrium sales below the optimal production level, it creates a *double marginalization* problem where volumes and marginal profits are misaligned across the linked value-chain functions (Eccles, 1985; Pindyck and Rubinfeld, 2009; Riordan 2008). Under complex distribution, the misalignment effect can be mitigated by engaging idiosyncratic capabilities in downstream distribution, sales, and

services to extend the product-service offerings so customers are willing pay more (D'Aveni and Ravenscraft, 1994; Hoopes *et al*., 2003). This requires that manufacturing incentivizes individuals employed in downstream customer-focused functions (Grossman and Hart, 1986; Barney, 2018) to be service-oriented, market-conscious, and entrepreneurial (Brickley and Dark, 1987; Woodruff, 2002; Lafontaine and Slade, 2007; Kowalkowski and Kindström, 2015). Trust and openness between individuals in production, distribution, sales, and services are important to facilitate collaborative responses across the interdependent value-chain activities (Arrow, 1974; Nooteboom, 2004; Gibbons, 2010).

In short, manufacturing firms that contemplate forward integration must be conscious of the level of complexity in the product-markets they serve as they move from open market transactions to coordinate internalized value-chain activities (Figure 2). In stable low-complexity product-markets it is possible to create effective market sales with operating efficiencies through standardized management controls reflected in directional distribution. In dynamic highly complex product-markets, production quality and operating efficiencies remain important, but it becomes crucial to engage entrepreneurial efforts in the downstream customer-focused functions as reflected in complex distribution.

--- Insert Figure 2 about here ---

These theories as they are applied to analyze governance of forward integration may focus on one set of advantages, or costs, but ignore (other) relevant effects. A transaction cost perspective suggests that a manufacturer with asset-specific investments can integrate forward to reduce opportunistic haggling whereas a property rights perspective argues for segregated ownership to incentivize individual agents (Grossman and Hart, 1986; Woodruff, 2002). This is a prescriptive conflict between theoretical rationales with opposing recommendations. Some theories have contradictory rationales particularly in complex product-markets with vertically

integrated value-chain activities (Williamson, 1973). Hence, the analysis of forward integration must reconcile the implied tradeoffs (Williamson, 1979; Gibbons, 2005). Complex distribution captures the theoretical challenges in contemporary product-market settings with a frame to analyze effective forward integration in manufacturing.

Micro-foundations

The descriptions of servitization through the lenses of forward integration and complex distribution identifies the essential role of individuals in an integrated corporation that caters to complex dynamic product-markets. This resonates with calls to study the roles and effects of people and decision-makers in organizations. Felin and Foss (2005) argue that "*micro-foundations are needed for explanation in strategic organization*" (p. 441) against a common "*focus on collective level constructs (e.g. routines, capabilities) at the expense of individual-level considerations*" (p. 442). So, we should understand "*how the interaction of individuals leads to emergent, collective, and organization-level outcomes and performance*" (Felin *et al*., 2015, p. 576). This also implicates values-driven behaviors linked to transaction cost theory as managers and employees execute the business activities and upper echelons theory when executives make strategic decisions. As Felin *et al*. (2015, p. 585) observe "*transaction cost economics*" and the "*literature on upper echelons and top management teams … may also be seen as microfoundational*".

Complexity implicates "*dealing with rapidly changing, complex problems in the overlapping hierarchies linked in an interactive network*" (Tal and Gordon, 2016, p. 260) where emergent changes require responses that can be resolved by interacting individuals. These responses can be triggered when market conditions change and engaged individuals together form creative solutions (Uhl-Bien *et al*., 2007). These behaviors are hard to foster in written contracts but evolve from values that permeate an organizational culture as accepted ways to deal with

unexpected conditions. Camerer and Vepsaleinen (1988) note how costly imperfect contracts can be replaced by "*unwritten cultural contracts … broad but clear enough to specify optimal employee action in the face of contingencies too difficult to foresee*" (p. 117). Deal and Kennedy (2000) argue that "*values are the bedrock of any corporate culture*" (p. 21). A corporate culture derives from beliefs, values, and assumptions of influential (executive) leaders expressed in observable acts, principles, and symbols (Schein, 2004).

Complexity theory may suggest how organizations can deal with complex uncertain conditions by honing networks of interacting individuals that modify the system as things evolve. It requires a common purpose and flexible structures with individual autonomy to innovate through dynamic knowledge creation (Nonaka, 1994). He argues that "*you need individuals in the learning process to experiment and gain new insights*" as they "*accumulate tacit knowledge through direct 'hands-on' experience*" (Nonaka, 1994, p. 21). Leadership is also important because "*it is the role of top or middle management to determine the evaluation standard*" reflected in corporate aims and values (Nonaka, 1994, p. 26). Organizations innovate in complex rapidly changing contexts as individuals create knowledge for adaptive solutions (McElroy, 2000). The leaders trust their employees "*to self- organize to solve problems … rather than script procedures*" and "*encourage rather than banish informal communications networks*" (Grobman, 2005, p. 350). As servitization through forward integration (increasingly) responds to dynamic and complex product-market conditions, it is conceivable that successful integrated manufacturing firms have similar characteristics.

These micro-analytic rationales identify clear links from economic theories on forward integration and distribution contexts to applications of complexity theory and dynamic knowledge-creation that imply employee, managerial, and executive interactions. The study adopts these complementary theoretical lenses to understand how individual interactions across

levels and functions drive organizational performance. Hence, the study does not conduct detailed field analysis of micro-foundational processes but analyzes the way (individual) executives influence how (individual) managers and employees interact across vertically integrated activities to advance enterprise outcomes.

3. Methodology

The servitization, forward integration, complex distribution, and micro-foundations literatures provide relevant theoretical angles to frame a comparative study of integration oriented PSS in manufacturing. The study adopts an abductive methodological approach combining theory with empirical observations moving back and forth between the two to gain new insights. As Dubois and Gadde (2002) argue "*theory cannot be understood without empirical observation and vice versa*" (p. 555). Induction, deduction, and abduction are related research stages triggered as existing 'beliefs' fail to explain observed reality and is interpreted openly in view of current theories (Reichertz, 2014).

The relationship between servitization and performance inspired this study observing how two close competitors in the same industry realized very different performance outcomes in their forward integration strategies from manufacturing towards distribution, sales, and services. A study of such representative firms with detailed data and real-life information are appropriate sources for theory extension (Eisenhardt, 1991). Analyzing two firms pursuing product-service integration strategies with significantly different results allows us to contrast 'less' with 'very' successful cases noting differences between them (Eisenhardt and Graebner, 2007; Welch *et al*., 2011; Yin, 2018). The case study method has been widely used in exploratory servitization research (e.g., Brax, 2005; Brax and Jonsson, 2009; Lightfoot *et al*., 2009; Pellinen *et al*., 2016; Rajala *et al*., 2019; Dmitrijeva *et al*., 2022).

The industry context

Historically, manufacturing companies like Singer, McCormick, Westinghouse and General Electric (in North America) expanded forward to integrate their own distribution activities (Chandler, 1977; Schmenner, 2009; Bucheli *et al*., 2010). In Europe, expansion of extended product-service offerings reflects similar attempts to integrate forward towards distribution, sales, and services (e.g., Bain *et al*., 2009). That is, forward integration has been common to extend business activities downstream with integrated product-service offerings although it only later is identified as a specific servitization orientation (e.g., Stonebraker and Liao, 2004; Neely, 2008).

In Europe, the capital-intensive truck manufacturing industry underwent major consolidations from the 1970s onwards as global competition intensified with companies going bankrupt, or being acquired. Today the industry counts seven major brands owned by five enterprises. The truck manufacturers started to integrate forward by first acquiring major import companies and later local distributors. They operate in business-to-business markets with customers ranging from single owner-drivers to large transport companies. The product caters to a variety of market segments with diverse needs and service requirements. Trucks to large fleet customers are fairly standardized, whereas special users, e.g., concrete mixers, cranes, tippers, garbage collectors, etc., require substantial upgrading. Special features like chassis rigidity, multi-traction steering and other customized features provide rich potential for combined product-services. Durable long-lived products require maintenance and upgrading services to keep them operational over lifetime ownership. These factors influence buying decisions where distribution, sales, and services can differentiate market offerings.

