



CHALMERS

Building a Competitive Central European Supplier Base

A Case Study within the Carbon Steel Sheet Forming Segment at IKEA of Sweden

Master of Science Thesis

in the Management and Economics of Innovation Programme

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Master's Thesis E 2014: 090

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Chalmers Reproservice
Göteborg, Sweden 2014

Abstract

IKEA has a vision of doubling global revenues from 29 BEUR to ~50 BEUR from 2014 to 2020. There are two ways of changing the supply chain of products; make the chain longer or make the chain shorter. The rationale for making the chain longer is to decrease total cost by lowering the cost of production. This has been the historical logic for IKEA's carbon steel sheet products, which are mainly sourced from China in 2014. Given a stable future European market, converging labour costs globally and a Chinese inability to decrease green house gas emissions in a seven to eight years' horizon, this thesis flip the logic by assessing how to make the chain significantly shorter.

The purpose is to describe how to develop a Central European competitive supplier base of carbon steel sheet products, driving purchasing volume from the current 6 MEUR to 30 MEUR from 2014 to 2020. Four research questions are used to fulfil that purpose. Firstly, which countries are competitive in Central Europe for the supplier base to be located in? Secondly, given competitive countries, which regional clusters within these countries are the most competitive ones? Thirdly, given competitive countries and clusters, which players within these have the potential to form the future carbon steel sheet forming supplier base in Central Europe? Fourthly, how is the supplier integrated in new product development and what can be learned from theory for future competitiveness? The first and second question draws upon Porter's Diamond Model (1990), the third draws upon the resource-based view of the firm (Barney, 1991; Wernerfelt, 1984), and the fourth draws upon knowledge and supplier integration theory (Berggren et al 2011; Rosell, 2013). The research is a case study, with a mix of qualitative and quantitative methods.

Results and analysis show that Czech Republic, Poland and Slovakia are competitive countries with Ostrava (CZ), Katowice (PL) and Kosice (SK) as three key examples of strong clusters. In general, IKEA adds value in the customers' living room, when the customer assembles the products. Thus, players that are process focused and thus make money on high volume is more suitable than players that are used to add value by being product focused. Five automotive metal tier-2 suppliers (Tawesco, Essa, Klein & Blazek, Huhn Press and Clamason), process specialists within pressing, have potential to be part of the future supplier base by making cabinets¹ and pressing line products¹ while three food packaging players (CanPack, Massilly, Silgan), process specialists within cylindrical bodies with a bottom, have potential to be the other part of the future supplier base by making bin & box products¹. Required behavioural changes from IKEA's side are longer contracts, earlier supplier integration and a decreased supplier dependency on IKEA and instead learn from other co-customers.

There is a need for earlier supplier integration than the current status. There is consequently also a need to earlier find the optimal manufacturer of the product. This demands a supplier base with complementary knowledge towards IKEA. Some degree of overlapping knowledge is however also needed in order for both actors to be able to grasp and apply the transferred knowledge. Manufacturing limitations must be identified early when there is room for changes in design within the borders of customer requirements. The proposed next step is implementation of the above and initial discussions with recommended players.

¹ Key product group within the carbon steel sheet forming segment

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1 Introduction

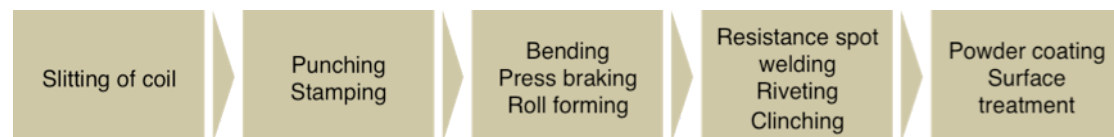
1.1 General background

IKEA has a vision of almost doubling global revenues from 29 BEUR to ~50 BEUR from 2014 to 2020, expanding from the current 340 sales warehouses globally to 530. Strategic decisions considering from where and from whom to source must be taken proactively towards 2020. To simplify, there are two ways of changing the supply chain of products; make the chain longer or make the chain shorter. The rationale for making the chain longer is to decrease total cost by lowering the cost of production. Historically, this logic has been translated into supply chain strategies of many global players. Current IKEA products in the carbon steel sheet forming segment are mainly sourced from China, which essentially is the result of above-mentioned logic; to make the chain longer and leverage low costs of factor inputs.

This thesis will flip this logic by assessing how to make the chain significantly shorter. The aim is to address the need of development of a competitive supplier base of carbon steel sheet forming products in Central Europe. There are three key reasons that drive this need. Firstly, sustainability is gaining attention on the strategic agenda of IKEA. Few supply chains have historically been constructed with sustainability as the objective function and China will not be able to decrease green house gas emissions on a seven to eight years horizon. The potential of creating a more sustainable future increases substantially by making the supply chain significantly shorter and in particular leveraging European Union's prior, current and future sustainability investments. Secondly, despite strong global growth the bulk of demand of carbon steel sheet products is projected to be retained in Europe by 2020, which implies a stable future European market. Thirdly, labour costs are converging globally on a long-term basis due to globalization, which erodes the historical competitive advantage of regions with low costs of factor inputs. Although, despite converging global labour costs and increased focus on sustainability on the strategic agenda, new ways of thinking about how to produce these products might be required when making the supply chain shorter.

IKEA finds better ways of improving the life of the many people at a high speed, with 20 % new products in the range every year. This significant speed of innovation, together with the strong growth vision and a need of making the supply chain short, put massive pressure on the future actors that will form the supplier base of carbon steel sheet forming products.

When generalizing, the IKEA products within the carbon steel sheet forming segment can be split into four groups; cabinets, bins and boxes, pressing line products and wall/ceiling brackets. These products share more or less the same production process steps.



Source: Internal documents, Interviews

Illustration 1.1.1 Typical carbon steel sheet forming production process steps³

When seeing these products from a process perspective rather than a product perspective, one realizes that it is not only home furnishing suppliers that are suitable for supplying home furnishing. Since IKEA delivers in flat packs and let the customer assemble the furniture, a potential cabinet supplier could obviously be a cabinet producer but it could definitely also be a producer of six metal parts that could be assembled to a cabinet (or possibly a car component). Thus, opportunities exist to leverage suppliers in other industries that process carbon steel sheet. To think in these new ways is critical to find new ways of producing these products in a competitive way in Central Europe. For instance, food cans are produced in a similar way as flower pots (bins and boxes) and pressed automotive components are produced in a similar way as pressed shoe shelves or parts for cabinets. There are five key criteria of the carbon steel sheet production process which are important capabilities of future players that will form the supplier base; automatic raw material feeding from coil or blanks, transfer/step tools or progressive tooling, automatic stamping/punching and

³ All forthcoming illustrations (including graphs, diagrams, tables, pictures etc) are the authors own, otherwise explicitly stated with "not the authors' own"

press brake line(s), possibly integrated resistance welding and an importance of tool maker/die set and maintenance.

1.2 Purpose and research questions

How can IKEA develop a competitive supplier base of carbon steel sheet forming products in Central Europe for long-term competitiveness, which drives purchasing volume from 6 MEUR to 30 MEUR from 2014 to 2020? This is the main purpose, which is further broken down into four questions. The logic behind is to do four analyses top-down; assessing which countries that are competitive in Central Europe, assessing which clusters (within these countries) that are competitive, assessing which players (within these clusters and countries) that are competitive and fourthly, assessing how current suppliers are integrated in new product development and comparing and drawing insights from literature on supplier integration in new product development.

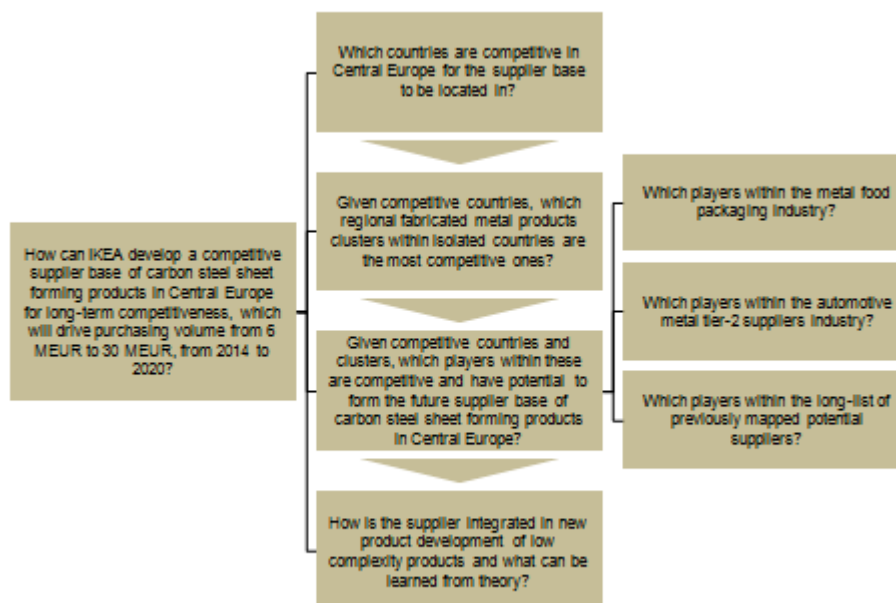


Illustration 1.2.1 Purpose and the sequential four research questions with sub-questions

Thus, this thesis spans over three levels of analysis: macro (country level), meso (industry clusters level) and micro (firm level). In more depth, the first is a comparative analysis of the competitiveness of Central European countries, with the purpose to isolate the countries that are suitable for the future supplier base to be

located in. The answer to the first question feeds into the second question, which is a comparative analysis of industry dynamics of regional clusters within previously isolated countries. The purpose is to isolate the industry clusters that are the most competitive ones. The first and second questions are structured with help of Porter's Diamond Model. The answers to these two questions feed into the third question, which is a player scan where players within potential supplying industries are assessed on competitiveness using the resource-based view of the firm. The key output is a set of competitive suppliers that have the best potential of forming the future supplier base of carbon steel sheet forming products in Central Europe towards and beyond 2020. The fourth question is a rather blank spot in the academic world and the purpose is to understand and assess how suppliers are integrated in the new product development process of low complexity products. Additionally, findings from theory and other industries are assessed on transferability to IKEA.

An interesting aspect of above-mentioned four research questions is how answers to these contribute firstly to research within the management and economics of innovation field and secondly to IKEA as a firm.

This thesis is one way of analysing how to make a supply chain shorter. The first and second research questions are in general adding a way of applying Porter's Diamond Model in a case study in a logical way where focus is put on the most important things. Scholars have previously mapped clusters in the new EU-29 countries and assessed competitiveness of clusters based on demographics (Sölvell et al, 2008). This thesis complements previous research with productivity, scale and labour costs of certain industry clusters in Central Europe. Thus, the way of structuring and conducting the analysis could be replicated in other industry clusters and therefore explains how to add valuable cluster research in the future. Furthermore, the third question is a way of applying the resource-based view of the firm when scanning players or mapping new potential suppliers. The answer to the fourth question, contributes to supplier integration in low-complexity product development research.

