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manufacturing companies***

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Competitive advantage through service differentiation by manufacturing companies

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ABSTRACT

This paper examines the relationship among the complexity of customer needs, customer centricity, innovativeness, service differentiation, and business performance within the context of companies that have made a service transition from pure goods providers to service providers. A survey of 332 manufacturing companies provides the basis for the empirical investigation. One key finding is that a strong emphasis on service differentiation can lead to a manufacturing firm's strategies for customer centricity being less sensitive to increasingly complex customer needs, which can increase a firm's payoff for customer centricity. In contrast, the payoff from innovativeness appears to be higher if the firm focuses its resources on either product or service innovation; that is, a dual focus does not work well. This paper discusses the implications of these findings for researchers and managers.

Keywords: service infusion in manufacturing companies, customer centricity, innovation, service differentiation

1. INTRODUCTION

Markets have become highly competitive and turbulent and are constantly changing. Market conditions move from being simple to complex, from stable to dynamic, and from tame to hostile (Neu and Brown, 2005). In response to changing market conditions, manufacturing companies have traditionally become more customer-centric and innovative, in a way that customers receive products that better fit their needs (Deshpande et al., 1993; Drucker, 1954; Johnson and Selnes, 2004; Narver and Slater, 1990; Treacy and Wiersma, 1993). In addition, manufacturing companies have started adding more services to their total offerings as part of a differentiation strategy (Gebauer et al., 2010; Neu and Brown, 2005; Oliva and Kallenberg, 2003,). Companies with greater reliance on the service part of their business reportedly achieve better return on sales and improve their value (Fang et al., 2008).

Manufacturing companies are redirecting their efforts towards customer centricity and innovativeness, but also from goods to services. Instead of only innovating products, companies are investing in service differentiation. Consequently, instead of services being add-ons to the product, they become the center of the total offering, with products as add-ons to the services. Various terms describe this service differentiation in manufacturing firms, including service business development, servitization, service infusion, high-value solutions, and transition from products to services (Davies, 2004; Gustafsson et al., 2010; Oliva and Kallenberg, 2003; Vandermerwe and Rada, 1988). A common rationale involves using service differentiation to take advantage of strategic, financial, and marketing opportunities. The fact that services are less visible and more labor-dependent makes them a strategic opportunity and a sustainable source of competitive advantage (Heskett et al., 1997). Services lead to co-creation of value based on the competencies of the company and the customer (Matthyssens et al., 2006; Vargo and Lusch, 2008), which leads to resources that are unique and hard to imitate (Wernerfelt, 1984). Financial opportunities include additional service

revenues throughout the product lifecycle (Potts, 1988; Wise and Baumgartner, 1999). Marketing opportunities involve using services to augment the product offering and increasing the quality of the customer interaction (Mathieu, 2001).

However, most researchers study the phenomenon of service differentiation in isolation from other firm activities (Homburg et al., 2003; Neu and Brown, 2005). In so doing, they neglect the interaction of service differentiation with other antecedents that may affect success, such as customer centricity and innovativeness. Combining service differentiation with factors such as innovativeness and customer centricity, versus service differentiation alone, can sustain above-industry average performance. Only the combination of service differentiation with other factors can translate into valuable resources that are neither perfectly imitable nor easily substitutable (Hoopes et al., 2003).

With few exceptions, the general approach to studying the service differentiation phenomenon involves case studies. This approach allows in-depth exploration of mechanisms related to service differentiation, which makes the method appropriate for exploring emerging trends. The disadvantage of the method stems from the difficulty in judging the effect of service differentiation for manufacturing firms in general. A few studies have taken a large-scale study approach (Fang et al., 2008; Gebauer, 2008), but none of them have investigated service differentiation in relation to other firm activities.

In order to fill this research void, the present study examines the interaction of service differentiation with customer centricity and innovativeness through a cross-sectional study of manufacturing companies. To this end, the study builds on established relationships among complexity of customer needs, customer centricity, innovativeness, and business performance. The study integrates service differentiation as a moderator into these relationships, and the moderator analysis explores the weakening (negative) and strengthening

(positive) effect that service differentiation has on those relationships. The study covers 332 European-based manufacturing companies from a variety of industries.

This research makes several contributions to the literature. Firstly, the research expands the existing literature by studying service differentiation with an emphasis on the interaction of service differentiation with customer centricity and innovativeness, rather than in isolation from the strategic orientation of manufacturing companies. This perspective on service differentiation fits more closely with how manufacturing firms work with service. Secondly, the study provides some insights into the effects of service differentiation and how a company achieves them.

2. THEORETICAL FRAMEWORK

The theoretical framework of this study builds on customer centricity and innovativeness in relation to market orientation, which represents one of the various strategic orientations of manufacturing companies. Other strategic orientations include technological and entrepreneurial orientations. Technology orientation advocates a commitment to R&D, the acquisition of new technologies, and the application of the latest technology, while entrepreneurial orientation pursues new market opportunities or the renewal of existing areas of operation (Zhou et al., 2005). Whereas customer centricity and innovativeness, as parts of market orientation, are likely to interact with the service differentiation of a manufacturing company, the acquisition of state-of-the-art technology or the renewal of existing markets might be more independent of the service differentiation. Entrepreneurial orientation promotes the proactive exploitation of market opportunities, tolerates risk, and is receptive to innovations, but it does not necessarily result from higher complexity of customer needs. Although market orientation and technological orientation both promote openness to new ideas, technological orientation prefers those companies that employ state-of-the-art

technologies. Customer centricity and innovativeness embed in market orientation favors ideas that more accurately satisfy the increasing complexity of customer needs. Therefore, the conceptual model in this paper concentrates on customer centricity and innovativeness and how these factors relate to service differentiation.

There has been a wide range of research contributions that examine the relationships among innovativeness, customer centricity, and business performance (e.g., Hult et al., 2004; Jaworski and Kohli, 1993; Narver and Slater, 1990). Narver and Slater (1990; 2000) test and retest the positive relationship between market orientation and business profitability, providing strong support for the importance and generalizability of the market orientation-profitability relationship. Hult et al. (2004) examine a general model of the direct relationship between innovativeness and business performance, which reveals the significant effects of innovativeness and market orientation on business performance. Strong support exists for the relationships among market orientation, innovativeness, and business performance across varying environmental contexts.