Case selection

Two large competitors with different growth, profitability, and customer satisfaction records were identified, one performing at par with the industry and another consistently outperforming

its peers. The two companies (A and B) date back more than a century with annual production in excess of 80,000 units, revenues over EUR10 billion, and more than 35,000 employees[1]. They both operate internationally, A with a somewhat larger home market than B, managing their own international distribution entities. By 2005 the companies posted similar revenues but B has steadily outperformed since then (Figure 3).

--- Insert Figure 3 about here ---

The revenues of Company A increased from EUR7.5 billion in 2005 to around EUR12.8 billion in 2019 (15-year compound rate: 12.7%), whereas Company B grew from revenues of EUR6.7 billion to around EUR15 billion over the same period (15-year compound rate: 19.1%). Profitability indicated by return on sales (ROS: net income before tax as percentage of revenue) has been volatile due to interim economic crises but Company B has consistently scored higher than Company A with ROS of 10.5% against 3.4% respectively in 2019. Both companies pursue a strategy to integrate downstream distribution, sales, and services reflecting servitization efforts that make them suited for contrastive analyses. It can be difficult to identify cases that are truly different in all respects but one (Levy, 2008). Yet, given comparable origins of the firms in the same industry with significant differences in performance over more than fifteen years, they appear to be good candidates.

The ensuing analyses rely on secondary public information accessed from annual reports, company websites, industry reviews, etc., and primary data collected from interviews with corporate executives and country managers as key informants as well as on-site observations from conversations and meetings recorded in extensive field notes.

[1] Based on their 2019 Annual Reports.

Data collection

The executive choices made on strategic priorities, corporate structure, and management controls shape organizational culture and drive micro-foundational behaviors important to understand individual interactions across interdependent activities. Hence, we collected information on governance rationales and organizational processes in the two companies from annual reports and interviews with senior managers at headquarters and sales managers in local national markets. The cultural and behavioral artefacts were obtained from observing and conversing with managers and employees at internal meetings and visits. Information on corporate mission and espoused values was obtained from various documents (Figure 4). These archival sources were analyzed through the lenses of forward integration, economic theories, and micro-foundational dimensions to assess individual behaviors across levels and functions among employees, managers, and executives.

--- Insert Figure 4 about here ---

The interview protocol was inspired by the literatures on servitization, forward integration, and complex distribution being cognizant about micro-foundational dimensions. It prompted questions searching for the rationales used to pursue servitization through forward integration and approaches taken to coordinate interrelated value-chain activities, management accounting and control systems. The interviews were structured as open-ended conversations with room to capture unsolicited information.

Insights on corporate mission, strategic priorities, and espoused values were gathered from secondary sources. Annual Reports over the twenty-year period 2000-2019 and corporate websites provided complementary data on purpose and structural characteristics. The data was cross-checked against other sources, e.g., patent registers, company jubilee yearbooks, truck of the year awards, customer satisfaction surveys, and market share reports. Additional field

observations on individual behaviors, cultural symbols, and rituals were observed in various encounters at headquarters and local units (Table 1).

--- Insert Table 1 about here ---

The semi-structured interviews were conducted with managers at headquarters and national distribution entities including board members, senior executives and officers across hierarchical levels, operating functions, and country locations. Use of multiple informants gains saturation in the data collection (Strauss and Corbin, 1998) and triangulates sources for valid findings (Flick, 2014; Yin, 2018). The approach does not provide purely grounded theorizing but offers theory-guided qualitative induction inspired by "*theoretically specified aspects of reality*" (Levy, 2008, p. 4) extrapolating from current theory (Reichertz, 2014). Partial theory-guidance has merit as "*the best qualitative research is more theoretically driven*" with "*more potential to contribute to the cumulation of knowledge*" (Levy, 2008, p. 2). The study also incorporates the approach suggested by Gioia *et al*. (2012) to increase '*qualitative rigor*' using informant data to generate broad 1st order themes followed by 2nd order concepts formed by the researcher. This phase cycles "*between emergent data, themes, concepts, and dimensions and the relevant literatures… transitioning from 'inductive' to a form of 'abductive' research*" (Gioia *et al*., 2012, p. 21). It supports the aim to obtain open unbiased, yet rigorous interpretations of the empirical data.

The information was collected during 2016-2019 from the two case companies enabling comparisons across distribution locations, operating functions, and hierarchical levels. The interviews had an average duration of around seventy-five minutes and were taped, transcribed, and coded. To protect anonymity and gain open feedback, all interviewees signed non-disclosure agreements.

Coding and analysis

NVivo was used as analytical software to code primary and secondary data for subsequent analyses. The initial coding categorized archival data from annual reports, strategic programs, official websites, corporate documents, jubilee yearbooks, external reviews, consultancy reports, customer satisfaction surveys, market share reports, patent registers, truck-of-the-year-awards, and academic articles to identify purpose and integration rationales. Data and fine grained insights on corporate coordination, management accounting, and control processes were obtained from face-to-face interviews.

These primary and secondary data were coded in a first cycle grouped around terms and expressions with similar content in broad 1st order themes (see Appendix) using a gradual lumping technique to capture nuances (Gioia *et al*., 2012; Bazeley and Jackson, 2013; Saldaña, 2016). This process consolidated the 1st order themes to form more condensed 2nd order concepts resonating with theoretical perspectives from the literature (Braun and Clarke, 2006; Gioia *et al*., 2012; Saldaña, 2016). The 2nd order concepts were then aggregated into three dimensions that accord with extant theories (Figure 5).

--- Insert Figure 5 about here ---

The integration rationale of Company A is pursuit of an industrial organization structure to gain scale and scope economies forging cost efficient sales and distribution with low entrepreneurial effort. In contrast, Company B has a balanced value chain rationale with equal emphasis on manufacturing and downstream distribution, sales, and services with market-driven use of resources and high entrepreneurial effort to create customer value. Hence, Company A exhibits characteristics of directional distribution whereas Company B has dimensions that resemble complex distribution.

The methodology follows a partially theory-guided abductive approach open for new insights while pursuing qualitative rigor (Dubois and Gadde, 2002; Levy, 2008; Gioia *et al*., 2013;

Reichertz, 2014). The Appendix summarizes the transition from 1st order themes to 2nd order concepts onto final dimensions. The following presents information from archival sources, informant statements, and field observations from the case companies.

4. Empirical observations

The following conveys informative snapshots from archival sources, interviews, and informal encounters with individual across the two case companies. These observations are organized to provide insights from the coding of 1st order themes that follow the order of the seven (1-7) condensed 2nd order concepts (Appendix).

Company A

1. Distribution serves manufacturing

Budgeting at manufacturing headquarters focuses primarily on volume to reach optimal production levels pushed by top-down planning with ambitious sales targets. A country managing director describes it this way: *"it gives them [at headquarters] the freedom to boost the markets in terms of allocating resources to various parts if they think they need that to have more production output"*. A country sales director notes: "*they [headquarters] are defining the targets breaking it down to the smallest unit … and then, in our daily steering, we are always focusing on volume".* Another country managing director adds: "*the factory basically has a very linear mentality to planning. They have little or no concept to the vagaries and the dynamics in each market*." This depicts a rationale where distribution primarily generates sales to secure operating efficiency in manufacturing.

2. Engineering as value source

The company has a (proud) engineering/manufacturing heritage away from end-users in the market. A country managing director argues: "*I think mainly engineering, supreme*

technologies, and reliability in the engineering … is what made us a strong company". A senior ranking employee at headquarters ponders: *"I would say it's our damn task to become the voice of the customer … being close to the customer … and here we have definitely room for improvement"*. The annual reports show a one-sided focus on engineering where the past twenty reports make statements about *"Engineering the Future".* This is recognized in truck of the year awards that acknowledge efficiency and sophisticated technical solutions.