There are three contribution areas to IKEA as a firm. Firstly, the thesis combines the competitiveness of countries with the competitiveness and importance of clusters, which is a way of long-term thinking about supplier base location. Secondly, the

answer to the third question is a set of players that have the potential to form the future carbon steel sheet supplier base of which ~95 % of these players are new to the firm, which could be viewed as valuable to IKEA. Thirdly, the discussion and conclusion chapters are adding behavioural changes that are required from IKEA's side to approach above-mentioned players. This could open up room for discussions on new ways of working within sourcing in general, expectantly towards increased long-term competitiveness.

1.3 Delimitations and Definitions

The delimitations of this thesis could be split into six different types; geographical scope delimitation, product range delimitation, supply chain delimitation, delimitation of new potential supplying industries, organizational delimitation and conclusively implementation delimitation.

The geographical scope delimitation is Central Europe, which is defined as six countries; Poland, Czech Republic, Slovakia, Hungary, Austria and Italy. Since the strategic decision to develop a competitive supplier base in Central Europe is considered taken, these countries are not compared to other regions globally. However, there is one exception and that is comparative data on China, Bulgaria and Hungary; China since it is the main current sourcing country of carbon steel sheet forming products and Bulgaria and Romania to clarify what would happen if the supplier base was located one step east.



Source: Interviews with co-workers at Trading Area Central Europe

Illustration 1.3.1 The geographical scope set as Poland, Czech Republic, Slovakia, Hungary, Austria and Italy

The second delimitation considers the product range, in which ~15 % of the carbon steel sheet forming products account for ~70 % of the total purchasing volume. From this subset, eight proxy products that drive ~60 % of the total purchasing volume have been selected. These products (See *Table 1.3.1.*) are proxies for the total carbon steel sheet forming range and others are therefore neglected. Furthermore, the key product groups that are treated in this thesis are three out of four; cabinets, bin & box products and pressing line products and thus the Betydlig group is delimited. This delimitation is partly due to 80/20 thinking and partly due to that these products are good proxies for the general production process of products within the carbon steel sheet forming segment.

Table 1.3.1 Key product groups, annual quantities, share of annual purchasing volume

Key product groups	Reference items	Quantity 2014e	Share of purchasing volume 2014e
Cabinets group	Helmer, Erik	~1 M	25 %
Bin & Box group	Skurar, Socker pots & vase	~18,5 M	15 %
Pressing line group	Komplement shoe shelf, Algot Bracket	~8,5 M	10 %
Betydlig	Betydlig wall/ceiling bracket, Enudden	~18 M	10 %

Source: Internal MIS, Interviews with Category Leader, Category Leader Europe

Thirdly, the supply chain is delimited to the metal sheet/coil supplier as the starting actor and the internal logistics cluster as the end actor. There are therefore one actor and two types of transportations as the focal supply chain in this thesis; transportation of coil from the metal sheet/coil suppliers to the processing actors that transform metal sheet or coil to products (i.e. supplier) and thereafter the transportation of products from this processing actor to the logistics cluster within Central Europe. Further downstream the supply chain there are distribution actors, the sales warehouses and the customers. Irrespective of which country, cluster or player that will form the output of this thesis, i.e. the competitive supplier base, these carbon steel sheet products are distributed in the same way downstream after reaching the logistics clusters. Therefore, this delimitation does not have an impact on the answer on the research question. Similarly, analysis of the upstream supply chain further than the metal sheet/coil supplier is irrelevant, since these metal volumes account for a very small share of the total steel industry volume and therefore are far from impacting global market prices on hot-rolled or cold-rolled metal sheet/coil. The relevant part is the transportation between these metal suppliers and the processing supplier.

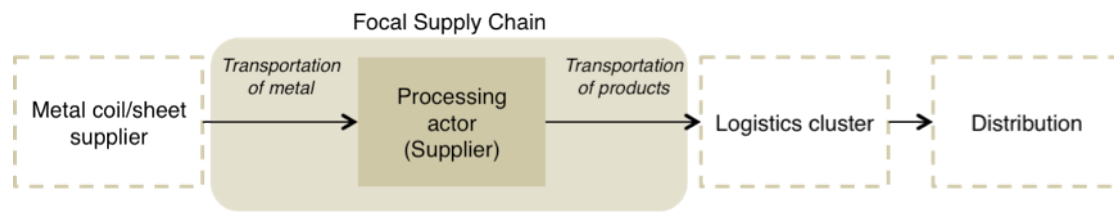
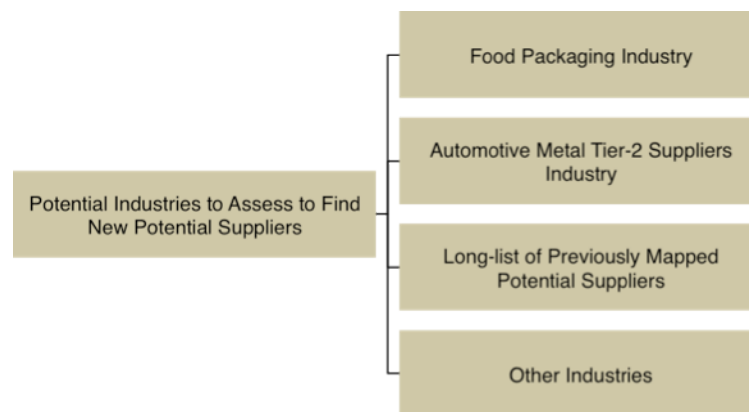


Illustration 1.3.2 Supply chain delimitation

When analysing the third question, i.e. finding new competitive players within certain industries that will form the future competitive supplier base, this thesis is delimited to taking two key industries into account. These industries are the automotive metal tier-2 supplier industry and the metal food packaging industry, and were broadly given as proposals from IKEA. These two industries share the above-mentioned key criteria of the carbon steel sheet forming production process more or less. Actors within these industries are playing in similar highly competitive environments and are focused on process improvements rather than on product differentiation. There could be players within other industries potential of becoming future IKEA suppliers, but players within above-mentioned industries are considered having more potential. Thus, other industries are delimited from this thesis.



Source: Interviews with Category Leader, Category Leader Europe, Trading Area Central Europe metal team

Illustration 1.3.3 Potential industries for supplying carbon steel sheet forming products

The thesis is conclusively delimited to four parts of the IKEA organization. On the purchasing & supply side, the research is done on IKEA of Sweden's carbon steel category in the carbon steel sheet forming segment. Logically, no other materials or

categories have been analysed. On the sales side, the research focuses on IKEA of Sweden's sourcing developers of the previously mentioned proxy products that account for the bulk of the purchasing volume of carbon steel sheet forming products. Thirdly, this research is done solely on Trading Area Central Europe headquartered in Prague, Czech Republic, which is one trading area out of nine globally. The trading areas have a competitive relationship to each other and their aim is to develop suppliers of their area. Discussions with other trading areas than Central Europe have in general been delimited, although communication with Trading Area South East Europe has existed to a small extent. Fourthly, experts within the logistics department and in particular with knowledge of logistic clusters in Central Europe have been interviewed to gain an understanding of how the logistics work from the Central European suppliers to the logistics clusters.

The implementation delimitation is worth mentioning, together with the fact that the authors are students. A potential fifth research question would have answered how the implementation went. Moreover, an answer to a fifth research question would have been specifying best practices and pitfalls of writing contracts, entering relationships and running the first months with new partners. Since the authors are students and have in different ways mentioned that when contacting new potential suppliers, there has been a total absence of interest from these players point-of-view in answering questions, discussing or inviting for initial meetings.

2 Theoretical framework

The purpose of this chapter is to match the four research questions with suitable theories. The first two questions, aiming at isolating competitive countries and regional clusters for the supplier base to be located in, are chosen to be answered by Porter's diamond model. Local demand conditions, one of four aspects in the Diamond Model, is not considered due to two reasons; firstly, since these industry clusters in Central Europe are competing globally with most customers located in Western Europe and secondly, since other aspects of the diamond model is significantly more relevant. Above-mentioned theory is described in the first sub-chapter, 2.1., Competitiveness of Regions. The third question, aiming at answering which specific players in certain industries that are future competitive suppliers of carbon steel sheet forming products, is treated through the resource-based view of the firm. There are certain capabilities and resources that are more crucial than others for a player to become a competitive IKEA supplier. Those characteristics are analysed to isolate which players that have more potential than others to become a part of the future supplier base. Above-mentioned theory is described in the sub-chapter 2.2., Competitiveness of Firms. The fourth question, aiming at describing supplier integration in the new product development process and learning from other industries, is treated through theories on knowledge integration in the new product development process. These theories are described in the two sub-chapters 2.3 Knowledge Integration and 2.4 Supplier Integration.

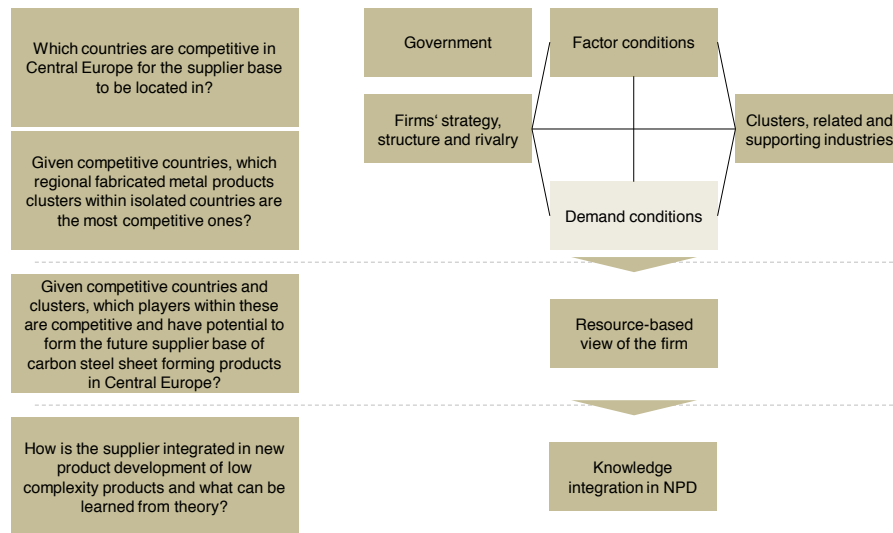


Illustration 2.1 Theoretical framework in relation to the four research questions

2.1 Competitiveness of regions

Porter's diamond model (Porter, 1990) clarifies the meaning of competitiveness at the regional or country level by describing that countries, similar to firms, compete for their share of the world market. The model describes that the competitive advantage of a country is influenced by four determinants; factor conditions, demand conditions, related and supporting industries, and firm strategy, structure and rivalry. These four determinants are by Porter viewed as an interactive system where the relationships between these factors explain competitiveness on a country-level.

