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**WORKING PAPER**

**ANALYZING FIRM PERFORMANCE  
HETEROGENEITY: THE RELATIVE EFFECT OF  
BUSINESS DEFINITION**

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## **Abstract**

An ongoing discussion in strategic management concerns the relative impact of specific strategic decisions on firm performance. In this tradition, this research analyzes the relative impact of business domain choices on firm performance. More specific, the paper at hand (a) discusses a method to assess the relative impact of firm and business definition effects on firm performance within a specific industry, and (b) demonstrates the value of this method by measuring the effect of business definition on performance within the context of a specific SME-dominated industry, namely the Belgian electrical whole sale sector. The results indicate that firm effects explain most of the variance in four performance variables but that the impact of business definition on performance could be underestimated. It turns out, according to our findings, that business membership (and thus differences in business definition) explains about 8 percent of the variance in performance between firms within the examined industry. Consequently, managers should carefully monitor and examine the business domain they are in as it directly related with the firm's level of performance.

### **Key words:**

Business definition, domain choice, electrical wholesale sector, performance differences, variance decomposition

### **Classification codes:**

C00; C13; C83; D21; L10

## **1. INTRODUCTION**

One of the major discussions in strategy concerns the determinants of firm performance. Academics from various backgrounds have focused on explaining firm performance and on identifying the sources of inter-firm performance differences (McGahan and Porter 1997). Researchers in the industrial-organization tradition, for example, have argued that industry structure is a central determinant of firm performance and contend that the structural features of an industry effect the competitive position of all business units in that specific industry (Chang and Singh 2000). However, the inability of the industrial-organization tradition to provide a rigorous explanation for intra-industry heterogeneity in performance has stimulated strategy researchers to focus on the firm itself (Chang and Singh 2000). As a result, firms were no longer viewed as identical “black boxes” in a given market structure but as dynamic collections of specific capabilities influenced by differing organizational structures and specific strategic decisions (Hawawini, Subramanian, and Verdin 2003). One of these vital strategic decisions, assumed to impact organizational performance, is the (implicit or explicit) selected business definition (Sidhu 2004). Especially in the case of small and medium sized enterprises (SME’s) an adequate business definition seems to be of vital importance as the traditional explanation for their success is that SME’s choose their battles carefully (Gomes-Casseres 1997). Consequently, in addition to the decision of which industry to enter, entrepreneurs are confronted with the ordeal of selecting which business definition to adopt (McDougall et al. 1994). However, despite the importance of these issues, assessing the relative impact of industry, firm and business domain effects on performance has received scant empirical study (McGahan and Porter 1997). On top, these issues have only been seldom addressed within the context of SME’s (Chang and Singh 2000). The paper at hand tackles this issue by analyzing the relative impact of firm and business domain effects on firm performance within a specific SME-dominated industry, namely the Belgian electrical whole sale sector. The results of this

study contribute to our understanding of the performance impact of business definitions and will help remediate the fact that “few articles have been published that specifically deal with how to support strategic analysis and management in SME’s (Rangone 1999)”. The paper at hand is structured as follows. The first section elaborates on the issue of defining the business. More specific, we first discuss the concepts of industry, firm and business definition and summarize prior research on the performance implications of business definitions. The following section presents the research method used for (a) delineating clusters based on business domain dimensions, and (b) determining the business effect versus the firm effect on performance. In addition, we describe the setting of our research, namely the Belgian electrical wholesale sector. The final section presents the research results and discusses the consequences for SME’s.

## **2. DEFINING THE BUSINESS DOMAIN**

Performance differences in firms are often the subject of academic research and government analysis (Verreynne and Meyer 2008). The underlying motivation for this kind of research is the quest for those factors that may provide firms with a competitive advantage and hence drive firm profitability. Traditionally, the emphasis in analyzing variations in firm performance has been at the industry level, implying that the structural characteristics of an industry ensure substantial homogeneity among firms within that industry and as a result determine to a large extent firm performance (Frazier and Howell 1983). However, despite the attention for and importance of the topic, defining a specific industry has always been a subject of discussion. The easiest way to draw industry boundaries is to use product similarity as the delineating criterion. Researchers tend to favor such industry classification as most industry statistics are product category based, often using the Standard Industrial Classification (SIC) codes. Consequently, industries are most often defined as a group of firms making or selling a similar