The literature review also shows that authors often consider market turbulence rather than directly assessing the complexity of customer needs. Jaworski and Kohli's (1993) association of market orientation with business performance appears to be robust across environmental contexts that are characterized by varying degrees of market turbulence, competitive intensity, and technological turbulence. Hult et al. (2004) reveal that the effect of innovativeness and market orientation on business performance does not differ greatly during periods of low and high market turbulence. In contrast, a significant relationship does exist between market orientation and innovativeness under high market turbulence, but not under low market turbulence.

Service differentiation represents an alternative business logic for manufacturing companies. Emphasizing service differentiation can lead to a company transitioning from

being a pure goods provider to a service provider (Oliva and Kallenberg, 2003). For a pure goods provider, the product dominates the total offering, and the service component only includes customer service (Vandermerwe and Rada, 1988). Customer service only augments product offerings and improves the quality of customer interaction (Mathieu, 2001). Products remain the main source of profits and revenue, while customer service only makes a marginal contribution (Oliva and Kallenberg, 2003). The strategic priority for a pure goods provider is the facilitation of product differentiation through customer centricity and innovativeness.

In contrast, service providers in this context do not restrict their offerings to customer service. They offer a comprehensive set of services including services for the installed products, design and construction services, high-value solutions, system integration services, or outsourcing services (Davies, 2004; Gebauer, 2008; Oliva and Kallenberg, 2003). A company can combine these services with product components in a manner that provides a solution to a customer's specific business needs. Services or solutions evolve to the main market offering and start to dominate the total offering of service providers (Vandermerwe and Rada, 1988). Accordingly, revenue and profits are mostly attributable to the services; products only become an add-on to services (Oliva and Kallenberg, 2003). For a service provider, service differentiation represents the main strategic priority, built on the company's customer centricity and innovativeness.

The next part of the paper introduces the basic model, including complexity of customer needs, customer centricity, innovativeness, and business performance. These concepts and their relationships are seen as a basis for the strategic orientation of manufacturing companies. The paper develops four hypotheses regarding these concepts and then introduces four additional hypotheses related to the concept of service differentiation and its role as moderator in the relationships between complexity of customer needs, customer centricity, innovativeness, and business performance.

2.1 Basic model

2.1.1 Complexity of customer needs, customer centricity and innovativeness

The complexity of customer needs is part of a company's external environment (Neu and Brown, 2005). Dess and Beard (1984) distinguish between three factors that characterize the external environment: munificence, complexity, and dynamism. Munificence refers to the scarcity of environmental resources that support a firm's growth within a given industry, while environmental complexity refers to the heterogeneity and concentration of environmental elements. Finally, environmental dynamism refers to the rate of change and the instability of the environment. Rapid change, short product life-cycles, and processes of creative destruction are all typical characteristics of a dynamic environment, which make current products and services obsolete and require the development of new competences (Dess and Beard, 1984). Jaworski and Kohli (1993) use the term 'competitive intensity', which reflects the behavior, resources, and ability of competitors to differentiate their products or services. They argue that competitors have an influence on organizational activities, but so do market turbulence, in terms of changing customer needs and product preferences.

Customer needs seem to evolve into a complex system involving a high level of integration of single customer requirements. Companies describe these complex systems as disparate interactions between products and service attributes. Customers have significantly differing views of product and service attributes, leading to a situation in which customers opt for various strategic options in order to satisfy their underlying needs (Neu and Brown, 2005). Outsourcing of product maintenance is an example of a unification strategy, while other strategies ensure proper product functioning or optimize the efficiency and effectiveness of the product within the customer process. Customers following different strategic options tend to have heterogeneous customer needs (Gebauer, 2008). Consequently, companies must deal

with the rapidly changing strategic choices of customers in order to satisfy their needs, which leads to unique customer preferences and wide-ranging customer needs. The term complexity of customer needs conceptualizes these changes in customer needs. On one hand, complexity of customer needs implies that customer requirements change considerably over time. On the other hand, complexity involves customers' tendency to constantly look for new offerings, and new customers tend to have needs that are different from those of existing customers (Jaworski and Kohli, 1993).

Customer centricity or customer orientation is a frequent dimension when conceptualizing market orientation. Market orientation is a business culture that produces outstanding performance through commitment to the creation of superior value for customers (Day, 1999; Deshpande et al., 1993; Kohli and Jaworski, 1990; Narver and Slater, 1990). The concept of customer centricity is similar to that of customer orientation, which emphasizes how firms capture and use information about customer needs (Matsuno and Mentzer, 2000). The present study conceptualizes customer centricity through the basic philosophy of utilizing a strategy to improve a firm's customer satisfaction (Johnson, 1998). Customer centricity aims to identify opportunities to create a competitive advantage based on increasing customer satisfaction (Shah et al., 2006).

Therefore, focusing simply on information regarding the needs of actual and potential customers is inadequate without also considering the more deeply rooted set of values and beliefs that are likely to reinforce customer centricity and pervade the organization (Deshpande et al., 1993). An integral part of customer centricity is customer treatment that affects customers' perceptions of performance (Antioco et al., 2008). Customer centricity can be also beneficial for discovering complex customer needs. A customer-centric organization is more likely to identify the changing and fragmented needs of its customers.

Innovativeness refers to a firm's capacity to engage in innovation; that is, to introduce new products, processes or services in the organization (Damanpour, 1991; Hult et al., 2004; Wheelwright and Clark, 1992). An innovation can take the form of a new product or service, a new production process, a new structure, or a new administrative system. The competitors and customers of an innovative company perceive the company as being able to utilize the latest technology and introduce new goods or services at an early stage.

2.1.2 Hypotheses development

This study hypothesizes positive relationships between the complexity of customer needs, customer centricity, innovativeness, and business performance. The subsequent assumption is that the complexity of customers needs drives the company's strategic orientation toward innovativeness and customer centricity (Hambrick, 1984; Kohli and Jaworski, 1990; McKee et al., 1989).