Company A has received a total of fifteen prices over the past two decades—far more than Company B— and Company A has registered more than 10 times as many technology patents than Company B[2]. The prioritization of engineering drives an integration approach where headquarters perceives value as primarily deriving from manufacturing.

3. Distribution as revenue center

Forward integration makes it possible to avoid sharing premiums with sales and distribution to maximize manufacturing profits and avoid volume reduction caused by double marginalization. However, when headquarters pushes production volume to optimize scale economies, it ignores value-enhancing entrepreneurial efforts in distribution, sales, and services. Hence, the downstream entities act as revenue centers with profit optimization coordinated through central planning and standardization. A country finance director explains: *"The idea is that through analysis done by headquarters, they can optimize the product mix of the countries and tell them how to achieve optimized operating profits … it's the job of the country to implement and deliver the results".* A country managing director adds: *"You're actually allowed to do the deal to lose money, but not allowed to keep your people and build your company. Shut up, do what we say,*

[2] Source: Patents.google.com (01/2000 – 08/2020)

and fire your people. We don't care. Just do it". This describes a coordination approach where the distribution and sales entities are revenue centers in a top-driven command structure without local autonomy and profit incentives.

4. Hedging against moral hazards

The company attempts to reduce moral hazards by enforcing ambitious sales targets with restrictive cost allocations leaving no resources in the distribution and sales entities to pursue own actions. A country managing director explains: *"We have these targets ... let's say, dreaming, wishes, extreme wishes. We spend 0.35% of turnover in marketing – one-third of what they spend in other brands. We don't spend in marketing because we spend on administrative costs ... a lot of internal inefficiencies that are stealing jobs ... we do not have people to support sales and product marketing".* A senior vice president at headquarters adds: *"I think we are an organization with too much control over people ... we don't let them take any decisions ... we in the central organization have to approve. I think that's stupid".*

5. KPI focused controls

The company manages the distribution and sales entities pushing corporate goals imposing efficiency-based key-performance-indicators (KPIs) monitoring if budget-targets are achieved. A country managing director explains: *"We keep telling headquarters that we're not going to deliver. We tell them that we're under pressure, but they don't accept reduction in our numbers ... they just say you have to. The planning for us, is a complete and utter waste of time because there's no two-way dialogue*". Another country managing director echoes: *"I can tell you ... the whole bonus process the company is driving ... it's market-share, it's ROS, it's all KPIs full stop. You do not evaluate how somebody's treating his people--how anybody is behaving. It's more and more really pure KPIs*". This shows an authoritarian approach without room for entrepreneurial efforts. The annual reports reveal that the company pays little attention to

mission and values—the 2004 Annual Report introduces corporate values—to disappear two years later, and not seen thereafter. The emphasis on KPIs—absent guiding mission and values—reflects a coordination approach focused on operating efficiency through formal controls.

6. Pushing central authority

Entrepreneurial efforts in distribution and sales to deal with customer needs are lacking. Local managers have no authority to take initiatives as headquarters enforces ambitious sales targets to support production priorities. A country managing director explains: "*I was on holiday. Different time zone. It was late at night. I received a phone call. I didn't pick up. I received it again. And again, and again, and again. So I said, Okay. Now I pick up. In the middle of the night. The caller said: I know you are on vacation, but you have now six hours to put the figures in the system. I responded: Okay. Why should I do so, because we will never achieve it. Because I tell you … if you do not do this, think about your last days in the company.*"

7. No entrepreneurial incentives

The company does not reward entrepreneurial engagement in distribution and sales and gives no incentives to local managers. A country finance director explains: "*One third is targets they can change themselves. Profitability and market share can only partially be influenced locally. So, 90% is out of their hands".* A country sales director argues: "*If it would be my company, I would focus much more on the customer and, especially, on the staff side. In the long run these are the two elements that impact performance. Then, in our daily steering, we are always focusing on volume ... we are acting short term.*" This uncovers a coordination approach using formal authority to drive sales targets and gain operating efficiencies without incentives for entrepreneurial customer-related initiatives.

Field observations

The field notes capture cultural artefacts from informal interactions with individuals at various encounters throughout the organization. For example, entry through the main gate of Company A features a pertinacious inspection of passport ID before being issued an entry card by a person in a military-like uniform. The magnetic card gives entry to a security gate with room for one person—also used to exit the grounds. The headquarters building has individual offices for directors and higher ranks with a secretary in front of each office as gatekeepers. The administrative personnel wears formal business attire.

Company B

1. Value from manufacturing

The company is manufacturing/engineering oriented but distribution, sales, and services are considered important to create value with product specifications tailored to customer needs and solutions that create value over the product life-time. Production adopted Japanese inspired continuous improvement processes refined through employee engagement—in agreement with labor unions—to ensure economic gains enhance development investments. Hence, Company B manufactures more than twice the amount of trucks and busses per employee compared to Company A. The Annual Reports over two decades (2000-2019) show a consistent emphasis on modular production. A senior executive explains: *"The company was globalizing very early. That meant a huge variation in customer applications--from different export markets. A genius in the company took up an old German system 'Bau Kasten' … and developed a system to build a truck as a LEGO system where the customer specifies the vehicle … It was a very smart system--the first in the whole industry".*

2. Value from distribution

The company emphasizes manufacturing but also recognizes the importance of enhanced product features and services, so services revenues and profits are reported as separate business activities. It has implemented a modular product specification concept to increase flexibility. The 2004 Annual Report notes: *"As the company has refined its modular system over the decades in research, development and production, today it is developing a similar system for the important service market."* The 2011 Annual Report states: *"The company's objective is to provide the best profitability for its customers throughout the product life cycle ... In partnership with customers, we develop packages of products and services that deliver high efficiency, profitability and sustainability".* This depicts a balanced integration rationale with equal emphasis across interrelated value-chain activities from production to distribution, sales, and services.

3. Distribution as profit center

A country managing director explains: *"If I don't have a consolidated picture on what we can earn when we sell this truck to this customer--then I leave the business. I would never give away a truck if I don't see that there is a potential in the long-term to have a profit".* A senior headquarter executive elaborates: "*If you look into sales and services--from commercial operations down to every workshop, and every bay in the workshop--they have their own P&L".* A headquarter executive adds: *"You can never be accountable or feel it is your own business if you're imposed and told. If you're told, do this, do that--after a while you just get yes soldiers. We have powerful managers—call it delegation closer to the market with accountable people."* This reflects coordination built on delegation, trust, and accountability engaging managers and employees across linked activities with resources to pursue market-driven initiatives.

4. Customer orientation

A senior executive explains: "*In the middle of the 90's, we started to work with Toyota manufacturing system … it has three leading words, 'customer-first', 'the people', and 'quality'. We introduced it in the mid-90s … so we already had that culture … our focus is on the customer*". The emphasis on customer services is recorded in related studies of integration decisions (Johnson and Bröms, 1995; Brooks and Reast, 1996; Brunninge, 2005; Ahlstrand, 2015). Top management identifies the complexity of integrated activities that needs an organizational culture of employee engagement combined with a market-oriented use of corporate resources.