product. Nonetheless, the inability of the industrial-organization tradition to provide a rigorous explanation for intra-industry heterogeneity in performance has stimulated strategy researchers to focus on the firm itself (Chang and Singh 2000). Hence, the idea that a firm's attributes, possessions, and actions are the driving forces behind performance has conquered a central position in the strategy field (Short et al. 2007). The resource based view, which champions a narrow delineation of competitive borders centered on the core competencies of an organization or group of organizations, is a prominent reflection of this idea (Sidhu, Nijssen, and Commandeur 2000). Another view focuses on the strategic decisions of organizations, and more specific the selection of the competitive arena in which a company (implicitly or explicitly) chooses to compete within an industry. As such strategic decisions will significantly effect a firm's structural position in its industry (Frazier and Howell 1983), it is likely that average performance differs among different competitive arenas or businesses within an industry (just as the average performance differs among industries). By considering businesses instead of the industry as the primary unit of analysis, researchers may gain a more in-depth knowledge of the rivalry patterns between firms and drivers of performance (Houthoofd 2006). The question now arises how business groups or business domains within an industry can be delineated. In most cases, the term "business domain" usually refers to the intersection between the supply side (the industry, a product oriented classification) and the demand side (the 'served market' in business language). A business domain or definition can be defined as a set of product-market-combinations or competitive arena where firms with similar products target customers with similar needs. Nevertheless, just as there is no best way to define an industry, there is no best way to define a business domain. Abell (Abell 1980, 1993), for example, was the first to add a third dimension and defined a business domain as a three-dimensional strategic space consisting of (1) customer groups served, (2) customer needs served, and (3) technologies employed. Cool and Schendel (Cool and Schendel 1987, 1988), Porter (Porter

1986), Martens (Martens 1988, 1989) and McGee and Segal-Horn (McGee and Segal-Horn 1990), in contrast, used geographic reach, in combination with products offered and markets served to picture the scope of the strategy of firms. Day (Day 1981, 1997) and Porter (Porter 1986), on the other hand, suggested that level of integration (whether forward or backward) could be a relevant business domain dimension in certain industries.

### **3. PRIOR RESEARCH ON THE BUSINESS DEFINITION - PERFORMANCE LINK**

It is unfortunate that in spite of the general accepted importance of defining the business domain as a first step in strategy formulation, research on the hypothesis that business definition affects the performance bottom-line, is scarce. Only a few studies have addressed the cited issue. Frazier and Howell (Frazier and Howell 1983), for example, delineated clusters of firms in the hospital supply industry based on two criteria for business definition: the degree of scope and differentiation of (1) customer needs served with a given technology and (2) customer groups (Abell 1980). Profitability (i.e. net profit before taxes, return on assets, return on net worth) did not significantly differ between these clusters, illustrating the fact that numerous paths exist in this industry to reach roughly the same profitability levels. However, performance criteria associated with sales volume (for example average order size) did vary significantly across the clusters of firms. Houthoofd and Heene (Houthoofd and Heene 1997) report a study (investigating 36 firms) on the differences in business definitions within the Belgian brewing industry during 1985 till 1988. They form clusters of firms – called strategic scope groups - within the brewing industry that define their business domain using a 4 dimensional "strategic space" consisting of buyer types, product types, geographical reach and level of vertical integration, in a similar way. Within the brewing industry in Belgium 5 such clusters could be identified. These clusters (representing in fact firms competing within different business domains) differ statistically significantly on a risk-adjusted return on assets

measure. Sidhu, Nijssen and Commandeur (Sidhu, Nijssen, and Commandeur 2000) investigate 56 firms in different industries on how these companies conceptualize their business domain (and thus their competitive arena) and how this conceptualization affects performance. They found that delineating competitive arenas relatively narrowly (with an organization's technological competencies as the reference point) is positively associated with performance in turbulent industries. Performance is operationalized as sales growth. In stable industries, on the contrary, a broad definition (encompassing producers of substitute products) is positively correlated to sales growth. Furthermore, the study shows that explicitly articulating the business domain of the company leads to superior performance, both in stable and in turbulent environments. In his study of the multimedia sector in the Netherlands, Sidhu (Sidhu 2004) discriminates between firms who have an explicit business domain statement and those who haven't. His study results point out that firms with a written business domain statement have significantly higher sales growth than others, after controlling for the effect of strategy planning comprehensiveness and strategy content. Furthermore, strategy planning comprehensiveness and a strategy of greater innovation contribute positively to sales growth. Wakabayashi (Wakabayashi 2005) studies the relationship between past business definitions and financial performance in 50 Japanese electric/electronics companies for a six year-period (1998 – 2004). Wakabayashi advocates that a business should be defined by its value to the customer. Consequently, a functional business definition is one that enables a firm to realize benefits or value for its customers. Wakabayashi (2005) defines 'functionality' as 'customer-value-providing action' or 'need-satisfying action'. His study results indicate that functional business definitions (i.e; elaborating customer-value orientedness) have a positive impact on sales growth and on the growth rate of aggregate market value (of the firm) over a period of five or six years.