Customer centricity is beneficial generally during turbulent markets (Jaworski and Kohli, 1993) and varying the level of customer centricity to meet the changing complexity of customer needs is likely to be cost-effective. Companies confronted with complex customer needs must stay even closer to their customers (Day, 1999; Gale, 1994; Kohli and Jaworski, 1990; Kordupleski et al., 1993; Narver and Slater, 1990; Sheth and Parvatiyar, 1995). Customer centricity helps firms discover, understand and cope with individual customer needs and preferences (Shah et al., 2006). This outcome leads to a positive association between higher complexity of customer needs and customer centricity.

Firms that make their marketing investments more customer-centric improve their financial performance as a result (Rust et al., 2004; Shah et al., 2006; Venkatesan and Kumar, 2004). Customer centricity helps companies and customers co-create knowledge on needs and preferences, which serves as a resource-position barrier that can constitute an entry barrier for

competitors (Wernerfelt, 1984). Manufacturing firms create conditions in which their own resource position, both directly and indirectly, makes ‘catching up’ more difficult for competitors. This situation, in turn, leads to sustainable competitive advantages and attractive margins (Dierickx and Cool, 1989).

These lines of reasoning lead to this paper’s first two hypotheses. H₁: Complexity of customer needs relates positively to customer centricity. H₂: Customer centricity relates positively to business performance.

Constantly changing customer preferences leads to a continuous search for new products and services. As a result, firms should engage in innovative activities in order to achieve superior performance (Hult et al., 2004). Such activities may include inviting customers to co-design new products or services, or finding new ways to create value or work with new technology. Consequently, there should be a positive association between higher complexity of customer needs and innovativeness (Han et al., 1998; Hult et al., 2004; Hurley and Hult, 1998; Miller and Friesen, 1983; Zaltman et al., 1973).

The general intention is for innovativeness to contribute to business performance (Damanpour, 1991). Channeling resources into the development of new products, processes, or services can result in competitive advantages (Hurley and Hult, 1998). Because customer needs evolve, firms must adopt innovations over time, particularly in order to allow the firm to achieve a competitive advantage (Damanpour, 1991; Henard and Szymanski, 2001; Porter, 1990). H₃: Complexity of customer needs relates positively to innovativeness. H₄: Innovativeness relates positively to business performance.

The existing research looks closely at these four relationships and this study includes them merely as the basis for an extension, with service differentiation as a moderator in the basic model. For that reason, the paper discusses the development of service differentiation as a concept in a comprehensive manner. The discussion starts by describing the terminology

and nature of service differentiation and then investigates the interpretation of service differentiation as a moderator. The discussion ends by developing hypotheses for how service differentiation moderates the relationships among complexity of customer needs, customer centricity, innovativeness, and business performance.

2.2 Extension of the basic model through service differentiation

2.2.1 Terminology and nature of service differentiation

Changes in the business logic of manufacturing companies from pure goods providers to service providers may occur through an emphasis on service differentiation. Service differentiation is the extent to which a company focuses on service as its core offering and the extent to which customers regard the organization as a service provider (Jacob and Ulaga, 2008; Neu and Brown, 2005; Oliva and Kallenberg, 2003). Service differentiation translates into different ways to achieve competitive advantages through services.

Potential strategic avenues for service differentiation capture customer support services, business consulting, integrated services, or operational service. Business consulting becomes especially salient when strategic consultancy advice is necessary to analyze the customer's business and identify problems in the customer's organization on the basis of experience (Davies, 2004; Davies et al., 2007; Gebauer, 2008). Following this service differentiation becomes a strategy type and emerging business logic in manufacturing companies.

2.2.2 Service differentiation as a moderator effect

Service differentiation either has a direct effect or a moderator effect in the basic model. As a direct effect, service differentiation represents competitor orientation, which is part of the market orientation and is possible to conceptualize as a direct effect on business performance. Competitor orientation involves gathering intelligence on competitors; for

example, who the competitors are, what technologies they offer, and whether they represent an attractive alternative from the perspective of the target customers (Han et al., 1998).

The current understanding of service differentiation is not limited to gathering intelligence on competitors' service offerings. The view of service differentiation is as a strategy type and different business logic that manufacturing firms apply (Davies, 2004; Fang et al., 2008; Gebauer, 2008; Oliva and Kallenberg, 2003). Matsuno and Mentzer (2000) suggest conceptualizing different strategy types or business logics as moderators. They argue that implementing a particular strategy or business logic is essentially a process of organizational adaptation to the market environment, in which market orientation plays a fundamental role. They hypothesize that "the relationship between market orientation and economic performance is moderated by the type of strategy employed" (Matsuno and Mentzer, 2000, p. 3). Their prospector strategy type, for example (companies that almost continually search for market opportunities and regularly experiment with potential responses to emerging environmental trends), strengthens the positive association among market orientation, market share, sales growth, and percentage of new product sales (Matsuno and Mentzer, 2000).

Transferring their proposition to the present context means that service differentiation is a planned pattern of adaptations with a particular set of business performance goals. Strategy typology literature (Hambrick, 1984) suggests three relevant arguments for the moderator effects of service differentiation. Firstly, a manufacturing company chooses its service differentiation on the basis of its understanding of the business environment. Secondly, a chosen service differentiation directs a company's attention to certain performance dimensions (service revenue or profit). Thirdly, a company exceeds its existing performance levels by employing various activities that enhance and/or reduce customer centricity and innovativeness (Matsuno and Mentzer, 2000; Miles and Snow, 1978).

The rationale behind the present study's general hypothesized moderator effect is that service differentiation is likely to identify and share certain relevant information regarding the complexity of customer needs, to make decisions that are conducive to customer centricity and innovativeness, and to change the composition of business performance (revenues attributable to the products or services). These points are important because prior empirical studies do not provide an indication of whether the complexity of customer needs, customer centricity, innovativeness and business performance relationships are invariant across service differentiation.

As is the case with product differentiation, the present study interprets service differentiations as strategy types or business logics (Gebauer, 2008; Kim and Lim, 1988;) rather than as an antecedent embedded in the market orientation such as customer centricity and innovativeness. The study's overall assumption is that service differentiation moderates the relationship between complexity of customer needs, customer centricity, innovativeness, and business performance.

2.2.3 Development of hypotheses for the role of service differentiation

Although a range of research support H1 to H4, questions remain about their potential interaction with service differentiation. According to the outlined strategic, financial, and marketing opportunities associated with service differentiation, companies that emphasize service differentiation might receive a higher payoff from their customer centricity or innovativeness.