5. Importance of downstream resources

The mission statement (2000-2019) remains focused on customer value recognizing the ability of distribution, sales, and services to create relevant market offerings. The yearly marketing plans give feed-back to production on required product specifications also studied by top management. A country managing director explains: *"An investment goes up to the head office and there is a final decision on that investment--but there are no decisions on personnel, and on SG&A made at a central level."* So, there is open communication across hierarchies, an awareness about market developments, but headquarters delegates the coordination efforts to the local business entities. Employees are exchanged between headquarters and local sales and distribution entities to facilitate interaction across value-chain activities. A senior executive argues: *"You have to send out people to train them, to widen their horizon … learn--how to sell services to get the concept, and they were enthusiastic when they returned."*

6. Values based actions

The company seeks to economize on effort using delegation and motivation that resemble incentives provided by asset ownership. A senior executive at headquarters explains: "*We are*

extremely fortunate--I recognize after many years traveling the world. Our retail operation is extremely devoted and dedicated to our customers … we have people so passionate about working in this company. I see our success in the distribution. A country managing director adds: *"I think that the general picture is, if you are operating as a managing director for business unit, you have freedom and responsibility to act."*

7. Entrepreneurial incentives

Managers in the local distribution and sales entities are incentivized by business unit performance without pressure to fulfill short-term sales targets but with a focus on long-term sustainable outcomes. An executive explains: "*The worse it gets, the louder you scream--the more KPIs you ask for, and the more pressure you put on. It works for a short time, but something breaks--something is not addressed, so it's not sustainable"*. He continues: *"About one-third is company performance and two-thirds is due to local performance"*. Incentives for country directors are defined by targets that extend over a longer time horizon where a key target is customer satisfaction. A country managing director explains: *"The incentive programs are built in a way so that if I leave here now, I will still have an incentive part belonging to the company. So, it is not as if I on the last day of my assignment clean everything up to get an extremely good result the last year--then the next year would be a disaster due to that decision".*

Field observations

Entry into Company B premises happens in a relaxed atmosphere with no requirement to show ID at the front gate. The visitor is greeted by a smiling casually dressed person wearing a company sign who offers directions to the corporate offices. When reaching the 1st floor office space, another person greets and offers a cup of coffee before leading the way to a designated

meeting room. Company B has open office spaces where all directors including the CEO share facilities with the secretarial support staff. The office attire is informal.

The data reveal two organizations with very different forward integration structures, coordination approaches, control processes, cultural traits, and core values. In *Company A*, you do as you are told enforced by a top-down command structure with stringent management controls imposing ambitious sales targets using formal authority to enforce execution. Sales targets are monitored centrally with performance driven by budgetary demands and constraints. There is no dialogue between downstream distribution and sales entities and manufacturing headquarters, no autonomy to local managers, and no incentives to take entrepreneurial initiatives. There is no emphasis on individual learning and development but strict focus on KPIs with little attention to corporate mission and values. In *Company B*, attaining customer and stakeholder value is a corporate mission and top management is cognizant of important core values. There was an early focus on continuous improvement practices engaging employees in the development process. An internally created modular product specification system was applied for product refinements later adopted to develop extended product-service packages together with customers. The corporate culture prioritizes customers, people, and quality with a market-oriented use of resources where headquarters commits resources but delegates execution to local managers and employees.

Despite the apparent differences in cultural traits, it is noteworthy that staff members in both two companies are accessible and friendly. Interviewees in Company A were forthcoming and open about problems they have struggled with for decades explaining difficulties of cooperating with top-down pressures. The findings are summarized in a comparison of key characteristics observed in the two companies (Table 2).

--- Insert Table 2 about here ---

The servitization process in Company A takes the form of add-on services to the core product where manufacturing efficiency and engineering prowess are instrumental rationales for corporate performance (Figure 6, 1). That is, adjacent services are added but downstream distribution and sales entities do not interact with manufacturing to create incremental value for the end-users.

--- Insert Figure 6 about here ---

The literature emphasizes value-in-use and service accessibility where ownership of tangible assets can be more or less important with business models ranging between pure manufacturing and pure services (Baines *et al*., 2009). The interfaces between product-service compositions require product service systems (PSS) that can integrate product manufacturing and service delivery effectively (Figure 6, 2). The tangible products can be connected to customer support services where combined activities across production, distribution, sales, and services can enhance customer value.

This study probes the effective structure of forward integration from manufacturing towards downstream distribution, sales, and services. It observes how Company B relies on modular manufacturing to provide valuable products-in-use supported by entrepreneurial inputs from individuals in distribution and sales where product features are upgraded in tandem with valuable services (Figure 6, 3). The tangible product retains its importance enhanced by effective production technologies while adjacent service components increase product utility and end-user value. High quality manufacturing is important to accommodate complex products that respond to customer demands. In other words, the production and downstream distribution, sales, and services functions closer to the end-users are interrelated and mutually dependent activities. Company A uses central budget controls and standardization to coordinate the interrelated value-chain activities that sacrifices the entrepreneurial engagement of downstream

employees. Company B uses corporate mission, core values, trust, delegation, and open communication for flexible low-cost coordination that engages employees in entrepreneurial responses to complex product-market demands.

The study uncovers the importance of employee engagement fostered by values-based management embedded in a corporate culture formed by top management characterized by autonomy, trust, delegation, collaboration, and open communication. That is, the behavior of individual employees in the organization engaged in knowledge creation for customer value and the way the leaders encourage informal collaborative networks are instrumental aspects of effective integrated servitization efforts.

5. Discussion

The study investigates how two comparable manufacturing firms manage servitization through forward integration in the international truck industry where one integrated corporation has consistently outperformed. The structural characteristics of the companies confronted with similar competitive market conditions are very different. Different economic theories reason about unintended transaction costs and moral hazards along interdependent corporate value-chain activities but fail to provide consistent prescriptions (Holmström and Milgrom, 1994). The theoretical rationales on forward vertical integration are torn between central controls to optimize operating efficiency and minimize individual self-interest against the ability to give autonomy with ownership-like incentives that engage people in entrepreneurial efforts (Lafontaine and Slade, 2007). These conflicting prescriptions must be reconciled in an effective structure for the integrated servitization efforts. The dilemma is visible in the servitization literature where manufacturing firms struggle to make integration of services profitable (e.g., Gebauer *et al*., 2005; Neely, 2008; Story *et al*., 2017) and the issue is not resolved (Kamala *et al*., 2020; Brax, *et al*., 2021).

When manufacturing firms acquire or expand downstream distribution, sales, and services, the interrelated value-chain activities are managed through hierarchical governance imposed by corporate ownership. The directional and complex distribution types describe different approaches to structure and coordinate integrated production, distribution, and sales activities. In stable markets easy to describe, forward integration from manufacturing towards distribution, sales, and services gain efficiencies from central planning, standardization, and controls. In complex markets difficult to describe, forward integration is sensitive to customer needs where downstream resources close to the end-users must be engaged to develop relevant market offerings. Technological prowess and operating efficiency as well as entrepreneurial engagement among individual employees across all value-chain activities must be advanced through ownership-like incentives.

Company A is dominated by its manufacturing and engineering heritage. The forward integration was a way to reduce incentive misalignment and double marginalization. The manufacturing headquarters held ownership over distribution and sales entities using central authority to coordinate value-chain activities imposing ambitious sales targets to optimize returns. Weak incentives discourage entrepreneurial engagement of individuals in downstream functions enforcing efforts to realize budgeted sales. The distribution and sales entities are final points of sale and serve as revenue as opposed to profit centers where tight budget controls leave little free cash for entrepreneurial activities. The diagnostic control system reduces moral hazard in downstream entities but also eliminates incentives to achieve profitable results. Instead, the company monitors customer satisfaction at headquarters focusing on sales and cost-related KPIs paying little attention to market changes. Use of central authority to dictate distribution and sales activities mutes efforts to observe market changes and customer needs instead emphasizing immediate cost savings eliminating investments in business development.

The organizational culture drives micro-foundational behaviors that emphasize central controls and dampens open communication, knowledge sharing, and interactive collaboration among individuals across functions and linked value-chain activities.