#### **4. PROBLEM STATEMENT AND RESEARCH METHOD**

Our analysis of the business definition-performance link indicates that business definition choices do have performance implications but that the relative impact of industry, firm and business domain effects on performance has received scant empirical study and is still unclear (McGahan and Porter 1997). What is more, the analysis indicates that the cited issues have only been seldom addressed within the context of SME's (Chang and Singh 2000). Despite the traditional explanation that the success of small firms lies in their capacity to select their battlegrounds carefully (Gomes-Casseres 1997), it seems that research examining the performance impact of the business definitions of SME's is scarce. In combination with the observation that when a new venture succeeds or an existing one finds a sustainable path to growth it is "more often than not [...] in a market other than the one it was originally intended to serve, with products and services not quite those with which it had set out, bought in large part by customers it did not even think of when it started, and used for a host of purposes besides the ones for which the products were first designed (Drucker 1985)", it seems that insights into the relationship between the selected business domain and performance within a specific sector could provide entrepreneurs and managers of SME's with valuable information about the adequateness and profitability of specific business models. Consequently, the paper at hand (a) discusses a method to assess the relative impact of firm and business domain effects on firm performance within a specific industry, and (b) demonstrates the value of this method by measuring the effect of business definition on performance within the context of a specific SME-dominated industry, namely the Belgian electrical wholesale sector.

##### *4.1 Research method: Distinguishing firm effects from business domain effects*

Our study builds on research focusing on decomposing (a) industry performance effects from firm performance effects (McGahan and Porter 1997, 2005; Rumelt 1991; Schmalensee 1985), and (b) industry performance effects from group performance effects and firm performance



effects (González and Ventura 2002; Short et al. 2007). Prior research on industry and group effects has relied predominantly on applying analysis of variance to test whether performance means differ significantly from one group to another within an industry. In this paper we follow a different, although related, approach that uses sequential analysis of variance to estimate the relative impact of firm versus group effects on performance. In the paper at hand, business definition is used as the central criterion to delineate groups.

The basic model in our study specifies firm performance as determined by three factors:

$$R_{ijt} = \mu + \alpha_i + \beta_{ij} + \lambda_t + e_{ijt}$$

where  $R_{ijt}$  is the performance of firm  $j$  of business domain  $i$  in year  $t$ ,  $\mu$  is an intercept,  $\alpha_i$  is the effect of being in business domain  $i$ ,  $\beta_{ij}$  is the effect of being firm  $j$  in business domain  $i$ ,  $\lambda_t$  is the year effect, and  $e_{ijt}$  is the residual term or unexplained variance in performance. Firm, business domain and year effects in the expression may be treated as fixed parameters or as random variables in order to examine their respective effect on firm performance. In contrast to most previous studies, the research setting at hand calls for a fixed effects model (i.e., ANOVA) rather than a random effects model (i.e., variance components analysis and its numerous estimators) as the employed sample is nearly equal to the population. Most previous studies are multiple industry studies whereby the employed sample usually consists of a selection of firms. These samples are characterized by the fact that (a) not all industries are included, and (b) of the included industries not all firms are selected. As a result, the effects in the sample are in fact random what necessitates the use of random effects models (see appendix 1 for more information). The study at hand however focuses on one specific industry and examines almost all industry members. In our dataset, the delineated groups are hence not a random sample and neither are the included firms. Consequently, in order to examine the specific influence of each factor on the dependent variable, fixed effects models are estimated by means of Least Squares Dummy Variables (LSDV) estimator or the equivalent Analysis of

#### *4.2 Research setting: data and sample*

The industry studied is a service industry consisting of 25 electrical wholesalers. We have chosen this particular industry for three reasons. First, all firms in this industry are non-diversified firms. Arbitrary splits of overhead costs are thus not needed. Second, this also implies that the corporate level strategy merges with the business level strategy. Third, the number of firms in the selected industry is limited. The limited number of firms makes it possible to get acquainted with all of the industry participants individually and gave opportunities to control the validity of the collected data.