Factor conditions as the first determinant (Porter, 1990), is divided into four broad categories: human resources, physical resources, capital resources and infrastructure. These four factor conditions are further segmented into basic and advanced factors that either could be specialized or general. Basic factors are, for instance, natural resources and less-qualified human capital while advanced factors are, for instance, high-qualified human capital, research facilities, and technological and management competencies. To form the basis for sustainable competitive advantage, countries must create and upgrade advanced factors to specialized factors, either through

investments or innovation or possibly both, since these factors are regarded as hard to imitate or transfer to other regions.

Demand conditions, as the second determinant, are enhancing the competitiveness of a country by their buying sophistication (Porter, 1990). Porter stresses that firms perceive, interpret and respond to wants and needs of regional customers and thus innovate and aim for a new competitive position in the region. For instance, a new competitive position could be higher productivity or increased economies of scale in production. The differences between wants and needs of regional customers, explain the relative international competitiveness of firms of different regions.

The third determinant is related and supporting industries (Porter, 1990). The existence of external economies intensifies specialization and therefore drives the emergence of clusters. "Clusters are geographic concentrations of interconnected companies and institutions in a particular field." (Porter, p.78, 1998) There are three ways in which clusters affect competition. Firstly, clusters increase productivity of regions. Secondly, clusters drive innovations in a certain way that sets the direction of future productivity. Thirdly, it creates incentives for new entrants in the cluster. Knowledge sharing, relationships, motivation, innovation and technology spillover within regional clusters explain the competitiveness of a country Porter (1998). stresses that cluster development should be among the key competitive priorities of countries. Clusters promote competition together with cooperation, where the two can coexist.

Porter implicitly disregards governments as a determinant. Rather, Porter views the governments as an external factor driving change in the four determinants, by regulations and incentives (Porter, 1990). Beinhocker (2006) stresses that we may not be able to predict or direct economic evolution. Conversely, we can design our institutions and societies to be better or worse evolvers (Beinhocker, 2006:324). Beinhocker gives a comparable view of the state as an institution. The purpose of the state is to strike an effective balance between cooperation and competition, support the economic evolution of markets and shape the economic fitness function that best serve the needs of society (Beinhocker, 2006:211).

In a world with scarcity of resources, there are competitive pressures to cooperate. (Beinhocker, 2006:266) “Societies that are better able to organize themselves will socially, economically, and militarily dominate societies that are less successful at creating cooperative structures.” (Beinhocker, 2006:266) Thus, it is the competition to cooperate that drives social innovation (Beinhocker, 2006).

2.2 Competitiveness of firms

The resource-based view (Barney, 1991) focuses on the firm rather than the industry when explaining competitive heterogeneity, where resource heterogeneity and immobility is assumed to explain the difference in competitiveness of firms within the same industry. Penrose (1959) defined resources as “...productive services available from management with experience within the firm” (p.5). Barney and Hoskisson (1989) argue that most industries are characterized by some heterogeneity and immobility (Barney, 1991).

Table 2.2.1 Resources characteristics and implication on competitiveness

Valuable	Rare	Imperfectly imitable	Non-susbtitutable	Implication on competitiveness
No	-	-	-	Disadvantage
Yes	No	-	-	Parity
Yes	Yes	No	-	Temporary advantage
Yes	Yes	Yes	No	Temporary advantage
Yes	Yes	Yes	Yes	Sustainable advantage

Source: Barney (1991), not the authors' own

Four factors determine whether firms' resources hold the potential of sustained competitive advantages (Barney, 1991). Firstly, the resource should be valuable. Valuable resources are resources that enable firms to enhance efficiency, effectiveness or possibly both. The environmental opportunities and threats of firms help identifying and isolating valuable resources.

Secondly, the resource of a firm must be rare in the competitive environment. When firms possess the same resources, which may be physical capital, human capital, organizational capital and managerial competencies, the firms are therefore implementing one common strategy that gives no advantage. Thus, it is crucial to separate competitive parity and competitive advantage, where the first implies that the same strategy among firms is implemented with the same valuable resources and the latter implies that one firm possess rare resources that enable that particular firm to create a competitive advantage. Notably, McKelvey (1980) and Porter (1980) argue that competitive parity increases firms' probability of survival in the industry (Barney, 1991).

Firms with valuable and rare resources may possess a temporary competitive advantage by being first mover (Barney, 1991). Although for the competitive advantage to be sustainable, firms' resources must be imperfectly imitable which is the third factor. Imperfect imitability has three underlying reasons. The first reason is unique historical conditions of the firm, where a unique historical path can enable the creation of valuable and rare resources that are not transferrable to other competitors. The second reason is a causal ambiguous relationship between the firm and the competitive advantage of that particular firm, where this relationship is by the firm not understood or improperly understood. Thus, imitation by other industry players is difficult. Dierickx and Cool (1989) argue that the third reason to imperfect imitability is social complexity (Barney, 1991). For instance, inter-organizational relationships, culture and reputation among customers and suppliers of the firm may enable a sustainable competitive advantage.

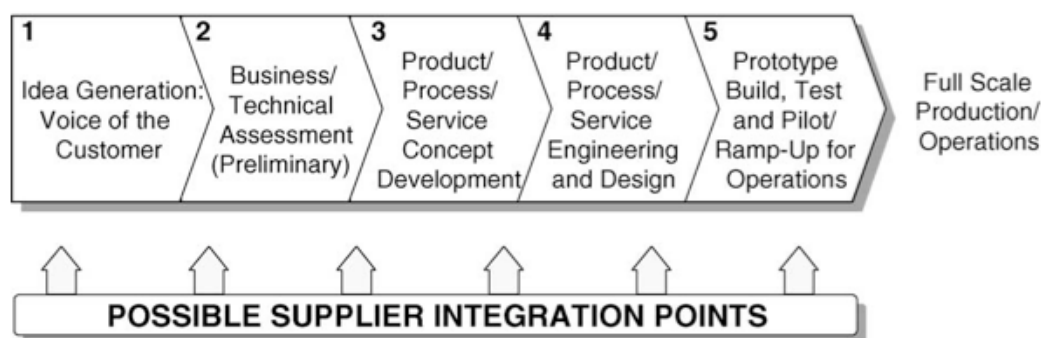
As a fourth factor, the resource should not be substitutable with resources that are valuable but neither rare nor imperfectly imitable (Barney, 1991). The substitutability could be done in two ways. Firstly, firms that not possess the valuable, rare and imperfectly imitable resource may use a substitute resource, which is neither rare nor imperfect imitable, and thus leverage from using the same substitute resource and therefore enhance their competitive position. Barney and Tyler (1990) argue that competitors could try replicating the leading firm's top management, but instead succeed to create a new unique management team, not necessarily equivalent, but with similar strategic thinking (Barney, 1991).

While Barney (1991) relates the characteristics of resources to sustainable competitive advantage, Wernerfelt (1984) views attractive resources as resources that enable the firm to build resource position barriers. Wernerfelt (1984) mentions four resource position barriers that could ultimately be the source of sustainable competitive advantage. Firstly, machine capacity translates entry barriers to resource position barriers, since new entrants would generate excess capacity which causes severe competition and decreased profitability. Customer loyalty, as the second resource position barrier, can create an advantage for early buyers in access to raw materials for instance. Thirdly, Boston Consulting Group (1972) states that production experience enables incumbent firms to create an advantage over less experienced firms that start at higher cost (Wernerfelt, 1984). Although, Wernerfelt (1984) stresses that experience leakage erases this barrier, which is applicable for production systems. As the fourth resource position barrier, technology leaders can use current advantage to invest in more research and development and thus enhance the advantage.

2.3 Knowledge Integration

The aim of this section is to provide a theoretical understanding of the concept of knowledge integration with focus on supplier's contribution to product development and the incentive for integrating knowledge in a buyer-supplier relationship.

The new product development process referred to in this study is the one of Handfield et al (1999) which is divided into 5 major steps. Every step of the process indicates a potential integration point for the supplier.



Source: Handfield et al (1999), not the authors' own

Illustration 2.3.1 New product development process

Literature shows several different definitions of the concept of knowledge integration. This thesis will use the definition of Grant (1996) and Postrel (2002), where they define it as the combination of specialized, differentiated, but complementary knowledge (Tell, 2011). In contrast to other definitions this aims to show that knowledge integration is also a process for creating new knowledge. Integration is therefore accomplished only when knowledge is transferred, shared and applied. As a result, integration must be inclusive of all three sub-processes and cannot be considered equivalent to knowledge transfer alone or knowledge sharing by itself for example (Berggren et al, 2011).

The main inputs to knowledge integration process is the existing knowledge base together with the goals or intended outcomes, which tend to come from both internal and external specialist sources (Berggren et al, 2011). Berggren et al (2011) further emphasizes that the process may vary in several ways and occur over extended periods of time. The number and type of actors involved and the type of collaboration are also often-occurred differences (Rosell, 2013).

Alavi and Tiwana (2002) and Nonaka (1994) state that knowledge integration is not just about accessing and sharing knowledge but also about application and specifically about the creation of new knowledge. Grant and Baden-Fuller (2004) further express that when combining or recombining elements from different knowledge bases, external knowledge might be needed. Knowledge intensive new product development processes hence implies specialization and application of many types of knowledge. As it is not likely that all knowledge necessary resides in one single firm, innovation may primarily be achieved through inter-organizational collaboration (Rosell, 2013).

2.4 Supplier Integration

Due to shrinking product life cycles, increasing global competition and firms acquiring more specialized skills, suppliers have become more important source of knowledge. LaBahn and Krapfel (2000) has associated an early supplier involvement in new product development with quicker product developments, reduced development costs, greater technological improvements and enhanced product quality (Walter, 2003). Hartley (1997) and Liker et al. (1996) further state that an effective

supplier involvement in new product development can decrease the complexity of the development process and enables the avoidance of problems that arise due to ignoring technological and manufacturing capabilities and constraints (Walter, 2003). However, effective supplier relationships do not just exist or emerge. Walter further emphasizes that supplier involvement highly depends on trust and commitment of the supplier as well as the ability of the buyer to grasp and utilize the knowledge. Drawing on more general strategic relationship and partnership theories one can conclude that knowledge integration from the supplier point of view is incentivized by mutual trust, shared risk and shared rewards or benefits which results in a business performance greater than what would be achieved by two firms working together in the absence of partnership (Wagner, 2013).

According Walter (2003) close collaborations provide the prerequisites for building trust, mutual understanding, and commitment from the supplier. This seems to work in the other direction as well. A high degree of trust helps supplier collaboration and inter-organizational creativity. However, according to Bhandar et al. (2006), the role of trust within new product development collaborations is depending upon the specific situation. The role played by trust depends on the task and general role of the supplier and customer (Rosell, 2013).