Company B has a clear mission with values prioritizing customers, people, and product-service quality. It retains a strong engineering orientation—visible in development of modular manufacturing with continuous improvements to enhance production efficiencies and customer satisfaction. The company pioneered user-specific product applications using information technology in direct consultation with the customers. They learned how to create customer value through tailored quality products collaborating with local distribution and sales entities. There is an entrepreneurial dynamic with equal emphasis on production, distribution, sales, and services. The distribution and sales entities operate as profit centers with incentives resembling direct ownership where services is a corporate business area. It coordinates interdependent activities along the value-chain adopting pragmatic ways to motivate entrepreneurial efforts and uses management accounting including KPIs to monitor efficiency. Performance reporting is not used to control distribution and sales but to inform local decisions. The organizational culture supports micro-foundational behaviors of autonomous initiatives to foster dynamic adaptation through joint knowledge-creation, open communication, and collaborative efforts among individuals including employees, managers, and executives.

Comparison

Contrasting the two case companies reveals other aspects. Both companies have strong engineering and manufacturing backgrounds but apply this very differently. Company A is focused on engineering excellence but Company B creates product-service combinations with superior customer satisfaction and profitability. The sales growth, financial returns, and customer satisfaction of company B over the past decades show the presence of competitive

advantage, i.e., sustainable outperformance of close competitors. This superior position is not achieved through defensive moves to protect existing advantages but is based on continuous improvement through knowledge creation (e.g., Nelson and Winter, 1982; Nonaka, 1994). It is accomplished in a firm-specific way integrating value-chain activities through open communication between individuals generating creative solutions to complex market conditions (e.g., McElroy, 2000; Grobman, 2005; Uhl-Bien *et al*., 2007). Although Company A has prioritized operating efficiency and technology, Company B develops products with better value propositions at higher productivity.

In other words, Company B generates sustainable competitive advantage because they apply unique, valuable, hard to imitate, and non-substitutable resources and adaptive processes (e.g., Barney, 1991; Peteraf, 1993; Teece *et al*., 1997). Although executives in Company A realize a need to transform their organization emphasizing customer value—expressed in various annual reports—they are unable to accomplish this. The advantages of Company B are attained from constant upgrading of organizational processes embedded in a corporate culture that represent uncertain imitability (Lippman and Rumelt, 1982). The causal ambiguity of adopted processes makes them difficult to copy (Reed and DeFillippi, 1990). Continued efforts to extend the processes retain intrafirm causal ambiguities that sustain the competitive advantage (e.g., King and Zeithaml, 2001; King, 2007). The inimitability is further enforced by the social complexity of the adopted approach (Johnson and Regnér, 2009) embedded in cultural artefacts (Barney, 1986; Camerer and Vepsalainen, 1988). This uncovers significant micro-foundational effects from individual employee and stakeholder interactions that create value from unique specialized resources (Felin *et al*., 2015; Barney, 2018).

These case observations, particularly of Company A, are consistent with insights generated in parts of the servitization literature. It is noted how the ability to gain customer feedback across

activities conflicts with manufacturing mass-production short of understanding customer business processes (Brax, 2005; Brax and Jonsson, 2009). Baines *et al*. (2009) note that "*most manufacturing operations are typically far removed from or at least buffered from customer interactions*" (p. 502) and have a poor service culture (Kamala *et al*., 2020). There is a shortage of open interaction between individuals across linked value-chain activities, where Baines *et al*. (2009) report "*that product manufacture and service delivery are largely decoupled*" (p. 512). Others express this as imbalance between efficiency and flexibility (Gebaur *et al*., 2005), ineffective combinations of exploration and exploitation (Rajala *et al*., 2019), or effectiveness-efficiency clashes (Kohtamaki *et al*., 2020). The comparative analysis of two case companies uncovers these tensions and observes many of these shortcomings in Company A, whereas Company B shows how these tensions are resolved through micro-foundational culture-driven behaviors. The way the firms ended up in their approaches to forward integration is partially found in corporate history induced by leadership-driven values forming organizational cultures engrained in common practices that are difficult to change. This explains why a firm is able to consistently outperform, such as Company B, whereas others, like Company A, have difficulty changing their ways even when they would like to change.

The two case companies both pursue servitization through forward integration but based on contrasting rationales adopting very different structural and cultural approaches. It is important for manufacturing firms that consider forward expansion into distribution, sales, and services to consider the complexity of the markets they cater to. When the end-users operate in dynamic and complex product-markets, a proper approach resembles complex distribution, where trade-offs between controls for efficiency and incentives for entrepreneurial effort are resolved through values-based management. Central control is replaced by unwritten cultural contracts

that hone collaborative interaction between individuals across interdependent value-chain activities to create customer value.

6. Conclusions

The study incorporates theoretical rationales from management science in the analysis of servitization as forward integration from manufacturing towards downstream market-related functions to understand the implied servitization efforts and effects on profitability. It was inspired by the (curious) observation that two comparable manufacturing firms—both pursuing integration oriented PSS strategies—realized very different performance outcomes with one consistently outperforming the industry spurring a curiosity to explore why this is so. Answers to this issue was pursued in a comparative case-study adopting a theory-guided abductive methodology, which despite obvious limitations of confined firm data, uncovers interesting and relevant insights. The findings identify important aspects of economic rationales, organizational structure, and coordination noting opposing applications of management accounting and controls against autonomy, trust, delegation, and communication. The integration oriented PSS is quelled by autocratic structures but advanced by a corporate culture that induces individuals to interact and collaborate across linked value-chain activities that generate valuable integrated product-services offerings for customers.

Forward integration from manufacturing to generate valuable product-service offerings in complex product-markets need balanced structures that engage individuals across production, distribution, sales, and services with the customers and suppliers in conjoint efforts. The values-driven micro-foundational behaviors are (very) important to drive effective forward integration towards downstream market-related activities. These aspects are potentially rewarding areas for future research on integration oriented servitization.