A questionnaire was sent to all 25 members of the industry. The questionnaire was carefully prepared in collaboration with members of the wholesalers' interest group. Great attention was paid to the correct wording of the questions and to the comprehensiveness of the questionnaire. The questionnaire was mailed by the interest group but completed questionnaires were returned directly to the first author, guaranteeing full discretion on the provided data. Additionally, we requested the wholesalers to include specific accounting data for the period 1998-2003 so that we could compute four performance measures (see research design for details). As the

questionnaire disclosed the identity of the firm, the validity of the provided accounting and questionnaire data could be verified with other sources, not in the least with our own knowledge of the sector and the incumbent firms. In total, 20 firms completed the questionnaire. All participating firms were small, family-owned private firms. Sales vary from EUR 4 million (25<sup>th</sup> percentile) to more than EUR 28 million (75<sup>th</sup> percentile) with a median of EUR 8 million. Total employment ranges from 14 (25<sup>th</sup> percentile) to 78 (75<sup>th</sup> percentile) with a median of 28 employees (see Table 1 for some descriptive indicators of the sample). As the non-participants were very small firms, over 95 percent of the market, in terms of output, was covered by the sample.

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Insert Table 1 about here  
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*4.3 Operationalizing the research design*

**Business definition variables.** The competitive arena in which a firm operates is defined by its business definition. Three dimensions characterize this scope in the electrical wholesale sector: buyer scope, product scope, and geographical reach. Buyer scope is operationalized with two measures: percentage of sales to business clients and percentage of sales to electricians. Product scope is measured through two measures: the percentage of sales of lighting material and percentage of sales of installation material. Geographical reach is measured with the proxy firm size and operationalized as the log of sales (Martens 1988, 1989). In contrast to studies in other industries (e. g. (Day 1981, 1997; Porter 1986), the level of integration was deemed an irrelevant business definition dimension as none of the Belgian electrical wholesale wholesalers is vertically integrated (neither forward, nor backward). As a result the level of integration does not play an important role in the competitive rivalry within the industry.

All selected variables reflect the average situation during the period 1998- 2003. Six-year averages were used as variable-measures throughout this paper to (a) cope with variations in

accounting practice, (b) give long-term measures, (c) mitigate the effects of various leads and lags, and (d) average the effects of swings in the economy (Barton and Gordon 1988; Bettis 1981; Hambrick 1983; Hambrick and Macmillan 1985; Souca De Vasconcellos e Sa and Hambrick 1989; Zeithaml and Fry 1984). An overview of the variables used and their operationalization can be found in Table 2. Table 3 provides some non-parametric descriptive statistics of the sample.

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**Performance variables.** Four variables are used to measure (financial) performance, namely (1) gross return on business assets (gROBA), (2) net return on business assets (nROBA), (3) gross profit margin (gPM), and (4) net profit margin (nPM). ROBA is a performance measure calculated before taxes and debt charges, so tax policy considerations and differences in tax rates are excluded. ROBA is computed (1) before debt charges to cope with differences in capital structure, (2) before depreciation charges (gROBA) and (3) after depreciation charges (nROBA). Profit margin is the ratio of operating profits to sales and is also calculated before (gPM) and after depreciation charges (nPM). Given the research interest in the intrinsic profitability of operating activities (excluding pure financial or exceptional activities) return on business assets (ROBA) was chosen as performance measure above the more common profitability measure return on assets (ROA). Opting to use ROBA has the additional benefit that it avoids the potential influence of participations (although this is not a serious problem in the industry at hand). Business assets are defined as non-financial assets (used here as an accounting term) and are composed of formation expenses, intangible assets, tangible assets, stocks and contracts in progress, amounts receivable within one year and deferred charges and accrued income. The larger this measure, the healthier the firm is supposed to be.

**5. RESEARCH RESULTS**

*5.1 Delineating businesses*

The first question is whether specific business domains exist within the examined industry. Cluster analysis was deemed the appropriate technique to answer this question and to classify the firms into specific business domains. However, as cluster analysis can be distorted by multicollinearity, we first conducted a factor analysis (FA) (principal components extraction method with orthogonal varimax rotation) on the business definition variables. When using the stopping rule that the eigenvalue must exceed 1, the factor analysis indicated that a 2-factor solution was appropriate (see Table 4). The two factors could be identified as 'Product-Market-combination' (factor 1) and 'Geographical reach' (factor 2) (see Table 5). Subsequently, the factor scores were computed and subjected to a hierarchical cluster analysis (Ward's method). Cluster significance was tested by means of Kruskal-Wallis analysis of variance. The results confirm that there are two clusters, and thus business domains, within the industry. The number of clusters was based on a visual inspection of the dendogram and the pronounced change in the tightness of the clusters as measured by a sharp increase in the error sum of squares (ESS) between two fusions in a hierarchical cluster analysis method (Everitt 1974).