External collaborations furthermore require specific internal competencies and knowledge integration capabilities (Berggren et al. 2011). Cohen and Levinthal (1990) and Takeishi (2002) confirm that there is a need for some degree of similar knowledge to absorb the external knowledge (Rosell, 2013). Tsai (2009) further defines the concept of absorptive capacity as a capability to use existing internal knowledge for assimilating and utilizing external knowledge. The high-tech industry, with a relatively large degree of R&D investments, tends to have a higher absorptive capacity than the low-tech industry (Rosell, 2013).

3 Method

This chapter handles the research design and the methods used to answer the previously stipulated research questions.

3.1 Research Design

This report is a product of a case study at IKEA. The case study is most accurately described as a typical case study, where the researcher explores a phenomenon by exemplifying with an organization (Bryman & Bell, 2011). The nature of the study is to combine both qualitative and quantitative methods as well as induce theory concerning competitiveness of regions and firms as well as knowledge and supplier integration.

The mixed method approach by using both qualitative and quantitative data was used to provide a better understanding of the research problem than had any of the methods been used alone. The mixed method furthermore enabled the authors to triangulate and approach the problem from different vantage points to achieve a greater validity of the research (Bryman & Bell, 2011).

The scope given by the focal company was initially wide. Therefore the process of this master's thesis has been a stepwise approach since that enables coming closer to the actual problem. This stepwise approach means that the project can be divided into two main phases, which is then divided into sub-phases. The first phase mainly focused on understanding the values and way-of-working within the focal company and was of qualitative nature. This assisted in narrowing the scope down and more clearly defining the problem at hand. It hence served as the underlying input for the first steps in the following phase when identifying key variables for analysis when defining a competitive supplier base in Central East Europe. The second phase therefore mainly consisted of collecting quantitative secondary data and continual data analysis. Alongside Phase 2 a literature study was conducted.

Table 3.1.1 Phases in the master's thesis

Phase 1 - Problem definition and grasping current status		
Phase	Description	Methods used
P1.1	Understanding the values of IKEA	Semi-structured interviews
P1.2	Understanding the way-of-working at IOS	Semi-structured interviews
P1.3	Understanding the way-of-working at TACE	Participant observation
P1.4	Supplier visits	Semi-structured interviews
Phase 2 – Finding and analyzing drivers for change		
P2.1	Identifying key variables for analysis	Secondary data
P2.2	Identifying best practices and drivers for change from external industries	Secondary data
P2.3	Assessing knowledge and supplier integration	Semi-structured interviews

3.2 Phase 1 – Problem Definition and Grasping Current Status

3.2.1 Understanding the values of IKEA

IKEA is a huge organization and in many cases a unique one. Even though the authors of this thesis were highly familiar with IKEA as a company, their values and their way-of-working was to a large extent unfamiliar. Their vision to “create a better everyday life for the many” is something that affects their entire value-chain and the day-to-day work of their co-worker. It was therefore important for both parties, the authors and IKEA, that a great understanding was achieved before going further with the project. Therefore the initial phase focused on reading through training material for new IKEA personnel and grasping the values of IKEA. Furthermore, focus was put on grasping IKEA’s 2020 vision and understanding why it may call for a new strategy concerning their global supplier base. This information was primarily gathered from discussions with the tutor/metal material leader.

3.2.2 Understanding the way-of-working at IOS, Älmhult

The second sub-phase mainly focused on reading up on and understanding the focal segments, carbon steel, current supplier capacity problems and what challenges that was expected in the future due to expected increased overall demand of carbon steel products. The majority of the information was collected from semi-structured interviews with internal stakeholders, the material leader and the category leaders for the segment.

Moreover, interviews were conducted with a business analyst and a process leader in order to get further in-depth knowledge of how similar projects are internally conducted. These interviews also led to a better understanding of what factors that could be relevant for analysis of RQ1 further on in the project and also what stakeholders that could be addressed with certain topics.

3.2.3 Understanding the way-of-working at TACE, Prague

The next sub-phase was carried out at IKEA's central European trading office in Prague during one month. This phase aimed to gain an understanding of the daily work between IKEA and their suppliers. Data was gathered both through participant observation of the daily work of the trading areas business developers as well through open interviews. This gave the authors a good insight of problems experienced by the business developers on daily basis. The business developers also had knowledge about the different regions and clusters within the trading area, which further on assisted in identifying the variables for analysis in RQ1, RQ2 and RQ3. During this phase the authors had a great opportunity to conduct continuous interviews with trading area personnel from different areas of expertise. This enabled a fast response rate to any upcoming uncertainties. Especially the easy access to technician's knowledge was essential when identifying what products within the segment that had similar production steps. Together with access to internal sales data made it possible to identify volume driving product groups.

3.2.4 Supplier visits

Simultaneous to the work in Prague, a number of suppliers were visited together with IKEA personnel. The aim of this was for the authors to get a general picture of the current status of the supplier base and to compare the differences of higher performing suppliers towards lower performing ones. It also served as a good insight

for the authors of the different production steps when producing IKEA furniture within the steel sheet forming segment. This is something that was unfamiliar for the author's prior the supplier visits. Apart from the factory visits five interviews were conducted with supplier key personnel in order to get an understanding of the relationship between IKEA and its suppliers, this was an essential step for finding key issues for further research of RQ4.

3.3 Phase 2 – Summing up Relevant Variables for Analysis

3.3.1 Identifying key variables for analysis

Phase 1 enabled the authors to more clearly define the problem at hand and gave a rich understanding of the needs from IKEA's point-of-view in accordance with what the authors found most significant to be analysed. This served as the main input to identify what variables that needed to be analysed when initially answering which countries that are competitive in Central Europe for the carbon steel sheet forming supplier base.

Answering the first research question enabled the authors to further narrow down the competitive countries into competitive regions and clusters which in its turn enabled to further narrow down into individual players.

The main source of data in this phase was of quantitative nature. Secondary data was collected and combined from various sources. This allowed the authors to also gather historical data and analyse the competitiveness of regions not only at a single point in time. Forecasted data was also used to a great extent to add a future perspective towards 2020.

3.3.2 Identifying best practices and drivers for change from other industries

This phase aimed to put IKEA in perspective to other industries having similar production steps for their products. The chosen industries were, as mentioned above, automotive sub-suppliers and the food packaging industry, mainly tin-can producers. This study was conducted using a combination of secondary data, both qualitative and quantitative, and semi-structured interviews with IKEA personnel with previous experience from these industries.

3.3.3 Assessment of supplier integration of low complexity products

The goal of the final phase was to assess the current level of knowledge and supplier integration in new product development at IKEA, RQ4. This study was primarily based on literature, which enabled the authors to add a comparative dimension to the findings. Data was collected through semi-structured interviews with sourcing developers within the focal segment as sample base.

3.4 Research Methods

Data was collected using three main methods. In order to answer RQ1, RQ2 and RQ3 data was collected using participant observation, interviews and secondary qualitative and quantitative data both internal and external. To answer RQ4 semi-structured interviews were used to identify the current status, which was then compared to relevant literature.

3.4.1 Participant observation

As stated in Phase 1.3, the authors of this thesis were during one month at IKEA's trading office in Prague participants-as-observers. This implies that the authors were integrated in a setting but other members were aware of the role of the researcher. The ethical issue is, compared to a complete participant, not as high however the observed members could be more hesitant and bias in the shared data. Since IKEA has competing trading areas it could have been in the interest of the members in the setting to tweak some of the data in order to pose TACE as more lucrative than other areas. However, it allowed the authors to get fast and continuous feedback on any uncertainties that arose. Furthermore, the authors' goal was to put a minimal amount of his or hers own bias on the data collected when using this method (Bryman and Bell, 2011).

As with every method, participant observation has a number of strengths and weaknesses. In general it can be considered an open and flexible method, which captures deep and rich information, and where the researcher dynamically can change and alter the approach. The data collected was from the primary source hence the validity of the method can be considered high and corresponds to the real world where implicit characteristics of the setting also were captured. On the downside this method was very time-consuming (Bryman and Bell, 2011).

3.4.2 Interviews

Interviews conducted during this study were mainly of open and semi-structured nature. During the open interviews the authors used a loose interview guide with predefined wide topics for discussion with the interviewee. The order of questions and phrasing was not absolute and varied between and within interviews. This made the method more flexible and the authors were able to alter or shift focus along the interview. It also enabled the possibility to follow up or engage in topics that arose in the interview, which made it easier to grasp the concept of what the subject really meant and allowed him or her to clarify using examples. This furthermore improved the validity of the interviews (Bryman and Bell, 2011).

Compared to the open interviews' wide topics, the authors also conducted semi-structured interviews with more pre-defined questions where the phrasing of the questions was similar between interviews. This made the interview less flexible than the unstructured. However it created a greater comparability across different interviews. It furthermore made it easier to cover more topics over a similar time frame (Bryman and Bell, 2011).

The strength of both the unstructured and semi-structured interviews, compared to the participant observation was that they gave a greater coverage of the subject in terms of a greater variety of people and situations. It did however not give the same insight in the culture and reality of the given setting of the interviewee. In general it generated deeper and richer information and served as a good complement to both the participant observation and the quantitative methods also used in the project.

The interviews with current IKEA suppliers in Phase 1.4 were conducted together with IKEA personnel. This could to some extent have affected the answers of the interviewees, mainly on questions regarding the opinion of their relationship with IKEA. This was later taken in to account when the findings from these meeting were analysed.

3.4.3 Secondary data

Once the variables for analysis were set secondary data, both quantitative and qualitative, were the primary source of data for the authors. The sources used were from IKEA's internal documents/databases, official statistic, universities, research

organizations, consultancy firms and governmental reports. This type of data was useful since there were limitations in time and resources for collection. The secondary data was in most cases combined or complimented with primary data from previous interviews conducted by the authors to give a greater substance to the study. It also enabled an additional comparative element. As mentioned above the use of archival data is related to low costs and less effort from the researchers' point of view. However, the analysis of this data was more difficult since it, in some cases, was hard to see what's behind the numbers or information. On the other hand the data is considered to be of high quality since the authors aimed to only use data collected by professional research organizations or using internal statistics. In accordance with Bryman and Bell (2004) if the origin of the data can't be defined it's harder to assure the quality of the data.

Since the collection phase of the secondary data was less time consuming, more time was be put into analysing the data. The analysis or re-analysis of the data did however in some cases give new or additional insights and conclusions in respect to the initial purpose of the secondary data.

To gain an easier overview of the quantitative secondary data, the authors of this study has in some cases coded the data into scales from low to high. The relation to the underlying numbers will be explained in each chapter where data coding is used.

3.5 Sampling

The initial sample base consisted of contacts given by the supervisors at IKEA. When further questions arose from the semi-structured interviews with the initial contacts additional contacts were referred to by the interviewee. This snowballing approach was the main process of building the sample base for RQ1, 2 and 3. When addressing RQ4, the sample base was built from internal employee catalogues.