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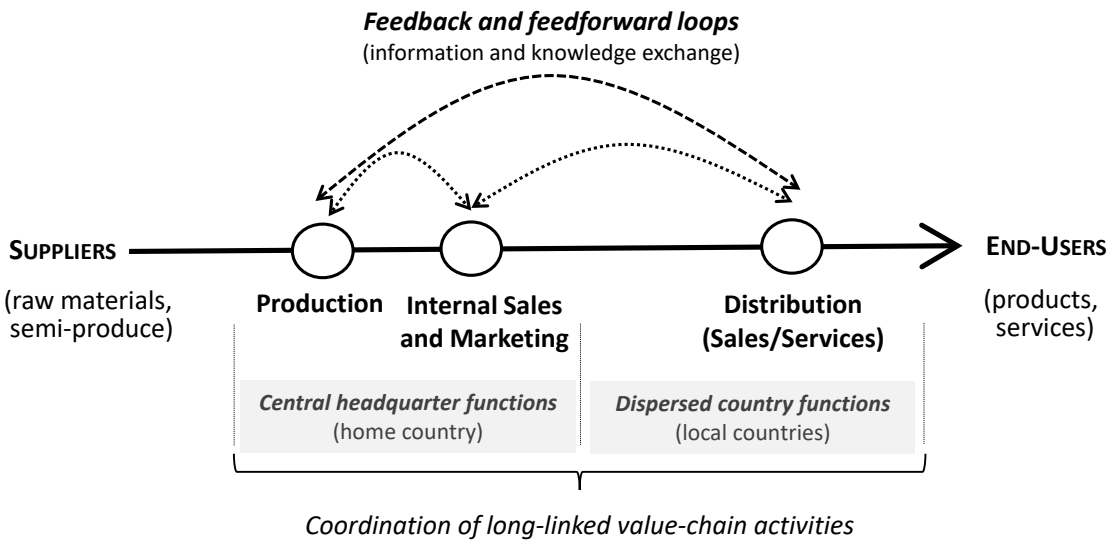
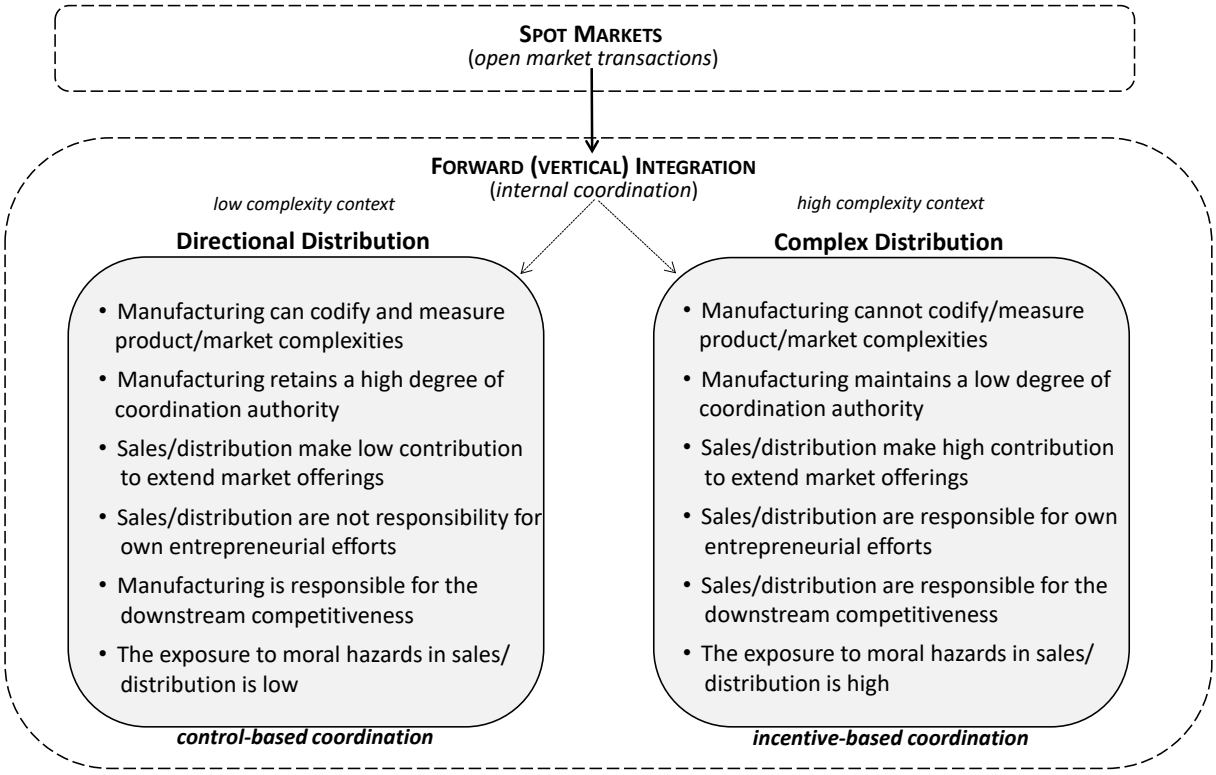


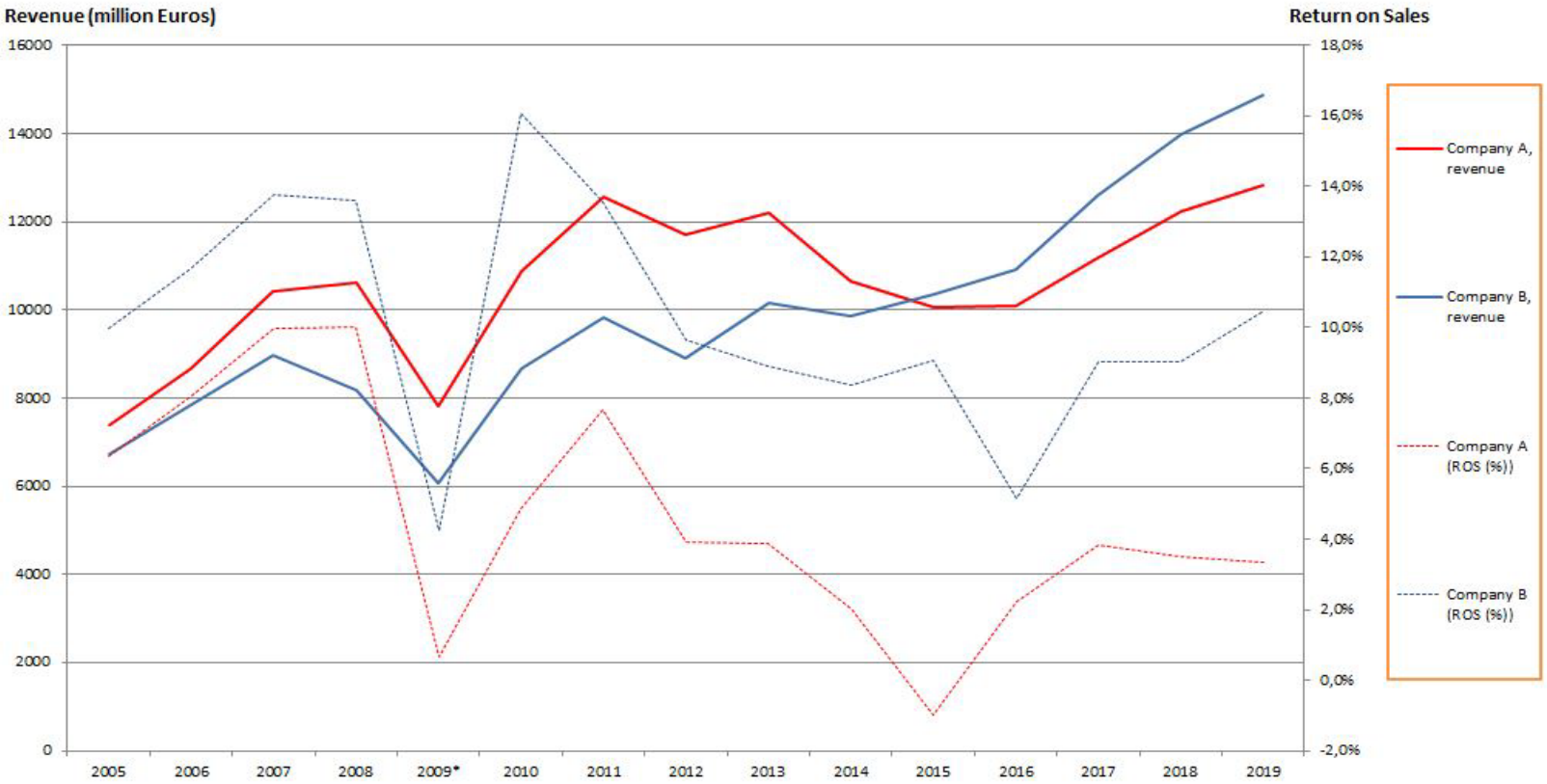
Figure 1. Long-Linked Value-Chain Activities in a Forward Integrated Manufacturing Firm

When a manufacturing firm pursues a forward integration strategy and move into distribution, sales, and services, the company effectively internalizes transactions that before were transacted in open spot markets between independent profit-seeking entities and must therefore coordinate these activities internally within the integrated corporation.



Post-acquisition governance of forward integration towards downstream distribution, sales, and services activities can be organized as *directional distribution* with standardized controls in product-markets with low complexity, or as *complex distribution* in product-markets with high complexity where the entrepreneurial efforts of agents are incentivized.

Figure 2. Two Distribution Types in Forward (Vertical) Integration



Notes: Revenue indicates million Euros; Return on Sales (ROS) indicates Net Income (EBT) as a percentage of Sales.