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Insert Table 5 about here  
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These two clusters differ statistically significantly at the .05 level on both factors and on all of the original raw measures except for the percentage of sales of lighting material (see Table 6). The results indicate that twelve firms operate within the first business domain and eight firms in the second business domain.

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Insert Table 6 about here  
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The two business domains can be described as follows:

Business domain 1 (called the “locals”): relatively smaller sized firms with above average sales to business clients, below average sales to electricians, above average sales of installation material and lighting material.

Business domain 2 (called the “regional and national firms”): relatively larger firms with below average sales to business clients, above average sales to electricians, below average sales of installation material and lighting material.

The question now arises if these two businesses differ from each other in terms of average performance. Table 6 indicates that these two clusters of firms do indeed differ significantly in terms of performance. Table 7 demonstrates that the “locals” (business domain one) are more profitable on any of the four measures. The median net profit margin in business domain one is 1.3 % higher, the median gross profit margin is 1.6 % higher, the median net ROBA is 3.6 % higher and the median gross ROBA is 5.5 % higher relative to business domain two.

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Insert Table 7 about here  
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To recap, the study results suggest that business definition do matters in terms of performance within the analyzed industry. The next question then is: how much?

### *5.2 Firm effect versus business effect*

Table 8 shows the results of a sequential fixed effects analysis of variance that included first the year effects, then the business effects and finally the firm effects. The explanatory power of the non-nested effects (i.e. year and business effects) is measured by the  $R^2$  of the corresponding model. For the nested effect (i.e. the firm effect) we measured its explanatory power by the

change in  $R^2$ , with respect to the previous model. The results show that firm effects explain most of the variance in the dependent variable. The explanatory power of firm effects varies from 55 percent in explaining nROBA and gROBA to 63 percent when explaining nPM and gPM. Business domain effects explain from 6.8 percent to 9.7 percent of the variance of the performance variables. In addition, the analysis also shows that all business definition and firm effects are statistically significant at conventional levels. However, year effects explain only about 2 percent of the variance and are not statistically significant. Finally, Table 8 demonstrates that the serial correlation diminishes as additional effects are included in the model.

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Insert Table 8 about here  
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## **6. DISCUSSION AND CONCLUSION**

It is widely agreed upon that industry membership has performance implications. The effect of industry membership considers performance variation *between* industries. This study is, however, the first study to further analyze the performance heterogeneity *within* an industry by considering the effect of business membership and thus the effect of business domain choices. Indeed, there may be more than one business domain within an industry: different product offerings (the supply side) can be combined with different market segments (the demand side) with a different geographical reach. Such choices are really strategic in that they have lasting performance implications and consequences. The very intriguing question from a strategic management viewpoint is: how much of the performance heterogeneity between firms in the same industry can be attributed to differences in business definition and how much of the performance heterogeneity between firms is linked to firm characteristics? It turns out, according to our findings, that business membership (and thus differences in business domain) explains about 8 percent of the variance in performance between firms within the industry. So,

it pays for top managers to monitor the business definition of the firm. First of all, there are advantages connected with explicitly defining the business itself. By explicitly considering their business domain, firms may improve their competitor and competition analysis and streamline their competitor intelligence. Furthermore, significant threats and opportunities will be detected on a more timely basis, and a better basis for the formulation of appropriate short-term tactics and long-term strategy will be provided (Sidhu 2004). Determination of market boundaries is also a necessary prerequisite for determining a firm's market share (Curran and Goodfellow 1989). Business definition can affect the perception of strategic choices or options, and ultimately the performance bottom line. The essence of strategy formulation is to design a strategy that makes the most effective use of the firm's resources and capabilities. Designing strategy around the most critically important resources and capabilities implies that the firm deliberately manages its strategic scope, and may perform only those activities where it expects to establish and sustain a clear competitive advantage. This is especially true for small firms. But secondly, there are also indirect effects of business definition on performance via the operational and functional consequences of the domain choice. Further analysis of the two business domains identified in our research reveals that the supplier/wholesaler – relationship differs between the two businesses. There appears to emerge two different kinds of configurations or profiles of supplier-wholesaler-buyer relationships. Firms in business domain one (the “locals”) buy a larger part of their products at fewer suppliers. This specialization in brands of a limited number of suppliers not only leads to a larger knowledge of these products, it also helps them to maintain a higher degree of service to their clients (with lower inventories and thus costs). Being loyal to fewer suppliers may also help to obtain discount prices, and to obtain more support from these suppliers. The configuration that comes to the fore in the second competitive arena is that of larger firms, targeting more at electricians, selling more on price and moving large amounts of volume. They are less specialized and have a larger number