This higher payoff is twofold. On one hand, the payoff could be the result of service differentiation *weakening* the associations between complexity of customer needs and customer centricity (H1) and between complexity of customer needs and innovativeness (H3). On the other hand, the payoff could result from strengthening the associations between

customer centricity and business performance (H2) and between innovativeness and business performance (H4).

Weakening is interpretable as emphasizing service differentiation in order to increase knowledge about customer usage of products and the customer process for value creation. In manufacturing companies, an extension of the service offering equates to a shift towards relationship processes (Tuli et al., 2007), during which a company must focus on customization, integration of goods, and/or services, and support for customers on an ongoing basis throughout the product lifecycle (Potts, 1988; Sawhney et al., 2004; Tuli et al., 2007).

Businesses can fully leverage the sharing and co-creation of this intimate customer knowledge throughout the product's lifecycle in order to obtain the resources and skills they need to achieve customer centricity and innovativeness. This knowledge is likely to become a valuable asset for companies that have a higher complexity of customer needs (Tuli et al., 2007). Knowledge sharing enhances a company's ability to respond to changing customer needs by building a foundation for innovativeness and customer centricity (Fang et al., 2008). Adding service differentiation to the equation increases the chances of acting on complex customer needs to do with all phases of the product life-cycle.

Consequently, service differentiation weakens the positive associations between the complexity of customer needs and customer centricity, and between the complexity of customer needs and innovativeness. Service differentiation weakens both positive relationships (H₁ and H₃), and is therefore beneficial for manufacturing companies with increasingly complex customer needs.

Whereas service differentiation alters the relationship between complexity of customer needs, customer centricity and innovativeness negatively, the authors expected a positive (or strengthening) alteration for Hypotheses 2 and 4. Certain literature suggests higher profitability of services than products (Anderson and Narus, 1995; Neu and Brown,

2005; Oliva and Kallenberg, 2003). Adhering to this literature would lead to the assumption that emphasizing service differentiation would strengthen the positive relationship between customer centricity and business performance and the relationship between innovativeness and business performance. Ren and Gregory (2007) estimate the product margins and service margins in five manufacturing industries: paper machines, power equipment, metallurgy equipment, rail vehicles, and machine tools. The margin leverage (margin leverage=margin in services/margin in OEM-business) ranges from two to five, which means that service margins are two to five times higher than product margins. The entire service market often revolves around one or two orders of a greater magnitude than annual new product sales (Cohen et al., 2006; Potts, 1988; Wise and Baumgartner, 1999).

Service revenues are less volatile than product revenues (Potts, 1988; Wise and Baumgartner, 1999). Compared to the volatile product business, service revenues are often counter-cyclical or more resistant to the economic cycles that drive investment (Oliva and Kallenberg, 2003). Product-related services in particular, such as maintenance contracts, represent a stable source of income for manufacturing companies. Consequently, service differentiation also means stabilizing earnings and cash flows.

The relationship processes associated with service differentiation appear to be more effective for building customer loyalty. They comprehensively address customer needs and lead to customer satisfaction that, in turn, can further facilitate customer loyalty. However, in addition to the traditional concepts of volume and flexibility that determine profits in a manufacturing setting, service differentiation also benefits from economies of loyalty (Lewis, 1942). In other words, loyal customers are much more profitable than new customers, particularly in a service setting, since loyal customers are easier to serve (that is, they cost less to serve), engage more complex and profitable services, have lower price sensitivity, and provide positive referrals to other potential customers (Reichheld and Sasser, 1990). Service

differentiation comprises such aspects as intensity of interaction with customers, intensity of personal relationships with customers, and customer satisfaction and loyalty. Even with delayed benefits of increased quality of customer relationship associated with service differentiation, one can assume that service differentiation is beneficial for the relationship between customer centricity, innovativeness, and business performance.

Acquiring loyal customers, enhancing the quality of customer relationship, and increasing intensity of customer interactions through service differentiation helps strengthen the relationship between customer centricity and business performance (Homburg et al., 2003; Kalwani and Narayandas, 1995; Reichheld, 1996; Reichheld and Sasser, 1990).

In terms of innovativeness, service differentiation arguably reduces customers' perceived purchase risks and helps generate more customers who are cooperative and willing to try new products and services. In other words, customers' decision-making in relation to new products and services relies not only on confidence generated from innovation skills (Fang et al., 2008), but also on the identity and reputation of the service provider. Past successes with service differentiation have established a customer perception of high quality services. The implication is, therefore, that manufacturing companies that use service differentiation successfully can penetrate markets with new product and service offerings easier than companies lacking sufficient service differentiation. A good service reputation is an asset that can enhance the customer's expectations about the company's offerings and mitigate uncertainties about the offering's performance (Yoon et al., 1993).

Overall, service differentiation can provide ways to strengthen the impact of customer centricity and innovativeness on business performance. Simultaneously, however, service differentiation weakens the impact of complexity of customer on customer centricity and innovativeness (see Figure 1).

H₅: The positive association between complexity of customer needs and customer centricity becomes *weaker* as service differentiation increases. H₆: The positive association between customer centricity and business performance becomes *stronger* as service differentiation increases. H₇: The positive association between complexity of customer needs and innovativeness becomes *weaker* as service differentiation increases. H₈: The positive association between innovativeness and business performance becomes *stronger* as service differentiation increases.

Figure 1 here.

3. RESEARCH METHOD

3.1 Sample

A survey of European-based manufacturing companies provided the data for the study. Historically, the participating companies have followed the business logic of a pure goods provider by emphasizing product differentiation. Due to eroding product margins and more complex customer needs, however, the companies placed greater emphasis on service differentiation as a means of achieving competitive advantages. Depending on the size of the companies, the unit of analysis was either the company's strategic business unit (SBU) or the company itself.