Figure 3. Comparative Performance Indicators of Company A and Company B

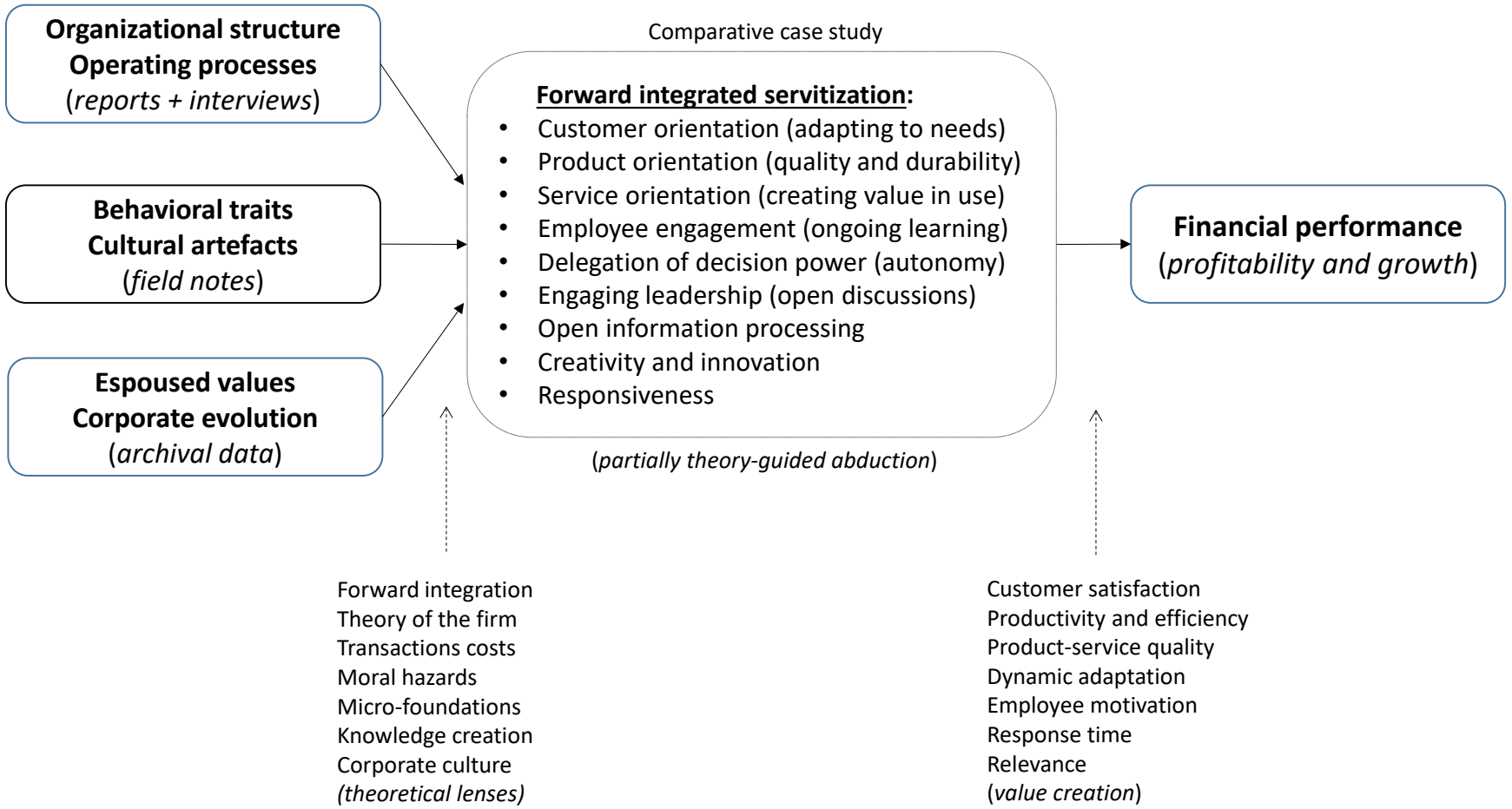


Figure 4. Methodological Approach and Implied Research Model – An Overview

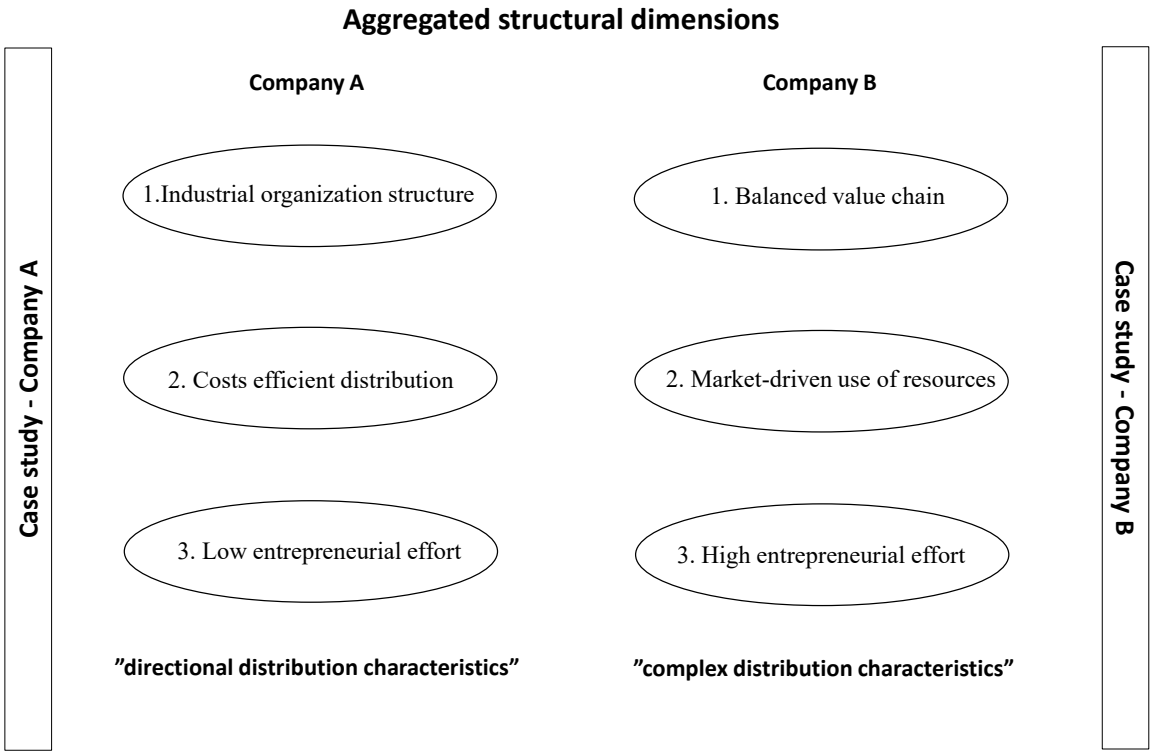
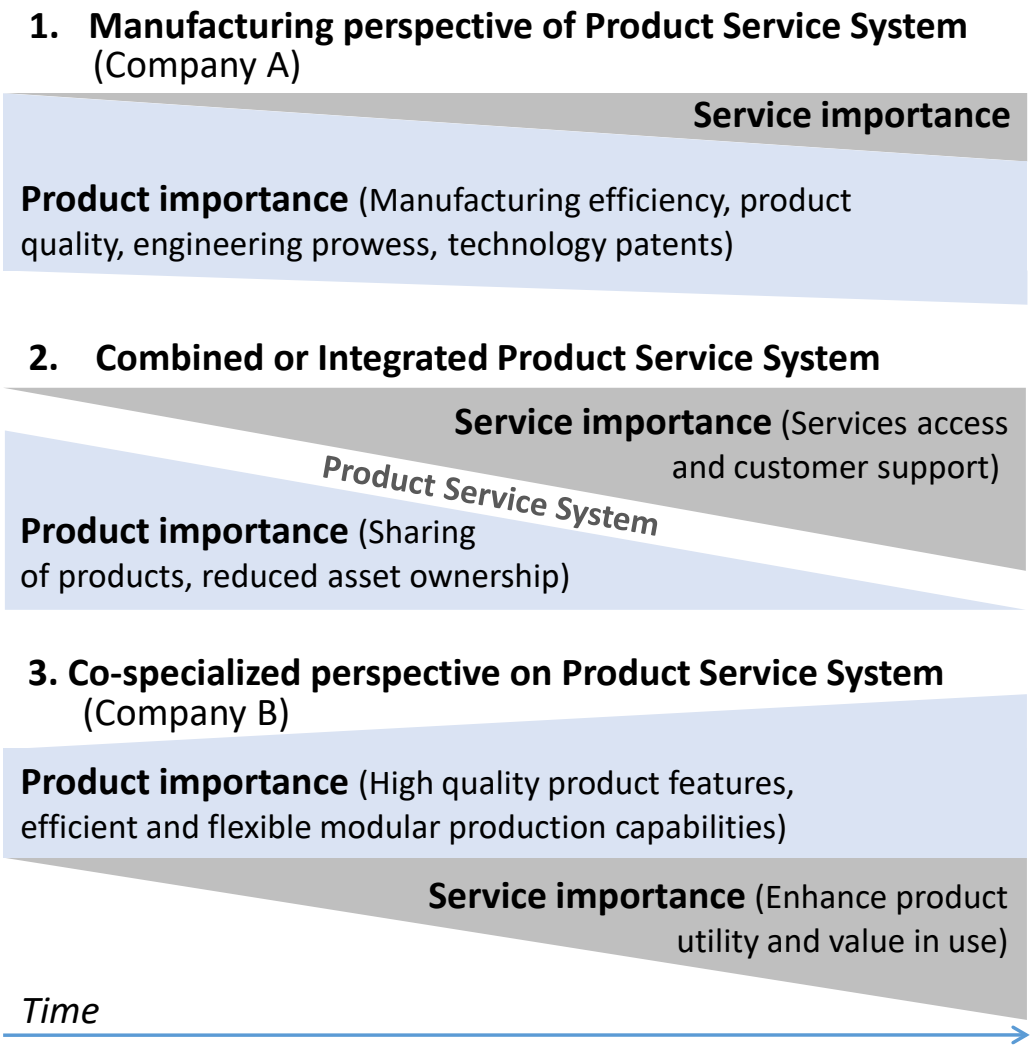