of suppliers. So they have a larger administrative component (larger back office) and more inventories.

Higher profitability occurs in wholesaling firms in business domain one (see above) with fewer suppliers and tight relations with their two largest suppliers. This finding is at odds with a certain traditional assumption that a wholesaler can shield the firm from pressure of suppliers (producers of electrical material in this case) by buying at as many suppliers as possible. The opposite seems to be true. Fields that study 'market power', e.g. industrial economics, predict that if sellers (the wholesalers in our case) are fragmented and suppliers (the producers of the electronic material) are concentrated, market power for these sellers will be low, and profits will suffer (Cool and Henderson, 1998). Relative concentration goes hand in hand with relative size. If smaller sized sellers are 'confronted' with larger sized suppliers, sellers will have to play the game according to the rules of the supplier. That is indeed the general situation of sellers in the wholesale sector. Wholesalers outnumber the number of suppliers, they are relatively much smaller than the suppliers (certainly the sellers in business domain one). So, it seems logic that these sellers don't play the game very hard and establish a more cooperative attitude with suppliers. Low power on behalf of the sellers in general, and especially in business domain one, does not result, however, in low performance. On the contrary, performance in business domain one is high! While the market power view has strong theoretical underpinnings, there are streams in the strategy literature that argue against the conclusion that the competitive power game must end with low profitability for the 'powerless' (the small sellers in business domain one in this case). The above average performance of the 'powerless' firms in business domain one, may reflect, according to the resource-based view, rents to unique resources, including (dynamic) capabilities. The resource-based view highlights the strategic importance of rare (and thus valuable), non-imitable, non-substitutable resources (Barney 1991, Wernerfelt 1984). That brings us to the second performance effect studied: the

firm effect which is about 60% in this study. That bears to the importance of each firm having idiosyncratic resources. The unique resources and capabilities encompass company image, company loyalty, trust from buyers, but also a dynamic capability like product knowledge, specialized knowledge of the needs of the buyers or efficient service. The dynamic capabilities approach sees competitive advantage as stemming from high-performance routines within the firm rather than from strong market positions shielded by entry barriers or from competitive conflicts raising rival's costs (Teece, Pisano, and Shuen 1997). Path dependencies are very important as the unique "soft" assets at stake here need to be built rather than bought. Success occurs, at least partly, because of policies pursued and experience and efficiency obtained in earlier periods. A relatively dynamic environment, such as in business domain one in the wholesale sector, demands dynamic competences to stay ahead. The findings of this study should urge managers to pay (more) attention on the resource accumulation process and on strengthening resources and combining those strong resources into dynamic competences.

To summarize, a categorization of firms in terms of business definition, based on three dimensions (buyer groups, product types, geographical reach), may result in a number of business domains (firms with similar business definition). The study results indicate that the examined industry consists of two distinct business domains whereby business domain membership explains about 8% of the variance in performance. The findings should urge managers to carefully (re)consider where (in terms of businesses) they are competing within the industry. Managers should pay (more) attention on business definition dimensions as business definition choices have operational consequences that affect the performance bottom-line. For instance, smaller firms are better off with tight relations with a small number of suppliers in the context of wholesaling. Aligning operations with the chosen domain is warranted. Top managers of small firms should also pay much attention on resource building and resource

leveraging as about 60 % of performance heterogeneity between firms in the same industry is linked with firm characteristics.

## **7. LIMITATION OF THE STUDY AND SUGGESTIONS FOR FUTURE RESEARCH**

This study is a single industry study. The empirical findings, therefore, need confirmation in other industries. The sample size, though it nearly equaled the population, was only 20 firms. Small samples are not unusual in strategic management research. Nevertheless, studies of larger industries are warranted. By using a multiple industry study, all four effects (industry, business, firm, year effect) can be dissected.

