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Abstract: The aim of the paper is to develop a competence-based taxonomy of supplier firms of the automotive industry. Two different theories, the resource based theory of the firm and the customer value approach, are linked and applied in order to develop this taxonomy. Competences are interpreted as complex groups of specific customer value dimensions and their aligned capabilities (and sub-capabilities), that create product and service packages, seen coherent, acceptable and assessable by the customer. Based on a qualitative research carried out in Hungary, specific customer value dimensions have been identified. Those capabilities and sub-capabilities have also been revealed, which enable supplier firms to create these identified customer value dimensions and overall customer value. The competence-based taxonomy of automotive supplier firms has been developed and a comprehensive description of different competences has been given on the basis of these results.

Keywords: supply chain, value dimension, capabilities, competence, taxonomy of suppliers

Autóipari beszállító vállalatok kompetencia alapú taxonómiája

Absztrakt: A műhelytanulmány célja, hogy bemutassa az autóipari ellátási lánc kompetencia alapú taxonómiáját. E taxonómia elméleti alapját két különböző elmélet, a vállalatok erőforrás alapú értelmezésének elmélete és a vevői érték megközelítés összekapcsolása teszi lehetővé. Kompetenciáknak tekintem specifikus vevői értékdimenzióknak és az azt létrehozó képességeknek (, illetve részképességeknek) összefüggő csoportjait, melyek a vevő szempontjából elfogadható és önmagában is értékelhető termék- és szolgáltatáscsomagot hoznak létre. A magyar autóipari beszállítók körében végzett kvalitatív kutatás segítségével sikerült azonosítani különböző értékdimenziókból álló vevői elvárás-csomagokat, illetve feltérképezni az ezek biztosításához szükséges vállalat képességeket és részképességeket.

Kulcsszavak: ellátási lánc, értékdimenzió, képesség, kompetencia, beszállító vállalatok taxonómiája

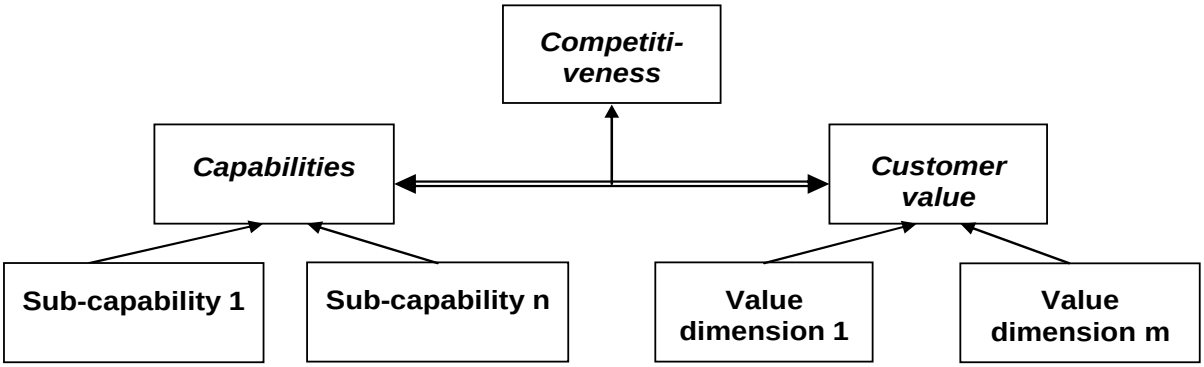
1. Introduction

The strategic relevance of resource- and capability-based analysis of firms was recognized more than 20 years ago, when Rumelt (1991) pointed out that in terms of the realised profit the differences within a particular industry are often much larger than those observed between industries. With his research Rumelt highlighted the importance of internal operational factors of companies in getting and maintaining firm competitiveness. The quoted study gave impetus to the so called resource-based research approach which sees company competitiveness as a result of company-specific resources and capabilities (Teece et al., 1997; Eisenhardt – Martin, 2000; Grant, 2002).

The resource-based theory has a long tradition and has provided detailed description of those resources and capabilities in general (see the VRIO-model), which should receive special attention in terms of long-term competitiveness (Peteraf, 1993; Wernerfelt, 1995; Barney, 2001). It is still weak however in explaining how specific resources and capabilities can lead to superior performance and consequently to firm competitiveness. In explaining this, the gap model known from the service management literature (Parasuraman et al., 1985) can bee considered as a starting point. The model states that customer satisfaction - as a basic source of firm competitiveness - depends on what extent the product- and service package supplied for the customer is in accordance with his/her expectations and on what extent it is able to create customer value. Consequently firm competitiveness depends on the fact, to what extent companies are able to develop and maintain those resources and capabilities which make them capable of satisfying customer expectations and creating customer value. The idea of linking customer value and firm capabilities has already appeared in literature (Möller and Törrönen, 2003; Ritter and Gemünden, 2004), but this connection has not been established systematically yet.