Figure 5. The Aggregated Dimensions of Company A and Company B



Note: Inspired by Baines, Lightfoot, Peppard, Johnson, Tiwari, Shehab and Swink (2009, p. 499)

Figure 6. Product and Service Importance in Company A and Company B

Table 1. Data Sources Used to Inform the Comparative Case Study

	Company A	Company B
Interviews:		
CEO/Board member (HQ)	1	2
Senior Vice President (HQ)	1	0
Senior Vice President (Local entity)	4	3
Directors (Local entity)	2	2
Field notes:		
Interaction with individual employees	X	X
Participation at company meetings	X	X
Archival data:		
Patents registered 2000-2020	X	X
Company jubilee yearbooks	X	X
Truck of the Year awards	X	X
Academic articles and consultancy reports	2	8
Internal strategic programs	7	0
Corporate incentive systems	X	X
Annual reports (and letter to shareholders)	2000-2019	2000-2019
Corporate website	2020	2020
Customer satisfaction surveys	2005-2017	2005-2017
Market share development	2005-2017	2005-2017

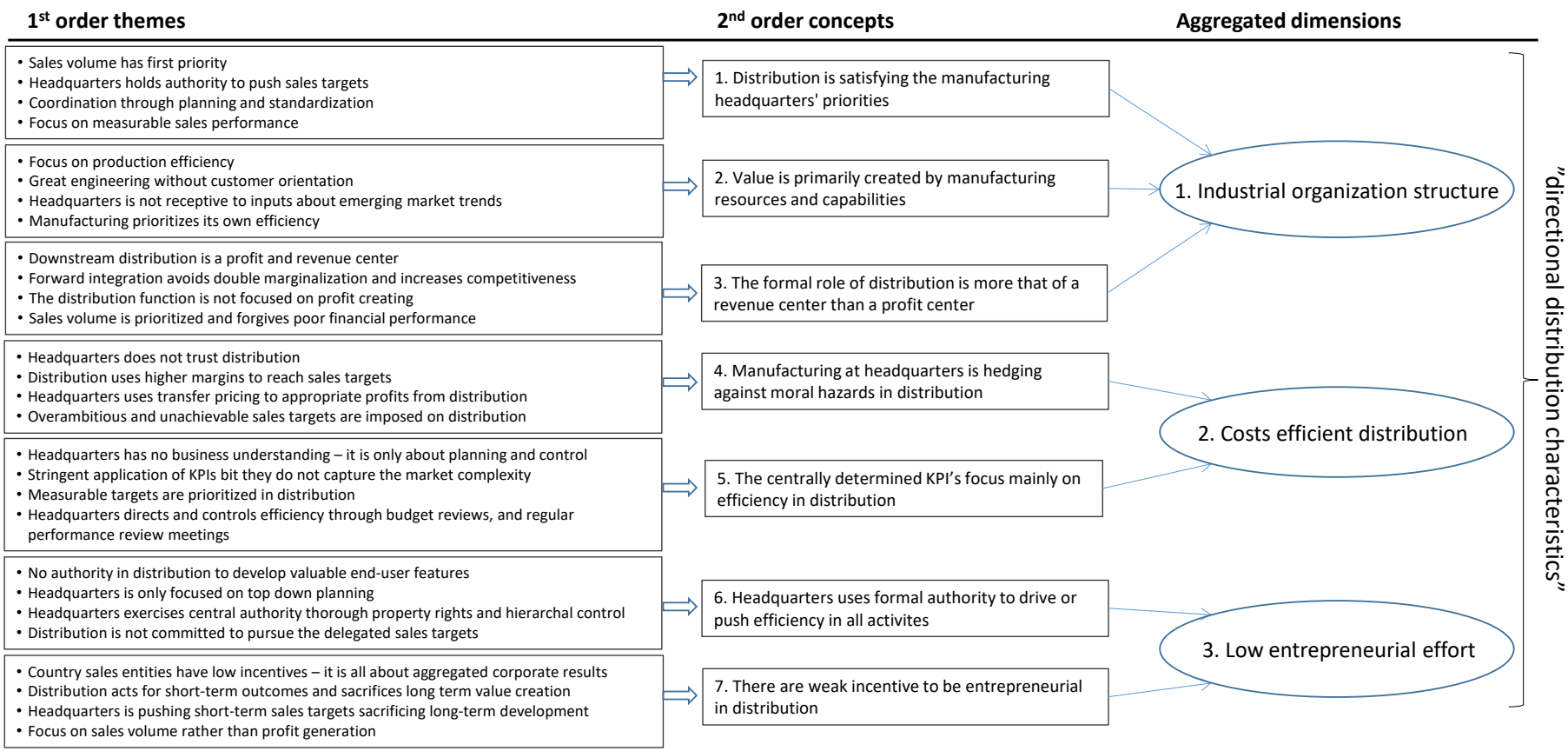
Notes: A number indicates how many individuals have been interviewed; A cross (X) indicates whether a source has been accessed; periodic interval indicates the years (time-period) of accessed sources.

Table 2. Comparing Key Characteristics across the Two Case Companies

Company A	Company B
Organizational structure	
Rationale:	Rationale:
Prioritize product engineering	Prioritize customers, people, and quality
Generate operating efficiencies	Create customer value
Pursue optimal sales volume	Pursue profitability in all activities
Reduce moral hazard	Delegation of responsibility and trust
Coordination:	Cordination:
Central plans and budgets	All business units are profit centers
Stringent budgetary controls	Open communication about results
Standardization of operating processes	Modular production and continuous learning
Fulfillment of predetermined KPIs	Strong behavioral values
Engagement:	Engagement:
Setting ambitious sales goals	Fulfilling mission and perform
Authoritative dictates to perform	Autonomy with authority to act
Doing as you are told	Collaborating to generate improvements
No entrepreneurial effort	Entrepreneurial efforts in all functions
Cultural artefacts	
Military-like security features	Simple security processes
Individual offices with own secretary	Shared open space offices for directors
Formal office attire	Relaxed office attire
Espoused values	
Engineering prowess	Customer value
Production efficiency	Continuous improvement
Command style	Employee engagement

APPENDIX

Case study - Company A



APPENDIX

Case study - Company B