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## APPENDIX 1

Effects are random when the data at hand are considered to be a sample from a larger population. The effects are thus a random sample of a larger population of effects. A random effects specification allows measuring the relative importance of each factor category (i.e., not the effect of "business  $i$ ", but the effect of "businesses" in explaining performance). In a random effects model, each effect is a random variable with a mean and a variance. The effects are modeled as realisations of stochastic distributions with mean zero and constant variances given by  $\sigma^2_\alpha, \sigma^2_\beta, \sigma^2_\lambda$ .

The linearity of the basic model allows the variance of the dependent variable to be decomposed into the sum of the variances of the random effects:  $\sigma^2_R = \sigma^2_\alpha + \sigma^2_\beta + \sigma^2_\lambda + \sigma^2_e$ . The estimates of these components can be interpreted as reflecting the relative importance of each factor. Variance Components Analysis (VCA) is a statistical tool that allows making the decomposition of the variance of the dependent variable into the sum of the variances of a specified number of sources of variation. This tool has been applied to estimate the relative importance of firm versus industry effects on firm performance (Rumelt 1991; Schmalensee 1985) and more recently to include the strategic group as a third nested source of variation (González and Ventura 2002). Early applications of VCA to the strategy field (Rumelt 1991; Schmalensee 1985) quantified the relative contribution of each effect by the ratio of the estimated component of variance to the variance of the dependent variable. However, Brush and Bromiley (Brush and Bromiley 1997) and Brush, Bromiley and Hendrickx (Brush, Bromiley, and Hendrickx 1999) have shown by means of a Monte Carlo simulation that it is better using the square roots of the variance components when computing an index of relative importance.

**Table 1: Descriptives of the Belgian electrical wholesale sector (Quartiles)**

	<b>25th</b>	<b>50th (median)</b>	<b>75th</b>
Employment (in units)	14	28	78
Total net profits (in EUR)	2,735.95	130,024.58	348,797.43
Total Assets (in EUR)	2,159,754.25	4236412.91	10,646,924.00
Inventories (in EUR)	657,604.72	1,062,911.75	2,422,405.29
Sales (in EUR)	4,537,066.16	8,737,122.75	28,753,382.00



**Table 2: Operationalization of variables**

<b>Business domain definition variables</b>	<b>Operational definition</b>
Market scope (buyer types)	% sales business clients % sales electricians (installers)
Product scope (product types)	% sales installation material % sales lighting material
Geographical reach)	size [log (sales)]
<b>Performance variables</b>	<b>Operational definition</b>
Gross return on business assets (gROBA)	Gross operating profit per business assets
Net return on business assets (nROBA)	Net operating profit per business assets
Gross profit margin (gPM)	Gross operating profit per sales
Net profit margin (nPM)	Net operating profit per sales

**Table 3: Descriptive statistics of the sample on the business definition variables: rank correlations, minimum, maximum and quartiles**

<b>Rank correlations</b>	<b>(A)</b>	<b>(B)</b>	<b>(C)</b>	<b>(D)</b>		
% sales to business clients (A)	1					
% sales to electricians (B)	-0,766	1				
% sales of installation material (C)	0,516	-0,462	1			
% sales of lighting material (D)	-0,396	0,201	-0,433	1		
size (E)	-0,157	0,298	-0,106	-0,211		
<b>Minimum, maximum and quartiles</b>	<b>N</b>	<b>Min</b>	<b>25th</b>	<b>50th</b>	<b>75th</b>	<b>Max</b>
% sales to business clients	20	5	18.88	25.23	35.75	69
% sales to electricians	20	19	45.00	57.00	65.00	95
% sales of installation material	20	35	42.18	53.43	59.74	73
% sales of lighting material	20	8	18.62	21.75	25.66	44
Size	20	52.588	5.883	6.159	6.597	7.389

**Table 4: Factor analysis of the business definition variables: eigenvalues and values explained**

<b>Component</b>	<b>Initial Eigenvalues</b>			<b>Rotation Sums of Squared Loadings</b>		
	<i>Total</i>	<i>% of Variance</i>	<i>Cumulative %</i>	<i>Total</i>	<i>% of Variance</i>	<i>Cumulative %</i>
1	2.453	49.066	49.066	2.453	49.063	49.063
2	1.257	25.147	74.213	1.257	25.149	74.213
3	.614	12.277	86.490			
4	.472	9.439	95.929			
5	.204	4.071	100.000			