Based on a qualitative research the paper aims to establish this link systematically both from a theoretical and a practical point of view and to analyse the structure of customer value and the supplier's capabilities necessary for them in the Hungarian automotive supply chain. In order to do so, the paper is connecting the resource-based and the customer value theory (Walters, 2002; Mandják and Durrieu, 2000; Walter et al., 2001; Möller and Törrönen, 2003) by stating that in order to develop and maintain supplier firm competitiveness it is indispensable to understand and deliver *customer value*. Suppliers have to be able to identify those *value dimensions* that are the most important for their customers, and the factors considered to be critical in evaluating the performance of a supplier company. Identifying customer value dimensions is necessary but not sufficient for competitiveness. It is also important to determine what specific *capabilities* - and their building blocks: *sub-capabilities* - have to be developed in order to be able to create the identified value dimensions and overall customer value. In the long run, company competitiveness can only be maintained by continually aligning customer value dimensions with the associated necessary capabilities. This context of company competitiveness is demonstrated in Figure 1.

Figure 1 – Two major components of company competitiveness discussed in the paper



The overall aim of the paper is to provide a competence-based taxonomy of the automotive supplier firms by connecting these two theories. In order to be able to develop and describe this taxonomy three specific research questions have to be answered:

Research question 1 – What specific customer value dimensions can be identified for supplier companies involved in supply chains of the car industry?

Research question 2 – What specific capabilities do suppliers have to possess in order to create the different relevant customer value dimensions?

Research question 3 – Is it possible to identify coherent packages of customer value dimensions and the associated capabilities (and sub-capabilities) of suppliers on the basis of which one could draw up a competence-based taxonomy of car industry suppliers?

Answering these research questions has both theoretical and practical relevance. For theoreticians the paper is beneficial, because the research carried out allow a further refinement of the used academic terms and concepts. This refinement makes it possible to get a deeper understanding of the structure and nexus of company competitiveness. The findings of the research, presented in the paper, have practical importance too. The identified customer value dimensions and the necessary capabilities describe the potential development path a supplier firm can come along, and also make it possible for them to benchmark themselves against competitors. This can lead to the formulation of a more established, well grounded strategy and eventually to an increase in firm competitiveness.

In the second and third sections of the paper the two relevant basic background theories – customer value approach and resource-based theory – are introduced and also linked in order to develop a new concept and interpretation of the term competence. In the forth part of the paper research methodology is presented. The fifth section includes research findings. First the identified customer value dimensions and their relationship is summarised, then specific aligned capabilities and competences are demonstrated. Finally conclusions are summarised.

2. Customer value and its dimensions

As already mentioned above, the competitiveness of a company fundamentally depends on its ability to provide value for its customers. The term customer value is interpreted as the subjective opinion of the customer as to what extent the provided product and service package meets his/her expectations (Parasuraman et al., 1985). This comprehensive definition of customer value can be broken down and better understood through the concept of customer value dimensions.

Breaking customer value down into its components result customer value dimensions. These are the most important dimensions of the given product-service package, through which customer value can be increased (Walters, 2002). Mandják and Durrieu (2000) reviewed the literature of value dimensions and concluded that value dimensions, provided by one party to the other during their cooperation, can appear at three different levels. These are transaction, relationship and network levels.

- At transaction level value dimensions are resulting from a specific transaction. These value dimensions include the characteristics of the given product and service package of the transaction.
- At relationship level value dimensions include those created in the course of several transactions during a long-term cooperation.
- Network level value dimensions are those created in a given cooperating relationship, however the successful realisation of which also depends on additional third party relationships.

Walter et al. (2001) classify value dimensions created in a cooperative relationship between business partners, in a different way. They introduce the categories of direct and indirect value dimensions. Direct value dimensions include the customer value components of a direct relationship with a given partner. Following the same logic,

indirect value dimensions include value components the realisation of which requires the involvement of a third party. Walter and his co authors examined the direct and indirect value dimensions of business relationships from the perspective of a supplier, looking at the question: what type of value dimensions a customer can create for its supplier. They distinguished between the following specific value dimensions:

Direct value dimensions:

- Profit dimension – it relates to the direct profit expected from the business relationship with the customer;
- Volume dimension – it relates to the volume generated by the given customer ensuring that the supplier reaches the break-even point;
- Safeguard dimension – it refers to whether or not the given cooperation can be expected to stay a long-term relationship, thus ensuring profitable operation.

Indirect value dimensions:

- Innovation dimension – it relates to whether or not product or process innovation can be expected from the given relationship;
- Market dimension – it relates to whether the given cooperation results in new market opportunities, i.e. orders.
- Scout dimension – whether or not the relationship with the given customer may provide market-related and other relevant information;
- Resource access dimension: whether or not the supplier gains access to other actors owing to the cooperation.

Möller and Törrönen (2003) further expanded the validity of the above introduced value dimensions. They claim that the value dimensions given by Walter et al. (2001) are not only potential assessment factors on the basis of which the supplier evaluates its

customers, but can be interpreted from the opposite perspective: as potential value dimensions of the product- and service package provided.

It has to be mentioned that operations management uses the concept 'sources of competitive advantage' interchangeably with the above definition of transaction level customer value dimensions (Chase et al., 2001); and specifies the most important transaction level customer value dimensions, the factors through which customer value can be identified and increased as the following: price, quality, flexibility and reliability and logistics service level.