In the comparative study between IKEA and two external industries the sample was built partly from suggestions from IKEA. The comparability of the two industries, automotive and food packing was however evaluated by the authors of this report prior the more in-depth analysis of them.

The roles and the number of interviews held with stakeholders can be seen below.

Table 3.5.1 Interviewees and interview type

Interviewees	Interview Type
Business Developer	Face-to-face
Business Developer	Face-to-face
Business Developer	Face-to-face
Business Developer	Face-to-face
Business Development manager	Face-to-face
Business Development manager	Web-Meeting
Category Leader	Face-to-face
Category Leader	Face-to-face
Range and Category Leader	Face-to-face
Process Leader	Face-to-face
Business analytic	Face-to-face
Material Leader	Face-to-face
Sustainability Project Leader	Face-to-face
Logistic Leader	Face-to-face
Production Developer	Face-to-face
Sourcing Developer	Face-to-face
IKEA Technican	Face-to-face
IKEA Technican	Face-to-face
Supplier	Face-to-face
Supplier	Face-to-face
Supplier	Face-to-face
Supplier	Face-to-face

3.6 Methodology Discussion

The variety of methods and the size of the sample base used in this study could with respect to the given time frame be considered large. The main upside by this approach is a higher validity and reliability of the collected data, it is however more time consuming. The validity, which refers to whether the study really corresponds to the actual phenomenon were achieved through triangulation from different sources and methods for collecting data (Bryman and Bell, 2011). Worth mentioning is that the vast amount of interviews conducted from time to time gave redundant information. This is the point where the authors of this study stopped following up on one particular track and started focusing on another. This additionally ensures a higher validity of the study.

The specific outcome of this study is based on a large amount of secondary data collected in the later phases. The validity of this data could be questioned, but given the time frame; primary data was not possible to collect to answers the first two

research questions through a longitudinal study. To increase the validity when using secondary data the authors of this study solely used different qualitative sources that also were triangulated which is believed to generate the highest possible validity given the conditions.

4 Empirical Findings and Analysis

Empirical findings and analysis is brought together in one chapter since the research questions must be analysed sequentially: the key insights from a certain question are the input for understanding which empirical data that is necessary for answering the next. This chapter starts with the current situation, 6 MEUR in 2014, and is proceeding with four parts corresponding to each of the four research questions, bringing the authors to the countries, clusters, players and behavioural changes required to make it to 30 MEUR in 2020. The first two research questions are answered through more quantitative-intensive data analyses, while the second two rather are analysed with a mix of quantitative and qualitative analyses.

4.1 Empirical Findings on Current Sourcing 2014

This sub-chapter explains current sourcing: 6 MEUR in purchasing volume of carbon steel sheet forming products in 2014 in Central Europe. That is small when put in a global context: considerably less than 10 %. The 6 MEUR comes mostly from pressing line products (one of four key product groups in carbon steel sheet forming), manufactured by the key supplier located in Ostrava in Czech Republic. Thus, this sub-chapter is broken down in three parts: what the key supplier does in 2014, what it will do towards 2020 and what challenges it will face while doing that.

The 6 MEUR is ~15 % of the supplier's total revenues currently. To understand the other ~85 %, there is a need to lift the carbon steel sheet forming segment one level, to the carbon steel category in general. The ~85 % is where this key supplier is good, and consists to a large extent of chairs, another carbon steel segment. The input is although coil, where the key supplier states that "...we source from a range of different actors" (2014, Key supplier, April). The key capability is processing tubes rather than sheet forming. The supplier describes, "...we're a technology leader on tubes and roll forming" (2014, Key supplier, April). From an operations management perspective, the production plant is a functional layout with a set of different operations between the coil slitting and the powder coating (see production process specifically for carbon steel sheet forming in illustration 1.1.1.), organized in

functions/“machine islands” with inventory in-between, where flows converge in the end, i.e. packaging. There are two key reasons why such actor uses a functional layout; firstly flexibility and secondly utilization of downstream operations if upstream machines stop. Although, the quantity driver products is to a large extent automated in a one-piece flow.

When the authors walked around in the production plant, seeing, feeling, asking, there was a strong focus, from the key supplier’s side, on tubes and roll forming. In a lonely corner, there was a pressing machine that looked like a spaceship: coil as input, a product as output ready for powder coating and packaging. That was the main footprint of carbon steel sheet forming in Central Europe. The knowledge required to build this production process, was coming from IKEA’s side, a firm producing the pressing tool and the key supplier in collaboration.

This supplier has experience of being an automotive tier-2 supplier. The key differences between the automotive tier-1 system providers and IKEA as customers, is explained as “...more proactivity and certainty in the automotive industry. We receive drawings ~1 year ahead of production start, enabling product optimization” (2014, Key supplier, April) .The quantities are fixed to a larger extent and thus, the key supplier feel more certain. The downside could sometimes be excessive quality requirements. “Sometimes automotive customers are incredible when it comes to quality...hard to satisfy” (2014, Key supplier, April) .

Secondly, what the key supplier will do towards 2020 is “continue with process improvements, since we are a technology leader” (2014, Key supplier, April).Interestingly, that was the answer to a question on whether the supplier has new products and horizontal integration on the strategic agenda. The misinterpretation of that question is somehow an indication of a process specialist.

Thirdly, the key long-term challenge is the labor availability, where “we’ll have a challenge long-term in finding engineers since there are attractive jobs in the automotive industry” (2014, Key supplier, April). The Ostrava cluster has a tradition

of metal and metal products manufacturing, and the automotive industry is an attractive industry since people care about image (2014, Key supplier, April).

Given these empirical findings on these 6 MEUR in current sourcing, interesting questions arose. Is Czech Republic the best country to be in towards 2020 for the carbon steel sheet segment? Is Ostrava a good cluster towards 2020? Which players should drive the volume to 30 MEUR in 2020? These questions are covered in the forthcoming chapters, treating the four research questions.

4.2 Summary of Empirical Findings and Analysis of the Four Research Questions

The summary deals with four parts, each responding to one of the four sequential research questions. The key insight from the empirical findings and analysis of the first question is that Czech Republic, Poland, Hungary and Slovakia are believed to be more suitable for the supplier base to be located in than Austria and Italy. Factor conditions considered are raw material, labour, energy and transportation costs while aspects considered of firms' strategy, structure and rivalry are feasible scale of firms, productivity of firms and complexity of products.

Table 4.2.1 Summary of empirical findings and analysis of competitiveness of Central European countries

Factor	2011						2020 Projection					
	PL	CZ	SK	HU	AT	IT	PL	CZ	SK	HU	AT	IT
Raw material Costs	-	-	-	-	-	-	-	-	-	-	-	-
Labour costs	100	123	105	94	404	283	155	190	162	145	486	340
Energy Costs	100	104	129	126	116	188	-	-	-	-	-	-
Distance to market	Close	Close	Med	Med	Med	Med	Close	Close	Med	Med	Med	Med
Sustainability	Low-Med	Low-Med	Med	Med	High	High	Med	Med	Med	Med	High	High
Scale of firms	Med	Med	Med	Low-Med	High	Med-High	-	-	-	-	-	-
Productivity of firms	Med	Med	Med-High	Med	High	High	-	-	-	-	-	-
Complexity of products	Low	Low	Low	Low	High	Med	-	-	-	-	-	-

Source: See forthcoming sub-chapters

As an answer to the second research question, competitive regional clusters within the four feasible countries are clusters in Czech Republic (Prague, Brno, Ostrava), in south Poland (Katowice, Krakow, Wroclaw) and Kosice in Slovakia. This is due to that these clusters have comparatively a large number of employees and share of industry employment in the fabricated metal products manufacturing industry. These clusters are also supported by metal and automotive clusters close or within these local regions.

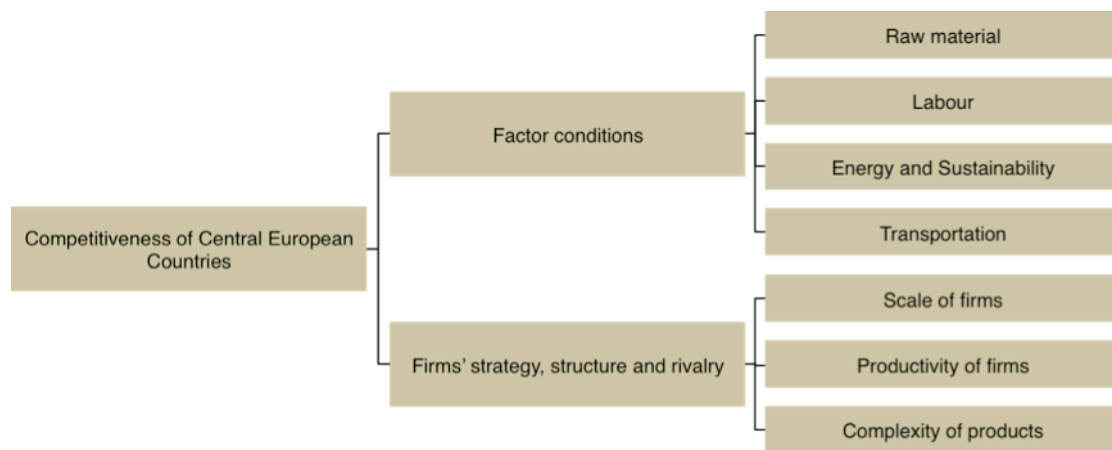
The third research question is treated in two parts; firstly what capabilities and resources that the authors are looking for, and secondly the actual player scanning based on the first part. To generalize what the authors are looking for, it is better with a player that makes money in the same way as IKEA does. The value added in IKEA's supply chain takes place in the living room of the customer, when the customer assembles products. Thus, upstream the value chain, the authors are not looking for players that are used to assemble products. Such players are believed to make money by high margins rather than high volume. The authors are rather looking for process specialists delivering components under competitive pressure in their current industries, in order to increase the potential of finding players with high strategic fit. Considering the third research question's second part, CanPack, Massilly and Silgan are competitive food packaging players while Klein & Blazek spol. S r.o., Tawesco, Essa, Huhn Press and Clamason are competitive automotive metal tier-2 players, suitable for being a part of the future supplier base of carbon steel sheet forming products in Central Europe. The previously mapped suppliers are believed to be product specialists rather than process specialists, thus not as suitable as the automotive metal tier-2 suppliers. The automotive metal tier-2 players above are potential suppliers due to that they are process focused, they meet the key criteria of carbon steel sheet forming production process and they are located in competitive countries and clusters. The food packaging players above are potential suppliers due to three key reasons; firstly since they have competitive pressure to diversify due to low European food can market share, secondly due to some flexibility in form

considering their current product range and thirdly due to location of plants in competitive countries and clusters.