Face-to-face interviews with service experts, including pretesting of a preliminary version of the questionnaire, preceded the study, and a commercial database provider supplied a random sample of firms for the survey. Of the 1712 distributed survey questionnaires, 187 participants responded in the first wave, 150 in the second wave, and 28 in the third wave. In total of 365 SBUs returned surveys. However, several responses were either from the same company or from pure service providers, or were missing too much data and as a consequence

removed from the analysis. This left a total of 332 usable responses, which in turn represents an overall response rate of 21 percent. The key respondents of the survey were CEOs, service managers, or marketing managers with more than 10 years of experience at their firm. The sample included a range of manufacturing industries, including pulp and paper, chemicals, mechanical equipment, electronic and optical equipment, and plastics. The typical company in the survey has approximately 280 employees and generates 85 percent of its turnover in the business market. The average turnover from service is 24 percent, which, following Fang et al. (2008), is in the range of 20–30 percent, at which a company reaches the critical mass required to obtain a sustainable pay-off from service.

In order to detect any possible problems with non-response error (time trend), the study applied t-tests to early and late respondents (Armstrong and Overton, 1977). The corresponding t-values for the variables included in the analyses range between 0.34 and 1.1, which indicates no statistically significant differences between early and late respondents.

Due to the use of a cross-sectional, single respondent approach for collecting data, the study controlled for common method variance by adopting three widely accepted practices in questionnaire design (Lindell and Whitney, 2001). Firstly, the use of reverse scoring addressed the tendency to agree with attitude statements regardless of their actual content (Podsakoff et al., 2003). Secondly, questions had no particular order, the final questionnaire was shorter than before, and the wording of the items varied. These practices reduced respondents' fatigue and avoided transient mood states (Podsakoff et al., 2003). Thirdly, in order to avoid over-justification effects, respondents were unaware of the nature of the relationships under investigation. In addition to those three practices in questionnaire design, a Harman's single-factor test was used post-hoc to test for common method variance (Podsakoff and Organ, 1986). The Harman's single-factor test assesses the degree to which the main model and moderating effects might be an artifact of common method variance

(Podsakoff et al., 2003). Using an eigenvalue greater than 1.0 as a cutoff, the study extracted all factors in the model, with no apparent general factor. This analysis does not completely rule out the possibility of common method variance, but does suggest that same-source bias is not an adequate explanation for the results of the study (Podsakoff et al., 2003).

The study used a confirmatory factor analysis for measure validation (Anderson and Gerbing, 1988) and performed structural equation modeling through the AMOS 7.0 program in order to estimate the basic model. One assumption of the study was that customer centricity and innovativeness function as mediators in the hypothesized path model. As a result, establishing the mediation effects before testing the main effects was important. A mediation testing procedure for structural equation modeling determined the role of innovativeness and customer centricity as mediators in the basic model (Baron and Kenny, 1986). In a revised version of the basic model, the study added a path between the complexity of customer needs and business performance. A chi-square (χ^2) lower than the basic model indicates a better fit of the data, while additional checks identified whether the difference in χ^2 -values was above the recommended level of 3.84 for one degree of freedom and $p < 0.05$ (Homburg and Giering, 1996).

Using structural equation modeling techniques allows the establishment of moderator effects either through subgroups analysis (Homburg and Giering, 2001) or by using a product term indicant analysis (interaction model) (Kenny and Judd, 1984; Ping, 1995). Because of the deficits of the subgroups analysis, the present study used a product term indicant analysis (interaction model) (Neale, 1998; Ping, 1995). The application of the interaction model took place in three different steps. The first step showed the main effect for X on Y (Model I). The second step added the moderator Z as a main effect on Y (Model II). The study tested for the existence of a significant path estimate for Z as a main effect. The third step added an interaction term XZ and calculated the path estimates for the interaction

(Model III). The third model reflects Kenny and Judd's (1984) basic interaction model, which consists of two latent factors, X and Z , each with observed indicators (items). The product latent factor XZ impacts the product observed variables X_iZ_i and the indicator Y . The study compared the resulting path estimates for the models to each other. If Z shows a significant path estimate as main effect, Z will be considered as a 'quasi' moderator. Z can be considered as a moderator if the path estimate for XZ is significant and the path estimates for X in Model III are lower than in Model I. The study applied this procedure to each moderation effect.

3.2 Measures

Following the recommendation of Churchill (1979), the operationalization of the constructs used reflective scales that coincide with the existing literature. A seven-point scale (1=lowest score, 7=highest score) measured the items. By adopting Jaworski and Kohli's (1993) constructs for the complexity of customer needs, the method included three items that measure the degree to which customer needs become more complex and assess the extent to which the composition and preferences of an organization's customers tend to change over time. The operationalization of innovativeness uses three items adapted from Deshpande et al. (1993) and Narver et al. (2004). The items cover various aspects of innovation in manufacturing companies, including whether a company is first to market with new products and services and how competitors view the organization in terms of innovativeness.

In consideration of the literature regarding customer centricity (Galbraith, 2005; Johnson, 1998; Shah et al., 2006), the construct used four items from Johnson (1998) in its assessment. The first item measures the degree to which customer satisfaction and loyalty are key drivers in the company's strategy, while the second item assesses the role of customer satisfaction in comparison to other company goals. The third item addresses the amount of customer focus, and the fourth item pertains to building customer relationships. Finally, two

items, related to market share and financial performance, measure the construct on business performance (Jaworski and Kohli, 1993). These two items are subjective performance measures, which is common practice in research into companies and business units (Powell, 1995). Consideration of only the financial business performance neglects the services benefit from economies of loyalty (Lewis, 1942). The premise of economies of loyalty is that customer satisfaction has an impact on financial performance measure. Therefore, the present paper argues that measuring financial performance is sufficient for assessing the impact of customer centricity, innovativeness, and service differentiation.

The operationalization of service differentiation relies on existing scales to measure differentiation strategies. Kim and Lim (1988), for example, suggest that product differentiation entails product differentiation, new product development, and a high-price product. Marketing differentiation strategy is operationalized through marketing by credit and discount, extending the market channel, marketing differentiation, and an emphasis on specialized market and image building. Davies and Schul (1993) develop measurement scales for brand differentiation (developing brand identification, innovation in marketing techniques, use of advertising and promotion), product differentiation (manufacturing specialty products, emphasizing high-price products, designing or producing to order), and service differentiation (emphasizing customer service, quick delivery/immediate response to order, and focus on specific customer requirements).