Table 1 – Different interpretation of customer value dimensions

The level at which the value dimension appears (Mandják – Durrieu, 2000)	**Interpretations of specific value dimensions**		**Nature of the value dimension (Walter et al., 2001)**
	Chase et al., 2001	**Möller and Törrönen, 2003 based on Walter et al., 2001**	
Transaction	Price	Profit Volume Safeguard	Direct
	Product quality (conformance)		
	Reliability		
	Associated services		
	Flexibility		
Relationship or network		Innovation	
Network		Innovation Market Scout Resource access	Indirect

The presented typologies concerning customer value dimensions partly overlap, and partly supplement each other. Table 1 gives an overall picture - a summary and a comparison - of the various approaches to customer value dimensions.

3. The resource-based approach

This literature is rather wide and rich and can basically be grouped in two different segments. These two segments can be differentiated along the diverse interpretation of key terms, especially the term capability. The first group of the research based literature is represented by the resource based theory of the firm and the resource based strategic management, while the second group is represented by the different functional management fields –operations and logistics management particularly - employing the resource based approach.

According to the resource-based theory of firm (Penrose, 1959; Rumelt, 1984; Wernerfelt, 1984) and the resource based strategic management (Teece, 1984; Teece et al., 1997; Grant, 2002) company competitiveness depends not only on special product-market positions, but also on company-specific elements. The resource based theory and the strategic management applies a consistent approach while exploring these elements and has already developed well defined and widely expected terms for describing them. Such basic concepts and terms are resource, capability, and routine. Resources have been interpreted as production or in a broader sense, operational factors (inputs) possessed by or available for a company (Grant, 2002). Accordingly capability is the capacity of a firm to carry out specific tasks and operations (Teece et al. (1997). The theory also stresses that organizational capabilities are manifested in routines or a group of interactive routines (Fahy, 2000; Miller et al., 2002).

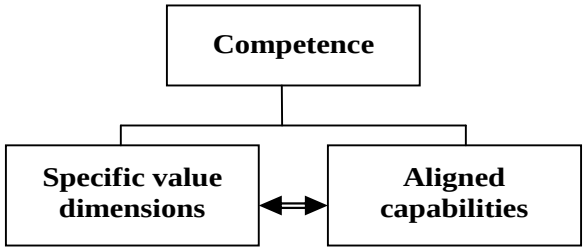
Competence is another often used but not as clearly defined concept. Specific competences - such as distinctive competence (Selznick, 1957), or core competence (Prahalad - Hamel, 1990) - are precisely defined, but in general, competence lacks clear-cut definition. Although there is no solid definition for competence, authors (Grant, 2002; Hamel – Prahalad, 1990; Miller et. al., 2002) agree on the basic features of it, by saying that competences are compound and systemic, being made up of several capabilities which themselves are often compound as well.

Functional management fields have also applied the resource based approach. However there is a basic distinction between this and the previously mentioned body of literature. The former has an unambiguous input orientation, while these management fields often approach the concept of capability applying an output orientation and interpreted it as performance indicator. Leong et al. (1990) list for example four production capabilities, namely quality, delivery performance, costs and flexibility. Hayes and Wheelwright (1984) as well as Noble (1995) add reliability to the above four. Vickery et al. (1993) identified 31 elements of manufacturing capabilities as added value components which are important for the customers. These include the cycle time of product development, manufacturing lead time, delivery speed etc.

Not only operations management, but logistics management apply this output orientation, when interpreting the term capability. This view is reflected in an article by Fewcett et al. (1997), who identify four core logistics capabilities, namely delivery performance; the quality and flexibility of logistics-related activities and processes; and the cost needed for maintaining relevant capabilities. Another example for the output approach is an article by Morash and Clinton (1997), who listed the following items as transportation capabilities: time-related capabilities, with emphasis on the reduction of delivery cycle time; stock rotation and inventory coverage index; reliable, on-time delivery and flexibility.

This output orientation highlights the unexpressed, latent need for aligning capabilities - interpreted as internal building blocks of company operation - with the customer value dimensions, which can be achieved by developing, possessing and using these capabilities. Company capabilities and performance dimensions, created by them, and also relevant for the customer, are two sides of the same coin, but are not the same. The model developed in this paper (Figure 1) distinguishes but at the same time also aligns these two sides. From a theoretical aspect the term ‘competence’ is appropriate for making this alignment feasible. Therefore the term ‘competence’ will be interpreted in this paper as complex and coherent group of specific customer value dimensions and their aligned capabilities (Figure 2).

Figure 2 – Interpretation of the term competence given in the paper



A competence represents a specific product and service package that is considered coherent and acceptable both by the customer and the supplier. The notion of this alignment, when using the term competence, was already formulated by the CLM Research Group in 1995, when they defined competence as managed result. On the other hand CLM Research Group did not give a precise interpretation of this alignment and do not develop the concept in details.

The aim of this paper is to develop competence based taxonomy of the supplier firms concerning the Hungarian automotive supply chain. While developing this taxonomy, the term competence will be interpreted as described above and shown in Figure 2. Before presenting research results, methodology will be presented in the next section.