The answer to the fourth research question is that above-mentioned process-focused suppliers should be integrated earlier in the new product development process, compared to current supplier integration. The strength of a process-focused supplier is in this case the knowledge of how to most efficiently refine metal sheets in to a specified product. Food packaging players are specialists within cylindrical bodies and a bottom and automotive metal tier-2 players are specialists within pressed components. In order to utilize these suppliers full potential, the most important aspect of the supplier integration is to transfer the degree of freedom of the product design, based on customer needs, to the supplier. The role of the supplier will then be to optimize the product based on their production reality/degree of freedom, within the borders of the customer needs. This is also essential when creating new knowledge and not merely transferring knowledge between the two actors.

4.3 Competitiveness of Central European Countries

The aim of this sub-chapter is to answer the first research question. This is done by analysing relevant aspects of competitiveness of Central European countries, in particular by assessing two of four aspects in Porter's Diamond Model (Porter, 1990); factor conditions and firms' strategy, structure and rivalry. The input is all Central European countries and the output is a subset of countries that are more competitive than the others regarding location of the future carbon steel sheet forming supplier base. This subset of countries is subsequently the input for the next chapter where the third determinant, regional clusters (related and supporting industries), is analysed.

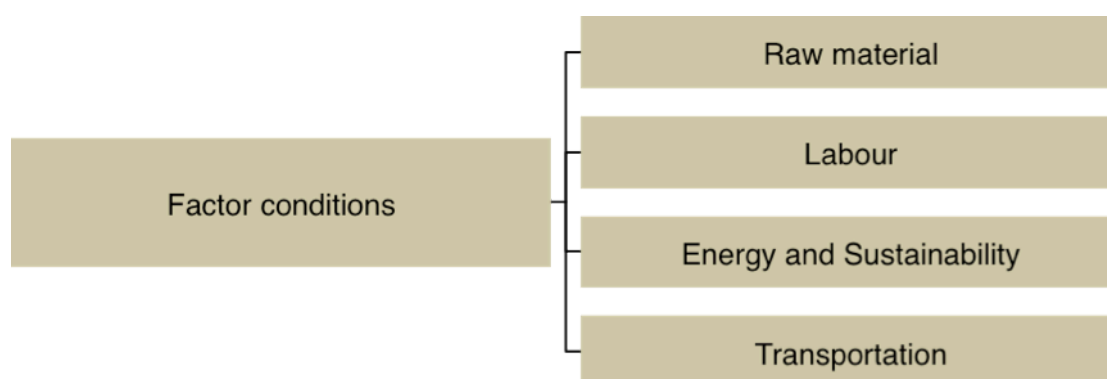


Source: Cost breakdowns of proxy products, interviews with metal leader, interviews with sourcing developers, interviews with metal business developer manager of trading area Central Europe

Illustration 4.3.1 Relevant elements to assess competitiveness of Central European countries

4.3.1 Factor conditions

This sub-chapter addresses current and projected future factor conditions of Central European countries, where Poland, Czech Republic, Slovakia and Hungary are assessed to be more suitable than Austria and Italy. Producing a cabinet is not like producing a spaceship. The production process is characterized by low-complex operations: slitting, punching, pressing, powder coating and packaging. Thus, it makes sense to look at the important cost elements of the four key product groups and think about how these costs differ between Central European countries. To generalize, raw material, labour, energy and transportation are key cost components and thus, it makes sense to explore these areas for the Central European countries respectively. Since “...we need to actively invest in renewable energy and sustainability towards 2020...” (2014, Metal Leader, April) energy costs are complemented with a general assessment of energy sustainability in Central European countries. The proceeding sub-chapters are therefore treating four areas: raw material, labour, energy and transportation. These sub-chapters are individually divided into three parts (more or less): data, assumptions and analysis to make it simple to separate raw data from interpretations of that raw data.



Source: Cost breakdowns of proxy products, interviews with metal leader, interviews with sourcing developers

Illustration 4.3.1.1 Relevant elements to assess factor conditions

Raw Material

This sub-chapter exists due to structural reasons, while forthcoming sentences explain why this analysis is put in chapter 4.3 treating industry clusters. Findings from interviews show that analyzing the cost of raw material on a country level is highly speculative. “To generalize, the more refined the carbon steel is, the more volatile the prices are. Although, the volume of these IKEA sheet products account for a small share of global steel demand and thus, do not have impact on global market prices” (2014, Metal Leader, April). It is assumed that similarly sized actors from geographically close regions will acquire raw material from the same sources and for the same cost due to a common market price. Hence, the difference lies in the transportation cost from the raw material source to the processing actor, i.e. the player that produces carbon steel sheet products. Thus, as stated above, this analysis is brought to smaller geographical regions within the Central European countries, clusters, to get more accurate.

Labour Costs and Labour Availability

This part treats two aspects of labour: cost and availability.

Labour costs projection data

Average labour costs in the fabricated metal products manufacturing industry were lowest in Hungary and Poland 2011 among Central European countries while China had labour costs that were more than half of that. In a long-term perspective, labour costs are expected to converge globally. In Poland, Czech Republic, Hungary and

Slovakia, labour costs are expected to grow by ~5% CAGR⁴ towards 2020. More innovation-driven Central European economies, i.e. Italy and Austria, are expected to grow labour costs by ~2 % CAGR while labour costs in China are expected to grow by ~8 % CAGR towards 2020.

Table 4.3.1.1 Labour cost projection index

**Estimated Labour Cost Projection Index for fabricated metal products manufacturing Industry
(Index Poland = 100 for 2011)**

	Poland	Czech Republic	Austria	Hungary	Italy	Slovakia	China
2012	100	123	424	94	283	105	45
2020	155	190	486	145	340	162	87

Source: EUROSTAT (2014), PwC (2013), Own Calculations

Labour costs projection assumptions

There are two key assumptions in the labour costs projection. Firstly, labour costs can be treated from multiple perspectives; the level of the individual, the firm, the industry and the country/region. Since this thesis ultimately aims at finding players to be the future suppliers, it makes sense to analyse average labour costs on the level of the firm or industry of different countries. Thus, labour costs 2011 are estimated as the total amount of personnel costs in the fabricated metal products manufacturing industry in a particular country divided by the total number of employees in that industry in that particular country. Thus, this comparison is not saying that people in Austria get X in hourly salary compared to Y in Czech Republic for the same type of job. This comparison is rather pointing on the mix of people and the general level of labour costs. For instance, a high share of administration and R&D people would imply higher average labour costs than a firm with only blue-collar workers. Secondly, the growth rates are assumed to follow a general trend. This general trend is based on wage rates projections towards 2020 and 2030 of Poland, Italy and China. The most critical assumption is that Czech, Slovak and Hungarian labour costs are expected to grow approximately in line with Polish labour costs. Italy and Austria are more similar countries i.e. more innovation-driven and thus, Austrian labour costs are expected to grow in line with Italian ones more or less. The projection is highlighting converging patterns globally, rather than pointing on specific indices of countries.

⁴ Compound annual growth rate

Although, labour costs indices for 2011 of the fabricated metal products industry is raw data and therefore valid to base stronger conclusions on.

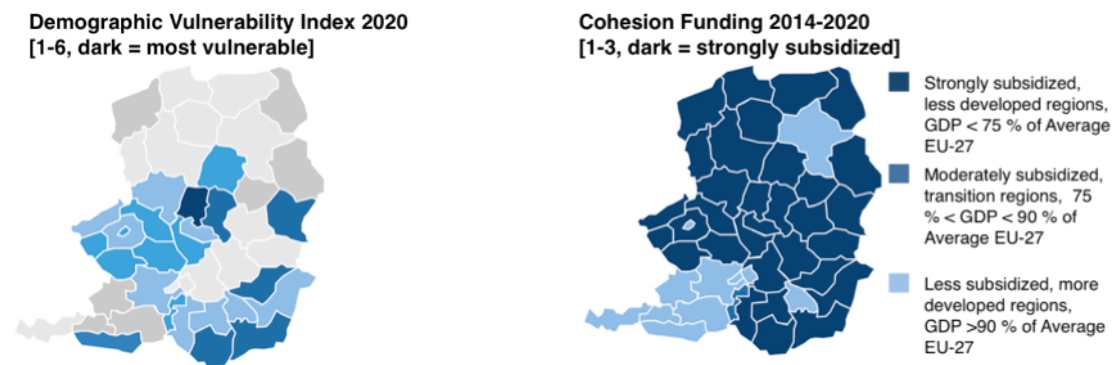
Labour costs projection analysis

One insight of the projection above is that Italy and Austria are not probable to have suitable labour cost structures within the fabricated metal products manufacturing industry. The average labour costs of these two countries are three to four times higher than for the other Central European countries. Thus, the mix of labour qualification levels is believed to be more appropriate in Czech Republic, Poland, Slovakia and Hungary. This is an indication rather than a truth. Likely is although that the probability of finding suitable players is higher in Poland, Czech Republic, Hungary and Slovakia than in Austria and Italy. In particular, these pieces of analyses hold in this specific situation, since the overall aim is to find countries in which players exist that are able to produce low-complex products competitively, not spaceships.

Labour availability projection data

Since engineers and process specialists within the general fabricated metal products industry might think it is of higher status to produce car components than a shoe shelf, labour availability is a key area to explore when trying finding players that can produce low-complexity products. (2014, Carbon Steel Category Leader Europe, May) The key supplier in Central Europe as the proxy firm believes that “...we’ll have a challenge in finding people with technological skills, since there are attractive jobs at automotive tier-2 suppliers”. (2014, Key supplier, April) Moreover, the category leader of European carbon steel explains this aspect as “...the players care a lot about image”. When the authors visited another IKEA supplier located in the more rural areas of Czech Republic, the labour availability had been a severe challenge due to urbanization and other priorities in the region than manufacturing fabricated metal products. (2014, Supplier, April) Therefore, labour availability is a critical factor towards 2020 to ensure that there will be people willing to produce IKEA products in a certain region. As shown below, there are demographically vulnerable regions, especially in Poland, Hungary and Czech Republic towards 2020. These demographic vulnerabilities are based on fertility and mortality rates, flows (in and out) of a certain region together with the share of labour force of the total regional population.