**Table 5: Factor matrix of the business definition variables**

	<b>Factor 1</b>	<b>Factor 2</b>
	<b>Product market combination</b>	<b>Geographical reach</b>
% sales to business clients	.891	
% sales to electricians		.300
% sales of installation material	.768	
Size		.842
% sales of lighting material	-.559	-.657

- Notes:
1. Data shown are factor loadings greater than or equal to 0.3
  2. The matrix is sorted
  3. Blanks for loadings smaller than 0.3 to enhance readability

**Table 6: Kruskal-Wallis 1-way ANOVA between businesses**

<b>Business definition measures</b>	<b>Chi-Square</b>	<b>df</b>	<b>Asymp. Sig.</b>
% sales to business clients	6.502	1	.011 **
% sales to electricians	13.460	1	.000 ***
% sales of installation material	7.513	1	.006 ***
% sales of lighting material	.252	1	.616
Size	4.339	1	.037 **
Factor 1 product-market-combination	9.524	1	.002 ***
Factor 2 geographical reach	6.095	1	.014 **
<b>Performance measures</b>			
Average nROBA	3.429	1	.064 *
Average gROBA	5.006	1	.025 **
Average nPM	2.881	1	.090 *
Average gPM	3.429	1	.064 *

\*  $p < .10$

\*\*  $p < .05$

\*\*\*  $p < .01$

**Table 7: businesses: descriptive statistics of performance measures**

Variable	N	Business	Percentiles				
			<i>min</i>	25	50	75	<i>max</i>
nROBA	12	Business 1	-2.35	3.72	7.37	10.57	13.47
	8	Business 2	-7.65	.12	2.75	4.49	13.93
gROBA	12	Business 1	.25	7.43	11.09	13.61	16.90
	8	Business 2	-5.11	2.89	5.56	6.99	15.81
nPM	12	Business 1	-2.02	1.67	2.88	5.24	6.79
	8	Business 2	-4.55	.07	1.50	2.16	5.97
gPM	12	Business 1	-.80	3.08	4.57	6.67	8.78
	8	Business 2	-3.10	1.37	2.93	3.37	6.77

**Table 8: Business effect versus firm effect (fixed effects models)**

<b>nROBA</b>					
	<i>DF</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$	<i>F-test</i>	<i>Ser. Corr.</i>
<b>YEAR</b>	5	0.024	-	0.52	0.83
<b>BUSINESS</b>	1	0.072	-	8.52***	0.78
<b>FIRM</b>	19	0.621	0.549	7.93***	0.24
<b>GLOBAL MODEL (FIRM+BUSINESS+YEAR)</b>	24	0.650		6.72***	0.25
<b>ERROR</b>	87	0.350			
<b>TOTAL</b>	111				
<b>gROBA</b>					
	<i>DF</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$	<i>F-test</i>	<i>Ser. Corr.</i>
<b>YEAR</b>	5	0.020	-	0.44	0.83
<b>BUSINESS</b>	1	0.097	-	11.77***	0.78
<b>FIRM</b>	19	0.646	0.549	8.84***	0.22
<b>GLOBAL MODEL (FIRM+BUSINESS+YEAR)</b>	24	0.670		7.35***	0.23
<b>ERROR</b>	87	0.330			
<b>TOTAL</b>	111				
<b>nPM</b>					
	<i>DF</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$	<i>F-test</i>	<i>Ser. Corr.</i>
<b>YEAR</b>	5	0.020	-	0.40	0.81
<b>BUSINESS</b>	1	0.068	-	8.02***	0.76
<b>FIRM</b>	19	0.696	0.628	11.09***	0.03
<b>GLOBAL MODEL (FIRM+BUSINESS+YEAR)</b>	24	0.718		9.22***	0.05
<b>ERROR</b>	87	0.282			
<b>TOTAL</b>	111				
<b>gPM</b>					
	<i>DF</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$	<i>F-test</i>	<i>Ser. Corr.</i>
<b>YEAR</b>	5	0.016	-	0.34	0.81
<b>BUSINESS</b>	1	0.087	-	10.26***	0.76
<b>FIRM</b>	19	0.722	0.635	12.27***	0.01
<b>GLOBAL MODEL (FIRM+BUSINESS+YEAR)</b>	24	0.739		10.02***	0.04
<b>ERROR</b>	85	0.261			
<b>TOTAL</b>	109				