4. The applied methodology

As literature review revealed, customer value dimensions and their aligned capabilities have not been linked systematically. Consequently the concept and interpretation of competence, developed and introduced in section 3 of this paper, was merely theoretical in nature and its usefulness and appropriateness and has to be examined during the research. In order to be able to both test the developed concept and to reveal the competence-based taxonomy of suppliers in the car supply chain, it was necessary to run a qualitative research. Interviews were carried out in 2005 and 2006, and were supplemented with the analysis of additional company and industry materials. The interviews were semi-structured and

followed a generic outline (see Appendix 1). Open ended questions were asked about general company and product information, industry structure and characteristics, customer expectations and firm capabilities. All interviews were subsequently transcribed verbatim and analysed.[1]

The basic research units were the supplier companies belonging to any of the global car making supply chains active in Hungary. For the selection of companies the so-called snowball sampling (McCall-Simmons, 1969) has been applied. In selecting supplier companies to be interviewed, experiences of a previous research - titled "Company Strategy and its Effect on Supply Chain Management Tools" (Demeter et al., 2006) – proved to be quite useful. This latter research program was conducted in 2003-2004 among Hungarian supplier firms in the automotive industry; allowing to apply purposive sampling too. Conscious attempts were made to involve in the ongoing research as many as possible of the companies who were involved and proved to be interesting during the 2003-2004 research course. This was important for a couple of reasons. First, the interviews of the 2003-2004 research supplied interesting information concerning both customer expectations and the supplier's capabilities. Second, they provided opportunity to check conclusions drawn in the ongoing research, and third, they made it possible to study the development paths made by the companies involved in both studies. Table 2 reveals that 60% of the companies in the present research program were involved in the previous program as well.

[1] The research was financed by the Hungarian Foundation for Academic Research (called OTKA in Hungarian). The research program was called: „Capabilities of Hungarian Supplier Companies in the Hungarian Automotive Industry Supply Chain" (identification number: T 049 147).

Table 2 – Companies involved in the research programs (yes = x, no = -)

Company	Position of the interviewee in the 2005-2006 research course	The research carried out in 2003-2004	Research in 2005-2006
ABF Bowden Technology Ltd.	Project manager, owner	**x**	**x**
Denso	Production control manager QAQC manager Quality Assurance Assistant Manager Purchasing Assistant Manager	**x**	**x**
Holz-Plast Plastic and Wood Processing Ltd.	Manager Managing director, owner	**-**	**x**
Linamar Hungary Rt.	Process manager	Linamar Products Division	Precision Parts Manufacturing Division
InterPlus Kft.	Logistics Director Purchase manager	**x**	**x**
Rába Machinery and Component Manufacturing Ltd.	Managing director Human Resources Director Strategic Procurement Manager Customer Coordination and Purchase Manager Lean Manager	**x**	**x**
Sokoró Industrial and Trading Ltd.	Technical Director Trade Director, co-owner	**x**	**x**
Schefenacker Automotive Parts Hungary	Kaizen Manager	**-**	**x**
Szemes Seal Technology	Managing director, owner	**x**	**x**
Working Hngary Ltd.	Managing director, owner	**-**	**x**

Besides making efforts to involve as many companies as possible from the 2003-2004 research sample, the representativeness of the sample was also monitored. Therefore the method of quota sampling was also applied. Company size, position in the car industry

pyramid, ownership type, level of operations and product complexity were aspects of the selection (Table 3). It was also important to determine which experts to be interviewed at a given company. The intention was to select mainly executives, who are likely to have an overall picture of the activities at the given company. In case of bigger companies several managers have been interviewed (see Table 2). Altogether 21 interviews at 10 companies were carried out.

An advantage of field research in general and of unstructured interviews in particular is its higher validity compared against quantitative research, allowing deeper understanding of the subject (Babbie, 1989; Silverman, 2001). Nevertheless, its reliability and generalizability are controversial. In terms of reliability, the basic problem is that of intersubjectivity: due to the assumptions and preconceptions of both the interviewer and the analyst, it is not guaranteed that, on the basis of the same background material and research method, other researchers would come to the same conclusions. In order to overcome this problem other researchers and the interviewees were asked to comment on the findings. A written report was sent out to all participants and findings were also presented in a workshop. Comments were then noted and the final version was revised.

Due to the nature of the research, generalizability of the conclusions is limited. It is although sure, that since automotive supply chains active in Hungary are global in nature, findings of the research are relevant for other parts of the chains too. It is an important result of the research that a model has been elaborated, which makes it possible to study generalizability, for example through future quantitative research methods.