While the literature has used such traditional differentiation scales widely, such scales do not fully cover service differentiation in the context of manufacturing firms moving from pure goods providers into service providers. Considering these existing scales, this study has developed a new scale for service differentiation. The new scale includes three items. These measures include differentiation of the total offerings through services in relation to

products and estimate whether the products or the service components lead customers to choose the offerings of the organization.

In terms of measurement validation, the study then subjected all five reflective multi-item constructs to a confirmatory factor analysis. The overall measures indicate a good fit with the hypothesized measurement model ($\chi^2/df=1.908$ ($p<0.001$), GFI (Goodness-of-Fit Index)=0.92, AGFI (Adjusted Goodness-of-Fit Index)=0.90, TLI (Tucker-Lewis-Index)=0.94, RMSEA (Root Mean Squared Error of Approximation)=0.050). As Table 1 shows, the reliability of the individual scales ranges from 0.67 to 0.88 for coefficient alpha and from 0.64 to 0.88 for composite (construct) reliability.

The Fornell-Larcker Criterion, used to examine the discriminant validity, demonstrates that the average variance extracted exceeds the squared correlation between all pairs of constructs. Fornell and Larcker (1981) state that the average variance extracted (AVE) should be higher than 0.5, and all constructs meet the Fornell-Larcker Criterion because the AVE exceeds the squared correlation between the corresponding pairs of constructs. As a result, the discriminant validity was sufficient to validate the study. Table 2 summarizes the correlations among the five constructs. Together, the results demonstrate that the measures have the sound psychometric properties necessary for hypothesis testing (Bagozzi and Yi, 1988).

Tables 1 and 2 about here.

4. RESULTS

4.1 Basic model

The overall fit measures suggest that the hypothesized path model provides a good data fit. The χ^2 -degrees of freedom ratio yielded strong results ($\chi^2/df= 1.782$, $p<0.001$) and the

other overall measures (GFI=0.89, AGFI=0.85, TLI=0.94, CFI=0.95, RMSEA=0.042) meet the requirements suggested in the relevant literature (Bagozzi and Yi, 1988).

The mediation tests for customer centricity and innovativeness also support the basic model and establish both constructs as mediators in the relationship between complexity of customer needs and business performance. The χ^2 in the revised model, with the additional path between complexity of customer needs and business performance, was 162.6, compared to 172.0 in the basic model. The lower χ^2 for the revised model indicates that the data fits the basic model better. Additionally, the χ^2 -difference of 9.4 is above the recommended level of 3.84 for one degree of freedom and $p < 0.05$ (Homburg and Giering, 1996).

As Figure 2 shows, the results support the two hypotheses regarding the relationship among complexity of customer needs, customer centricity, and/or innovativeness (H_1 : $y_1=0.190$, $p < 0.1$; H_3 : $y_3=0.231$, $p < 0.01$). The results also support the hypotheses related to the relationships among centricity, innovativeness, and business performance (H_2 : $y_2=0.197$, $p < 0.01$; H_4 : $y_4=0.332$, $p < 0.01$). The size and sign of all four effects are consistent with the range in the existing literature.

–Figure 2 here.

4.2 Service differentiation as a moderator

Having achieved support for the basic model, the next step considers the hypothesized moderator effects for service differentiation. Table 3 presents the results of the moderator analysis. Identifying a moderator variable necessitates determining whether a significant interaction is present between the hypothesized moderator variable, Z, and the predictor variable, X, by the product term indicant analysis (by identifying whether model III reports a significant interaction term). The study results support three of the four hypothesized

moderator effects. Firstly, one cannot reject Hypothesis 5, because $y_{CCN*SD-CC} = -0.059$ ($p < 0.1$) is significant and the negative sign implies that the service differentiation weakens the positive association between complexity of customer needs and customer centricity.

Secondly, the results support Hypothesis 6 in size and significance ($y_{CC*SD-BP} = 0.096$; $p < 0.1$). Service differentiation strengthens the positive relationship between customer centricity and business performance.

Thirdly, the results partly support Hypothesis 7. On one hand, $y_{CCN*SD-I} = -0.078$ ($p < 0.05$) is significant with the expected negative sign. On the other hand, Models II and III also suggest a main effect of service differentiation on innovativeness ($y_{SD-I} = 0.110$; $p < 0.05$ and $y_{SD-I} = 0.098$; $p < 0.05$). Service differentiation is, therefore, a quasi moderator, which means that service differentiation not only interacts with the complexity of customer needs, but is also an antecedent for innovativeness itself. Fourthly, the results do not support the hypothesized moderator effect of service differentiation on the relationship between innovativeness and business performance in terms of size and significance ($y_{I*SD-BP} = 0.012$; $p > 0.1$).

This missing moderating effect seems to be counter-intuitive and requires further exploration. A sub-group analysis suggested that the moderation effect for high and low service differentiation becomes significant. However, the results reject Hypothesis 8 in companies that achieve medium service differentiation. This outcome indicates that combining product and service differentiation reduces the influence of innovativeness on business performance. The ensuing implication is that such companies are stuck between product and service differentiation and are unable to use their innovativeness in the same way as companies that concentrate on either product or service differentiation. Companies that concentrate on either product or service differentiation achieve a stronger relationship

between innovativeness and business performance than those that place an average level of emphasis on both areas.

Table 3 here.

5. DISCUSSION

Academics continue to search for theories and empirical evidence regarding service differentiation in manufacturing firms (Davies, 2004; Fang et al., 2008; Gebauer, 2008). This paper expands the existing literature by studying service differentiation, not in isolation from the strategic orientation of manufacturing companies, but rather by emphasizing the interaction of service differentiation with customer centricity and innovativeness. This perspective on service differentiation fits better with the way that manufacturing firms work with services. Companies investing in customer centricity and innovativeness can make greater profits out of the investments by emphasizing service differentiation.

The results of the analysis of the basic model concur with previous research, which states that the complexity of customer needs drives customer centricity and innovativeness, which, in turn, improve business performance. The complexity of customer needs has similar impacts on customer centricity and on innovativeness, although the impact on business performance differs. Innovativeness has a greater impact on business performance than customer centricity does. In order to enhance business performance, innovation in processes, products, and services is relatively more important than focusing on customer centricity in the organizational processes and structures; doing both simultaneously achieves the best result, however. In the context of manufacturing firms, this study adds the construct of service differentiation and investigates how this construct moderates the four relationships in the basic model.