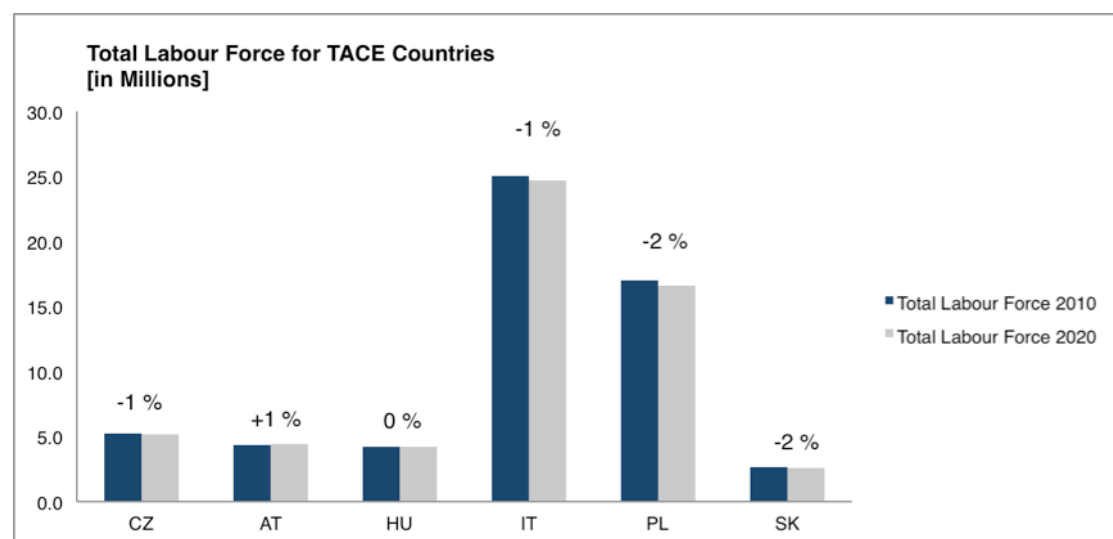
However, strong vulnerability is counterbalanced towards 2020 with strong cohesion funding.



Source: European Union Regional Policy (2008), European Cohesion Fund (2014), Own calculations

Illustration 4.3.1.2 Demographic vulnerability 2020 and cohesion funding patterns 2014-2020

Labour availability is, given above-mentioned vulnerabilities, expected to drop slightly towards 2020. As a proxy for labour availability towards 2020, total labour force of Central European countries have been used.

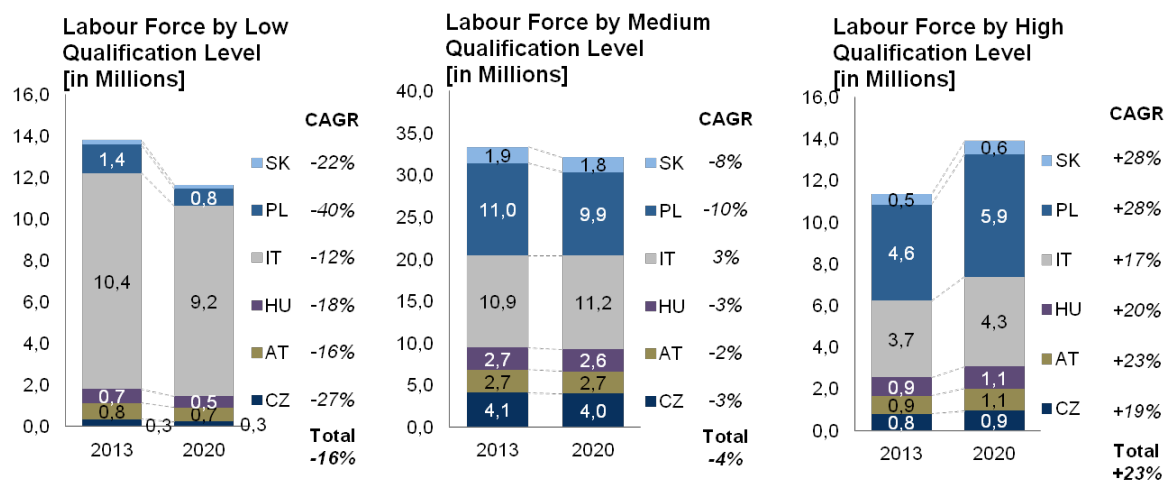


Source: Bulgarelli et al., (2009)

Illustration 4.3.1.3 Total Labour Force Projection 2010-2020

The total labour force projection indicates that there will be a slight drop but although no significant difference towards 2020. Though, what this projection does not tell is

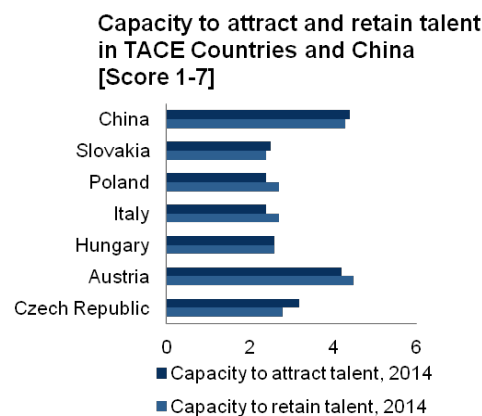
switches between different qualification levels. Towards 2020, a strong labour force switch towards high qualification levels is expected.



Source: Bulgarelli et al., (2009)

Illustration 4.3.1.4 Labour force switches between qualification levels, 2010-2020

Considering capacity to attract and retain talent within the country, Czech Republic and Austria are slightly more competitive than other Central European countries.



Source: Schwab (2014)

Illustration 4.3.1.5 Capacity to attract and retain talent in Central European countries and China

Labour availability projection assumptions

The most critical assumption considering labour availability is that the general trend in availability is reflecting the trend in labour availability of the players that will form the future Central European supplier base of carbon steel sheet forming products. This

is not true but gives an indication of labour availability of these players. The switch towards higher qualified jobs is also a general trend within these countries.

Labour availability projection analysis

The slight drop in labour force among Central European countries is believed to be a result of an ageing population, an increasing number of educated people and a general development of these countries into more innovation-driven ones. The first implication is that it will be increasingly difficult in general in Central Europe to find labour force for lower qualification level work, i.e. packaging. The second implication is that higher qualification levels and a strong capacity to attract talent are keys for increased automation and industrialization.

As a takeaway, Czech Republic, Poland, Slovakia and Hungary are more suitable than Italy and Austria due to labour cost structure of firms within the fabricated metal products manufacturing industry. The labour availability and capacity to retain talent aspects are not pointing at one specific country as better than the others but is rather highlighting general trends in Central Europe towards 2020.

Energy Costs and Sustainability

The aim of European Union towards 2020 is to firstly increase renewable energy share of total consumption to 20 %, secondly reduce CO₂ emissions by 20 % compared to 1990 levels, and thirdly increase energy efficiency by 20 %. Given these aims, is it good with as low current energy costs as possible? Countries with lower energy costs, i.e. Poland and Czech Republic, have lower dependency on other countries compared to Slovakia and Hungary, but are although strongly trapped by coal. Given European Union's above-mentioned 20/20/20 aim towards 2020, Central European countries will face challenges. The aim of this chapter is to assess the countries on the ability to find a balance between low energy costs and a sustainable future in terms of renewable energy and low dependency on other countries, i.e. Russian natural gas. The chapter is divided into four parts; energy costs projection data, energy costs assumptions, sustainability data and conclusively an energy analysis of preceding parts. Assumptions on the sustainability part are not needed since this part is rather stating and phrasing secondary data than performing calculations.

Energy costs projection data

Energy costs are currently lowest in Poland and Czech Republic among industrial consumers in Central European countries. Slovakia and Italy are the two countries with comparatively highest energy costs among the Central European countries. The difference between Poland and one step east, i.e. Bulgaria and Romania, is a drop of 10 – 15 % in energy costs 2012. When looking historically, Czech Republic has managed to decrease energy costs more than others.

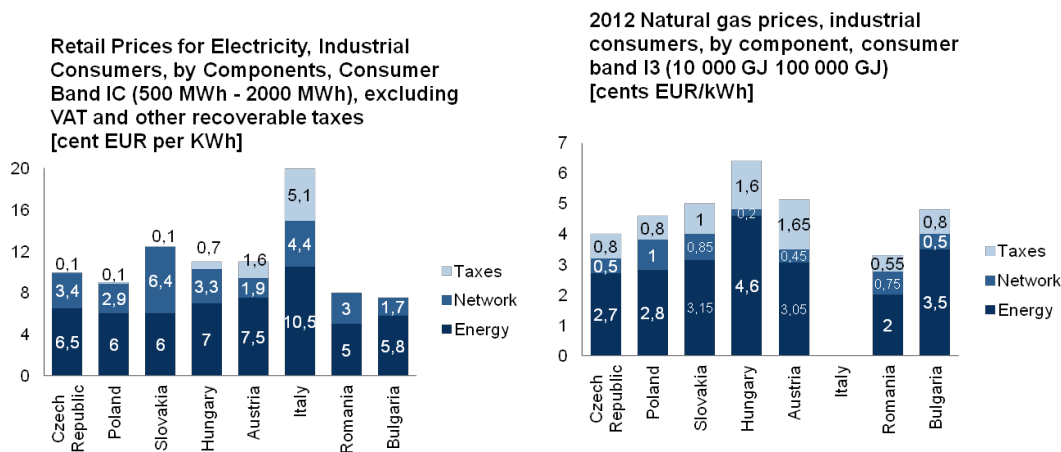
Table 4.3.1.2 Historical energy costs of Central European countries, snapshot 2008 and 2012

Energy costs, Industrial Consumers, Consumer Band IC (500MWh – 2000MWh), excluding VAT and other recoverable taxes and levies, 50% Electricity, 50% Natural Gas (cent EUR/kWh with Index Poland 2012 = 100)

	Poland	Czech Republic	Austria	Hungary	Italy	Slovakia	Romania	Bulgaria
2008	91	117	107	126	145	135	92	72
2012	100	104	116	126	188	129	83	90

Source: European Commission (2014), Own calculations

To explain energy cost differences, the energy cost can be broken down into three components; energy, network (transport from production to consumption) and taxes. Electricity costs generally differ due to network costs and taxes. When analysing natural gas, the costs differ more substantially between Central European countries due to different contracts and different dependency on Gazprom (Russian natural gas), which is explained in forthcoming chapters.