Table 3 – Relevant aspects of the sample

Company name	***Company size (according to the number of employees)***	***Major owner***	***Company type***	***Position in the supply pyramid***	***Product comp-lexity***
ABF Bowden Technology Ltd.	Medium	Hungarian, privately (family)-owned	Local	Tier 1	Fairly complex
Denso	Large	Japanese, privately-owned	Global	Tier 1	Complex
Holz-Plast Plastic and Wood Processing Ltd.	Small	Hungarian, privately (family)-owned	Local	Tier 3	Fairly complex
Linamar Hungary Rt.	Large	Canadian, privately-owned	Global	Tier 2	Complex
InterPlus Kft.	Medium	Hungarian, privately-owned	Local	Tier 2	Complex
Rába Machinery and Component Manufacturi ng Ltd.	Large	Hungarian, privately-owned	Local	Tier 1 and 2	Fairly complex
Sokoró Industrial and Trading Ltd.	Large	Hungarian, privately-owned	Local	Tier 2	Fairly complex
Schefenacker Automotive Parts Hungary	Large	German, privately-owned	Global	Tier 1	Complex
Szemes Seal Technology	Small	Hungarian, privately-owned	Local	Tier 2	Fairly complex
Working Hungary Ltd.	Small	Hungarian, privately-owned	Local	Tier 2	Fairly complex

5. Research results

In the core model of the paper firm competitiveness depends on the ability to identify relevant customer value dimensions and also to possess those capabilities, which make it possible for the supplier firm to create these value dimensions. The aligned customer value dimensions and necessary capabilities define those competences along which the competence-based taxonomy can be developed. Because of this two-sided character of competences the identified customer value dimensions will be presented first. Specific sets of customer value dimensions could be identified, which define different competences of the supplier companies. In the next sub-section, the customer value dimensions found in the research will be presented, then specific competences and their relevant capabilities will be described.

5.1. Relevant customer value dimensions for the automotive suppliers

Based on the interviews carried out, one can conclude that out of the value dimensions introduced by Walter et al. (2001) in general, and applied for suppliers by Möller and Törrönen (2003), the profit dimension proved to be relevant for all suppliers. This relates to that the performance of the supplier in a particular transaction must directly affect the profitability of the customer positively. The importance of this dimension is quite understandable. The profit dimension in Möller and Törrönen's classification is a comprehensive category, which can be broken down into further components, more specific customer value dimensions, like, for example, low price and customer's expectations for a continual decrease in prices. A supplier may also contribute to its customer's profitability by delivering products of appropriate quality, thus reducing the customer's costs in relation to quality control, repair and scrap. Another way in which a supplier can affect customer profitability is the quality and the reliability of its logistics

services, since as long as it performs its tasks on time, it helps the customer to keep its schedule, while delays may cause downtimes and re-scheduling for the customer, which consequently reduce the customer's profitability.

Beside low price, conformance quality, high level of logistics service level, and additional services were often considered important customer value dimensions. Just in Time and line sequence delivery belongs to these additional services. Suppliers' flexibility has also proved to be an important value dimension. Customers usually define for the supplier firms the limit of deviation in the ordered quantities that must be accepted. In case the supplier is not willing or is unable to accept this condition, it may suffer competitive disadvantage. Furthermore, flexibility value dimension includes all the expected prompt responses to the changes that may take place during everyday operation.

The next identified value dimension in the automotive industry is volume. Because of the global character of the car manufacturing industry, suppliers unable to offer large capacity and consequently large amounts of products, fall behind in the competition.

A further important value dimension is stability, since the operational stability of the partner (both in terms of finance and market position) is a fundamental condition for the customer's operational stability as well.

Among the indirect value components, innovation dimension proved to be significant. Walter et al. (2001) define innovation as an indirect value component, the creation and realisation of which is influenced also by actors other than the two counterparts. Though this is certainly a case with strategic innovation, the realisation of incremental innovation typically depends on activities taking place within the specific relationship, and its creation is usually independent from other actors in the network. The innovation value dimension can be theoretically split into incremental and strategic issue. This splitting can be observed in practice as well. Incremental innovation, as a customer value

dimension, practically covers customer's expectation towards suppliers to react quickly and properly to the small changes in the design of the supplied product and consequently in its manufacturing technology and process.

In some cases - mainly in the case of first-tier suppliers - strategic innovation is a relevant customer value dimension too. These suppliers not only respond to small scale innovative changes triggered by the customer, but are also expected to come up with completely new ideas regarding the development of products. Strategic innovation in this case means the development of a new 'catalogue product', or the development of a new specification for an existing one.

From among the indirect value dimensions discussed in the literature, it is scout dimension which is relevant in the automotive industry. Scout value dimension refers in general to the expectation of a customer, who would like to obtain new business information and/or gain access to new cooperating parties through business relationship with a given supplier. For companies in the automotive industry it is especially important whether a given supplier is able to find its appropriate sub-suppliers and manage the cooperation with them. Based on the interviews, scout value dimension is interpreted as customers' expectation towards its suppliers to be able to do this day-to-day second tyre supplier-base management.

An additional indirect customer value dimension appeared during the interviews. It is the resource access value dimension. This dimension is usually building on scout dimension, but is not identical with it. In case of the resource access dimension customers not only expect from their suppliers to find their own sub-supplier base and manage the daily operation with them according to the supplier's preferences, but also to develop these second-tire suppliers actively according to the customers' own wishes. This ensures a more direct and effective access for the customer to the resources and capabilities of the

second-tire suppliers. Resources access value dimension is usually important, when radical innovation occurs in the chain.