Firstly, strong service differentiation reduces the sensitivity of a manufacturing firm's strategies for customer centricity to the complexity of customer needs. The premise is that a service differentiation is a valuable resource that makes a firm's offerings harder to imitate, which makes the firm less sensitive to more complex customer needs. Manufacturing firms utilizing service differentiation are in a better position to handle dramatic changes in customer needs than pure goods providers are.

Secondly, strong service differentiation can improve a manufacturing firm's payoff for customer centricity and provide employees with a better understanding of customers' value creation processes. The organization can use such customer knowledge to design better goods and services, form better value propositions, and deliver better service. Service differentiation, therefore, not only strengthens the positive relationships between complexity of customer needs and customer centricity and those between customer centricity and business performance. Service differentiation is actually a prerequisite for these two relationships. Establishing customer centricity in order to cope with complex customer needs benefits from service differentiation, which is, in turn, a prerequisite for achieving higher business performance through customer centricity.

Thirdly, emphasizing service differentiation has a complex moderation effect on the relationship among complexity of customer needs, innovativeness, and business performance. Service differentiation functions as a quasi moderator and not only weakens the association of complexity of customer needs and innovativeness, but is also an antecedent for innovativeness itself.

Innovativeness has less impact on business performance of those companies that emphasize both goods and service differentiation than on the business performance of firms that concentrate on one or the other. Sharing available resources between goods and services in this way stabilizes the revenue stream and reduces the likelihood that a manufacturing firm

will act on everything that happens in the market. However, such a strategy can cause the resource requirements of product and service innovation to become overly demanding, which may dilute a firm's resources for innovation to such an extent that neither business has sufficient resources (Fang et al., 2008). The empirical investigation in this study indicates that the payoff from innovativeness is higher if the firm focuses its resources on either product or service innovations.

5.1 Managerial implications

More complex customer needs may reduce the value of a once sustainable source of competitive advantage for firms. This could create a need to redefine the way in which firms compete (Barney, 1991). The research for the present study suggests that many large manufacturing firms, such as IBM and General Electric, have deliberately adopted service differentiation strategies in order to redefine the industry structure. These companies use service differentiation to create resources that are difficult to imitate and are less sensitive to the complexity of customer needs.

IBM and GE exemplify the managerial implications of the balance between product and service innovation. Whenever IBM or GE differentiates through the superiority of their products, any change in customer needs has a direct impact on product innovation pipelines. As both companies have moved towards achieving differentiation through a combination of product superiority and service excellence, changes in customer needs often affect the innovation of either products or services. These companies have been able to respond to changing customer needs or competitive offerings by innovating a single product or service component, which reduces the impact of complexity of customer needs in comparison to a case of pure product differentiation. Interestingly, the impact of complexity of customer needs on innovativeness increased again as IBM and GE achieved competitive advantages. In the

case of General Electric Aviation, an association existed between pure service differentiation and the sale of jet engine usage, rather than the jet engine itself or the services necessary to maintain the jet engine. If customers change their needs and wants regarding jet engine usage, or if other competitors offer the same service for a better price, General Electric Aviation would have to put more effort into both new product design and a new service offer.

5.2 Research limitations and future directions

To some degree, effective business practice relies on an increased understanding of the effect that service differentiation has on a firm's other strategic orientations, such as customer centricity and innovativeness. This study has some limitations, the first of which is the use of subjective measures of business performance. The study builds on existing scales from previous research on the effects of market orientation (Jaworski and Kohli, 1993) on business results. Future studies could include objective measures of business performance and, ideally, track them over a longer period of time. In addition, the authors limited the business performance measures to financial indicators, and neglected customer satisfaction and loyalty as non-financial measures. Even if customer satisfaction and loyalty will be evident in financial measures in the long term, future studies should use a more comprehensive perspective on business performance and integrate customer satisfaction and loyalty as direct outcome variables.

Secondly, the study focuses on one empirical setting – a European sample of manufacturing firms. Although those companies are conducting business worldwide, the sample limits external validity. As is the case with studies on market orientation and strategy taxonomies in different cultural settings, such as North America, Europe, or Asia, the present study anticipated potential differences, although these are difficult to predict. For example, Meyer et al. (1999) suggest that U.S. firms are superior in their service performance, while

Selnes et al., (1996) point out that Scandinavian firms do not differ from U.S. firms in terms of market orientation and performance linkage. Scandinavian and U.K. firms appear quite similar to U.S. firms, whereas German companies specifically have problems regarding service performance (Meyer et al., 1999). Therefore, the possibility exists that cultural differences operate limiting the generalizability of this study's findings to all countries in Europe. Future research should conduct additional empirical investigations that cover large samples in different cultural regions.

Thirdly, unlike previous research, this study examines the interaction of service differentiation with two strategic orientations of the firm mediating the relationship between increasing complexity of customer needs and business performance. The present empirical investigation was only able to introduce customer centricity and innovativeness embedded in the market orientation of the firm. Future studies could expand this set to include other strategic orientations, such as technological and entrepreneurial orientation.

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Table 1: Measurement validation.

	Mean (Variance)	Cronbach's alpha	Construct reliability	Average Variance extracted (AVE)
Innovativeness (I)	4.623	0.88	0.88	0.58
I1. Competitors in this market recognize us as innovation leaders.	(2.360)			
I2. We are first to market with new products or services.				
I3. Customers view us as an innovative company.				
Customer centricity (CC)	6.087	0.83	0.82	0.53
CC1. Improvements in customer satisfaction and loyalty are key drivers of running a profitable business.	(1.031)			
CC2. Customer satisfaction has a high priority in comparison to other goals of the business.				
CC3. Customer focus is an important strategy to improve the results of an organization.				
CC4. We work to develop long and strong relationships with our customers.				
Business performance (BP)	5.150	0.76	0.77	0.50
BP1. Over the past three years, our market share has exceeded that of our competitors.	(2.175)			
BP3. Over the past three years, our financial performance has exceeded that of our competitors.				
Complexity of customer needs (CCN)	4.272	0.71	0.72	0.52
CCN1. In our kind of business, customers' needs change considerably over time.	(2.840)			
CCN2. Our customers tend to look for new offerings all the time.				
CCN3. New customers tend to have needs that are different from those of our existing customers.				
Service differentiation (SD)	4.291	0.64	0.67.	0.54
SD1. We focus on products, but we deliver services if the customers require them (R).	(3.999)			
SD2. Customers choose us for our products, services come second (R).				
SD3. Customers choose us for our service, products comes second.				

Note: R – reverse scale

Table 2: Correlations among Latent Constructs.

	Complexity of customer needs	Customer centricity	Innovativeness	Business performance	Service differentiation
Complexity of customer needs	1				
Customer centricity	0.107*	1			
Innovativeness	0.340***	0.197***	1		
Business performance	0.206***	0.303***	0.304***	1	
Service differentiation	-0.096*	0.017†	0.090*	-0.023†	1

*** – Correlation is significant at the 0.01 level

** – Correlation is significant at the 0.05 level

* – Correlation is significant at the 0.1 level

† – Correlation is not significant

Note: For the constructs, all correlations are significant to at least the $p < 0.01$ level, except for the relationship among customer centricity and service differentiation, and service differentiation and business performance.

Table 3: Moderating effects for service differentiation.

	Model I	Model II	Model III
H5: The positive association between complexity of customer needs and customer centricity becomes weaker as service differentiation increases.	$y_{CCN-CC}=0.190^*$	$y_{CCN-CC}=0.192^{**}$ $y_{SD-CC}=0.027^\dagger$	$y_{CCN-CC}=0.184^*$ $y_{SD-CC}=0.021^\dagger$ $y_{CCN*SD-CC}=-0.059^*$
H6: The positive association between customer centricity and business performance becomes stronger as service differentiation increases.	$y_{CC-BP}=0.231^{***}$	$y_{CC-BP}=0.304^{***}$ $y_{SD-BP}=-0.028^\dagger$	$y_{CC-BP}=0.309^{***}$ $y_{SD-BP}=-0.034^\dagger$ $y_{CC*SD-BP}=0.096^*$
H7: The positive association between complexity of customer needs and innovativeness becomes weaker as service differentiation increases.	$y_{CCN-I}=0.197^{***}$	$y_{CCN-I}=0.188^{***}$ $y_{SD-I}=0.110^{**}$	$y_{CCN-I}=0.167^{***}$ $y_{SD-I}=0.098^{**}$ $y_{CCN*SD-I}=-0.078^{**}$
H8: The positive association between innovativeness and business performance becomes stronger as service differentiation increases.	$y_{I-BP}=0.332^{***}$	$y_{I-BP}=0.318^{***}$ $y_{SD-BP}=-0.051^\dagger$	$y_{I-BP}=0.332^{***}$ $y_{SD-BP}=0.055^\dagger$ $y_{I*SD-BP}=0.012^\dagger$

*** – Significant at the 0.01 level

** – Significant at the 0.05 level

* – Significant at the 0.1 level

† – Significant

Figure 1: An overview of the extended model and hypotheses of the study: Hypothesized main and moderating effects (**Bold** - main effects, *cursive* - moderating effects)

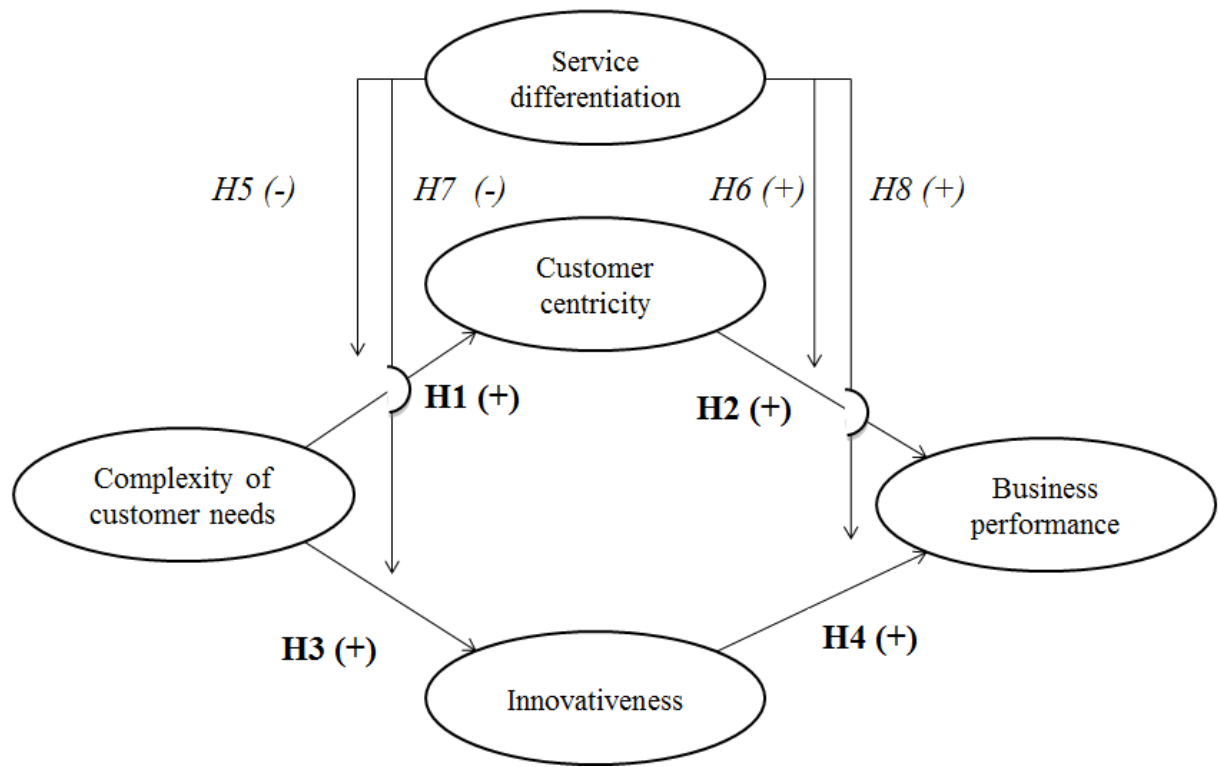


Figure 2: The results of the basic model.