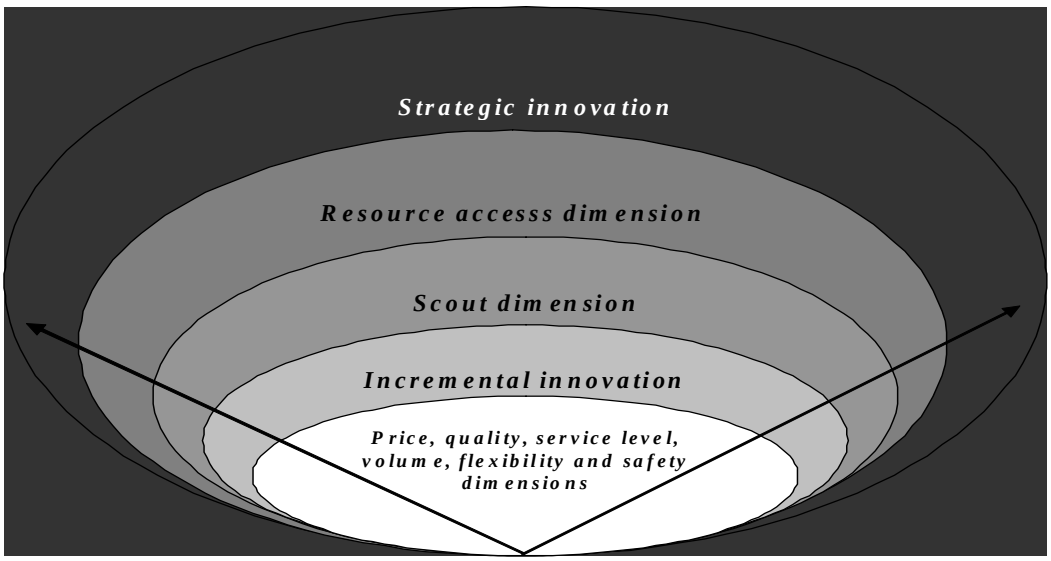
Table 4 – The classification of value dimensions observed during the research in the Hungarian car industry suppliers

Level of realisation of the value dimension	**Nature of the value dimension**	**Value dimensions**
Transaction level	Direct	Price
		Appropriate quality
		Reliability of the service
		Volume dimension
		Safeguard (stability) dimension
		Associated services
		Flexibility
Partnership level		Incremental innovation
Network level	Indirect	Strategic innovation dimension
		Scout value dimension
		Access value dimension

Table 4 demonstrates that most of the customer value dimensions described in the literature can be identified in the automotive industry. From the point of view of a competence-based taxonomy the core question is whether there are specific sets of coherent customer value dimensions here. All supplier companies interviewed listed the following issues: quality conformance, volume, price and logistics service level, flexibility and reliability dimensions. This is the basic package of customer expectations, which may be expanded with additional issues. The range of expectations may further include scout dimension, incremental innovation, resource access dimension and strategic

innovation dimension. These customer expectation-packages typically appear in a layered structure and may be widened in time along these layers. Figure 3 illustrates their typical stratification.

Figure 3 – Coherent sets of customer value dimensions and their typical stratification



5.2. Competence-based taxonomy of automotive suppliers

Along the different packages of customer value dimensions five competences could have been specified: capacity, product, adaptation, and network and innovation competence.

Suppliers with capacity competence perform wage work for their customers. Relying on their technological and production management knowledge they are able to manufacture the ordered product according to the required quality, in the necessary volume, at the required logistics service level and at an appropriate price. In addition to these customers value dimensions, flexibility and stability are essential customer value dimensions as well. In order to create these customer value dimensions suppliers with capacity competence rely on technological and production capabilities. While their technological capabilities are limited to the application of the necessary technology in the case of a

particular product, all production sub-capabilities (process management, production planning, production management, maintenance, quality management) are required to meet relevant customer value dimensions.

> Company 5, like many other suppliers in the sample, started its career as a supplier with capacity competence. One of the interviewees working for this company said: "We signed a wage work contract, and also a lease contract for the technology. The customer gave the technology; we contributed with our physical work. Everything - … including supplier selection - was organised and managed by the customer at that time."

Suppliers with product competence have a broader range of customer expectations to meet than those relying solely on capacity competence. In this supplier type customers not only expect to perform wage work, i.e. it is not only the supplier's capacity that the customer buys, but also requires the supplier to establish and manage its own network of suppliers. Beside the customer value dimensions introduced at capacity competence, this supplier type has to meet scout value dimension as well. Suppliers can meet this only by developing, along with capabilities and sub-capabilities associated with capacity competence, their supply capability, in particular the selection and management of suppliers and the sub-components needed for daily operation. The following statement sheds light on the difference between capacity and product competences:

> "There are two levels at which suppliers can enter the market: First, customers may outsource the manufacturing of parts in wage work but provide supply material themselves. Second, they may outsource not only manufacturing, but also supply

management activities: the materials then are purchased by the supplier. It brings additional tasks for the supplier, such as finding suppliers, auditing them, making sure that the delivered quality is appropriate, checking purity, and carrying out laboratory measurements."

In the case of companies with adaptation competence the group of customer expectations and the relevant aligned capabilities and sub-capabilities are even larger. Due to the fast changes characterising this industry, especially quick product changes and short product life cycles, the customer value dimension of incremental innovation has relevance among the expectations. Quick model changes result in frequent and often significant changes in the specification of the supplied parts. The supplier has therefore to be able to respond to these changes appropriately. This requires the ability to develop the new specification of the supplied part and to adjust supplier's technology and production processes accordingly.

"We talk about independent product development when product development is in the scope of the supplier's responsibilities" – claimed a manager at Company 4. "In our case this is not true." In the case of Company 4, the customer was responsible for the product development. "The Customer is changing specification, while the supplier is responsible for adapting the specification of its sub product and its production line to the changes triggered by the customer. Adaptation includes also the adjustment of tools, materials, capacity etc." The manager of this company described the core of adaptation competence.

A supplier with network competence has to be able to correspond to the above mentioned customer expectations plus the resource access value dimension. Resource access

dimension means that the customer expects the supplier to efficiently manage the complete supply network of the supplied product, and to take over all relevant responsibilities and activities (tasks) associated with this supplier network management from the customer. Suppliers can meet this customer value dimension only through further improvement of their product development capabilities, and this inevitably requires the conscious establishment of the sub-capability of supply base development. A supplier, willing to capitalise on network competence, must have sufficient level of knowledge concerning the product, technology and supplier market, which allows effective management of its own supplier base. This certainly needs further strengthening of its product development capability too. This means that, apart from its already existing sub-capability (the breaking down of specifications to the level of parts), the supplier will have to take an active, even pro-active, part in collaborative product development with their suppliers.

> An interviewee at Company 7 summarised network competence as follows: “As an integrator, Company 7 has a circle of Hungarian small enterprises around it.” ...”We obtain the units from them. And then we are the ones in direct contact with the customers, multinational companies, we are the ones who are able to handle this problem - the problem of supply management - at organisational level.”

Companies with innovation competence – as a response to the appearance of a new value dimension: the strategic innovation dimension – have to further develop their technological and product development capabilities. The value dimension of strategic innovation covers the customer expectation which requires the supplier to work out proposals for strategic innovations regarding the product and the applied technology,

based on its own experience and knowledge, thus dramatically enhancing its customer's competitiveness.

Although in the course of the research we met supplier companies who were making efforts to develop their own specifications for particular – and usually already existing – catalogue products, none of them had been successful by the time of the interviews. Nevertheless, many suppliers have recognised and emphasized the importance of independent product development competence. The following conversation is from an interview at Company 5:

> "In my opinion, the biggest problem in Hungary today is that there are hardly any own products which really meet market demands." ... "I think this is the next step for us, as we are very good at manufacturing and are able to adapt." – interviewee.
>
> "Can it also be applied to car manufacturing?" – questioner.
>
> "Yes. I think it should be a goal." – interviewee.

Table 5 describes the different competences of the automotive supplier firms analysed during the research program. It summarizes the different aligned customer value dimensions and capabilities, sub-capabilities. Please, note, that the order of presentation of the different competences – starting from the second line of the table (capacity competence) to the last one (innovation competence) – follows the typical competence development path a supplier firm goes through. In case of all competences Table 5 therefore lists only those value dimension(s) and capabilities which are new, compared to the lower level competences.

Table 5 – The internal structure of the different competences

Competences	**Relevant customer value dimensions**	**Capabilities necessary**	**Sub-capabilities necessary**
Capacity	Price, Conformance quality, Volume, Expected service level, Stability, Reliability	Production	Process management; Production planning; Production management; Maintenance; Quality management
		Technological	Application of the technology;
Adaptation	Incremental innovation	Technological	Manufacturing process development; Technology development;
		Product development	Break down customer specification for supplier's own product specification;
Product	Scout dimension	Supply	Selection of Suppliers; Supplier management;
Network	Resource access	Supply	Development of suppliers;
		Product development	Product development with partners;
Innovation	Strategic innovation	Technological	Technological innovation;
		Product development	Own specification 1: Development of products listed in the supplier catalogue; Own specification 2: Development of new catalogue product

On the basis of the competence portfolios of the studied companies, one can conclude that every supplier company in the sample is holding capacity and adaptation competences. In the cases of small and medium-sized companies, product competence is also frequently necessary, while some of the companies are in the possession of network competence too. Unfortunately there is a lack of innovation competence at suppliers involved in the study. On the other hand - as mentioned above- many companies have already realised the importance of this issue, and are making efforts to develop this distinguishing competence (Table 6)

Table 6 – Competence portfolio of suppliers in the research

Competences / **Companies**	***Capacity competence***	***Product competence***	***Adaptation competence***	***Network competence***	***Innovation competence ****
Company 1	+	-	+	-	-
Company 2	+	-	+	-	-
Company 3	+	+	+	-	-
Company 4	+	+	+	-	-
Company 5	+	+	+	-	-
Company 6	+	+	+	-	-
Company 7	+	+	+	+	→
Company 8	+	+	+	+	→
Company 9	+	+	+	+	→
Company 10	+	+	+	+	-

** Interpretation of the symbols: (1) The company possesses the given competence +; (2) The company does not possess the given competence: - (3) The development of the given competence is in progress: →*

6. Conclusion

The aim of the paper was to develop a competence-based taxonomy of supplier firms in the automotive industry. A theoretical model was developed in order to combine (associate) two closely linked, still different sides of firm competitiveness: customer value dimensions and the supplier firm capabilities needed in order to be able to create these value dimensions. This model made it necessary to combine two theoretical areas, the resource based theory and the customer value approach. The combination of these two approaches made it possible to interpret and define the concept of competence as complex groups of customer value dimensions and their aligned capabilities (and sub-

capabilities), which resulted product and service packages that are considered by the customer as coherent, acceptable and assessable.

As described in section 3 of this paper, the model made it possible to clear conceptual inaccuracy concerning basic terms of the research-based theory, especially as far as the term of competence and capability is concerned. Using terms more precise and unambiguous makes a deeper understanding of the researched economic phenomena possible.

An empirical research was conducted in order to develop competence-based taxonomy of suppliers. 21 managers of 10 different supplier firms active in the Hungarian automotive supplier chains were interviewed. The research findings revealed that the interpretation of competence, in the way proposed by the article, is useful for an in depth description of the analysed suppliers. Different taxonomies of automotive supplier firms have already been developed, the one presented in this article is partly confirms them, partly complementary in nature.

A taxonomy of automotive supplier firms, closely related to the one proposed here, was developed by Simon (1989 and Haffmans and van Weele (2003). Simon (1989) sorted suppliers into two groups: capacity (process)-based and product-based suppliers. The distinctive feature of capacity-based suppliers is that they trade their capacity, while the specification and parameters of the product (and often the manufacturing process as well) is provided by the customer. In Simon's interpretation a company should be taken as a product-based supplier if it develops the specifications of the products provided in house.

Haffmans and Weele (2003) accept Simon's categories but add a third one to it. They argue that the cause of the emergence of this new category was a boom in outsourcing. This boom led to an increase in the number of suppliers. Therefore it is now more and more difficult for the customer to keep contact with the growing number of suppliers, so

it strengthens its relationship with certain suppliers who will serve as a link between the customer and second or third tier suppliers. This supplier coordinates relevant groups of suppliers, thus easing the burden of communication on the car manufacturer, the customer. The distinctive feature of this supplier type is that it practically sells its business relations and the capability of its effective relationship management on the market. The authors refer to these companies as module or system-based suppliers.

Capacity based suppliers in the Haffmans and van Wheele taxonomy are identical with the suppliers described in this paper as of capacity competence; product based suppliers match with the suppliers with product competence; and finally module or system based suppliers are analogous with suppliers owning network competence. While confirming the existence of the previous supplier types, the suggested interpretation of competence made it possible to give their more throughout description, and on the other hand it revealed the existence of additional competence (as adaptation and innovation competence) types.

Understanding the internal structure of customer value, its different dimensions and the necessary capabilities has crucial role in enhancing firm competitiveness in general and in the automotive industry in particular. Without clear overview of potential and relevant customer value dimensions none of the supplier firms can be able to determine sources of their competitiveness. Lacking information about necessary capabilities also can hinder their development. As one of our interviewees pointed out in the final phase of the research, the presented competence-based taxonomy and the associated potential developmental path provide an opportunity for companies to implement a special kind of benchmarking and formulate established development strategies.

Appendix: Interview outline

Basic company and product information:

Size of the company, owners and ownership structure, circumstances of firm establishment, products and their main characteristics, the extent and speed of changes in their environment;

Industry structure and characteristics:

What drives the industry?

What direction the industry is developing towards? Which of these directions influence the operation of the company?

What speed are the changes taking place within the industry? What are the reasons of the changes?

Which players induce these changes? (Who influences companies to develop and change to a certain direction? Please give specific examples of the changes taking place!

Customer expectations/value dimensions:

Who are your main customers?

What are the expectations of your main customers in the automotive industry?

Along what aspects is your firm evaluated by the customer?

Which of these aspects are evaluated formally (in written form)?

Are there any evaluating factors, which are not part of the formal evaluation process, but you still feel important?

Have you experienced major changes in the customer expectations? What adaption they have demanded from your company? Please give examples!

Do you think such changes in customer expectations will occur in the near future? Why do you think it will (or will not) happen?

Capabilities:

Have you changed the way of operation in the company due to changes in customer expectation or other changes in the environment? How did this take place and why?

What is the most important issue your company has to do well in order to stay in the automotive supply chain?

In what respect and how your company has to be developed in order to stay competitive in the future and keep your customers (or even get new ones)?

Please give examples of your failures! What has to be done in a different way not to loose a customer? Did you learn from your failure? What?

What direction of further development do you see in the industry relevant for your company?

To what extent the product to produce is changing? Who triggers and who is responsible for these changes?

To what extent your company carries out product development activities?

What other development activities do you have in your company?

How many suppliers do you have? How do you deal with them? (Contact keeping, level of coordination and common problem solving, way of supplier selection and evaluation process)

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