Source: European Commission (2014)

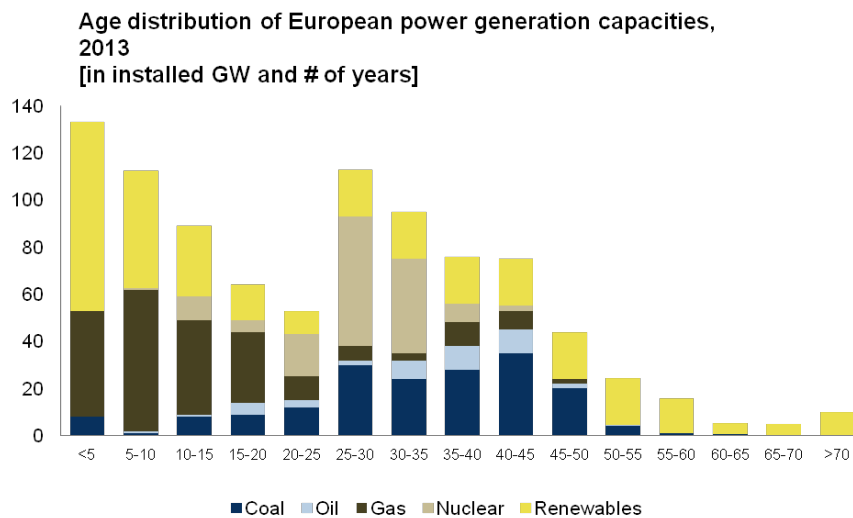
Illustration 4.3.1.6 Electricity and natural gas prices for industrial consumers broken down into components, 2012

Energy costs projection assumptions

This historical energy costs projection is based on current energy consumption split between natural gas and electricity of the key supplier of carbon steel sheet forming products in Central Europe. This split is currently ~50 % natural gas and ~50 % electricity and is assumed to reflect the general energy mix in the production process of carbon steel products. “Certain operations require electricity and certain operations are driven by gas, and it would be less energy efficient to let for example the powder coating line switch energy source”. (2014, Business Developer, April)

Energy sustainability data

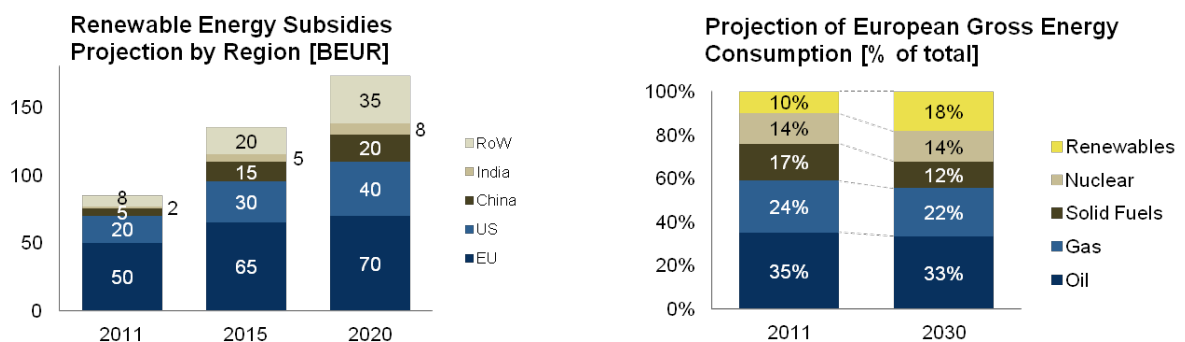
As highlighted above, low energy costs must be put in relation to the future sustainability. Europe faces severe challenges and tough investments are required to renew the power generation capacities. In particular, coal power generation capacities are old and need to be renewed or replaced towards 2020.



Source: European Commission (2013)

Illustration 4.3.1.7 Age distribution of European power generation capacities 2013

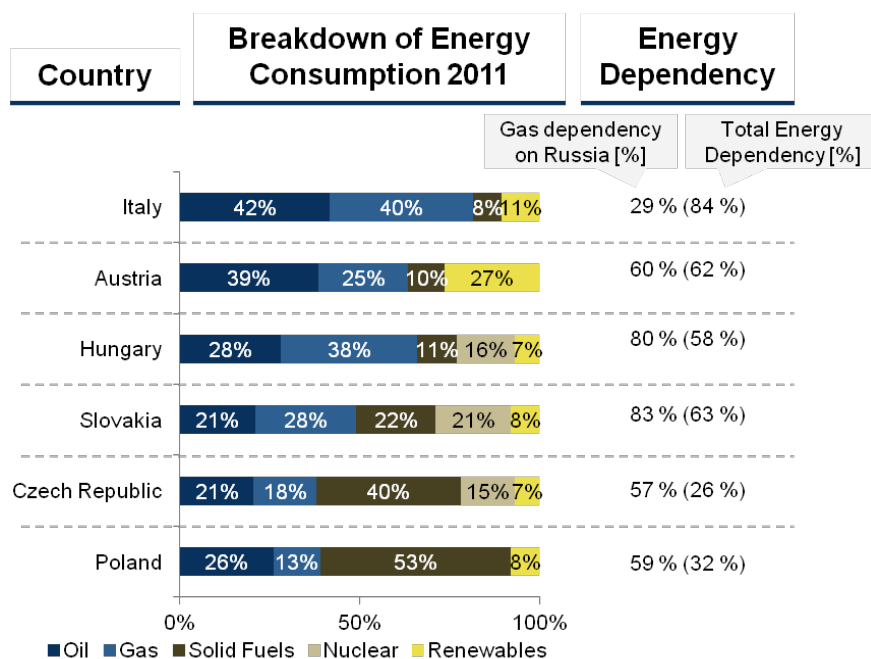
While current generation capacities need replacement, European Union has invested and will invest heavily in renewable energy generation capacities towards 2020 to meet the 20 % renewable energy goal. European Commission projects an average of 18 % renewable energy of European gross energy consumption 2030.



Source: European Commission (2013)

Illustration 4.3.1.7 Renewable energy outlook globally

Central European countries are dependent on Russian natural gas and countries like Poland and Czech Republic have a solid fuels share of total energy consumption of above 40 % while Slovakia and Hungary have a higher share of natural gas of ~30-40%.



Source: International Energy Agency (2014), Economist (2014), European Commission (2013)

Illustration 4.3.1.8 Breakdown of energy consumption and energy dependency in Central European countries 2011

Poland is trapped by coal, but is currently building up alternatives towards 2020. The first nuclear plant will be in operation 2022 with additional plants planned towards 2030. Poland has invested in R&D in clean coal technologies and storage, which enables the country to use its coal but limit the green house gas emissions. This option has been preferred over increasing the natural gas share in the energy mix, since Poland tries to diversify Russian gas dependency. On the natural gas side, Poland is diversifying through own production and new LNG terminals. According to the International Energy Agency, Poland will reach ~15 % in renewable energy share 2020 and GHG emissions in energy supply is expected to decrease.

Czech Republic has high energy intensity due to industry characteristics with a strong tradition of steel production. The country is pro-nuclear with two plants (Temelin, Dukova) and is scaling down its coal operations. The renewable energy mainly comes from photovoltaic panels and voluntary renewable energy agreements with the

industry are increasing. Czech Republic is projected to reach ~13 % renewable energy share 2020 and GHG emissions in energy supply is expected to decrease.

Slovakia has low incentives to increase energy efficiency and renewable energy, since focus rather is on decreasing gas dependency on Russia. The focus towards 2020 is to co-operate with Czech Republic, Poland and Hungary to decrease Russian natural gas dependency. Key renewable energy sources are biomass and large hydropower plants. Slovakia is projected to reach ~15 % renewable energy share 2020 and GHG emissions in energy supply is expected to increase slightly.

Energy analysis

This part is an analysis of the energy situation in the Central European countries, bringing together energy costs and future sustainability. Europe is in general one step ahead other regions on renewables subsidies. Carbon intensive countries will although face severe challenges in changing their energy mix to align with European Union's aims. To put it simple, Central European countries are either relying too heavily on Russian natural gas or are trapped by their own coal as energy source. Poland and Czech Republic are two countries with a coal share >40 % of total energy consumption, but less than 60 % gas dependency on Russia and ~30 % as energy import share of total consumption. Those two countries will face challenges in reducing the carbon intensity. Countries as Slovakia and Hungary have significantly lower coal share but are vulnerable due to Russian gas dependency of >80 % together with an energy import share of ~60 %. Those countries will face challenges in reducing the gas dependency on Russia. Worth highlighting is Austria, which is a step ahead others considering renewable energy share. As a takeaway, Poland and Czech Republic have lower energy costs, will face severe challenges, but are although investing in reaching European Union's energy goals 2020. Slovakia and Hungary have very high dependency on Russian natural gas, which from a risk perspective is believed to be unsuitable. Czech Republic, Poland, Hungary and Slovakia are although in line with each other considering renewable energy share projections towards 2020.

Transportation data and analysis

IKEA transports products from A to B, in this particular case from Central Europe to Western Europe. There are two ways of transporting products from A to B, either

directly from A to B or by passing other stops on the way from A to B. The purpose of such stops is to co-distribute products. There are three such stops in the Central European countries Poland, Czech Republic, Slovakia and Hungary; the Prague cross-docking cluster in Czech Republic, the Lubawa cross-docking cluster in Poland and the Kalisz COM40 storage center in Poland. “These are huge centers and therefore, purchasing volume growth of carbon steel sheet products from 6 MEUR to 30 MEUR towards 2020 is not a big deal and will not affect capacity constraints”. (2014, Logistic expert, May) Another deputy category manager continues; “the transportation costs from Central European countries to Western European markets are fairly similar in a global perspective.” When looking broadly on transportation costs 2014 from Central European countries to markets and distribution centers Doncaster, Dortmund and Paris in Western Europe, Czech Republic and to certain extent Poland have in general low transportation costs due to closeness to these markets.

There is although a key difference that needs to be understood. From the perspective of the transportation firm instead, “there is a strong correlation between transportation production costs and distance, while there is not a strong correlation between transportation price and distance” (2014, Deputy Category Manager, June). Given the same inputs, the production cost is therefore the same for transportation from Poland to Germany as transportation from Germany to Poland. It is not the same considering the price due to supply and demand, with “a strong flow from east to west in Europe” affecting the transportation costs for IKEA. Thus, price is “fundamentally driven by trade flows and the regional capacities’ ability to swallow periodic fluctuations”. (2014, Deputy Category Manager, June) Considering the development towards 2020, “we are not able to predict prices, more than saying that we expect a relatively faster increase in transportation costs in Italy compared to the other Central European countries” (2014, Deputy Category Manager, June).

Thus, given this expert assessment, the marginal utility of building a transportation costs projection model towards 2020 is comparatively small. Although, below is a projection of trade balance changes towards 2020 which explains a general increase in outflows minus inflows of goods. This would certainly point on increasing challenges, which cohesion funding is counterbalancing towards 2020 with strong help within

infrastructural enhancements as mentioned in chapter 4.2.1.2 treating labor availability.

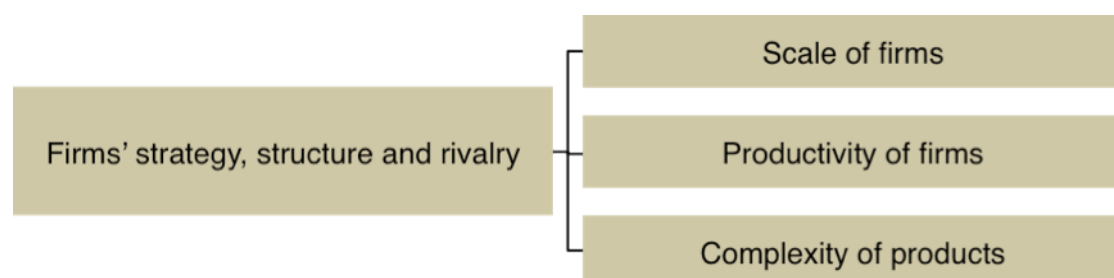


Source: International Monetary Fund (2014)

Illustration 4.3.1.9 Goods trade balance projection as exports minus imports as an index of 2012 levels for Central European countries

4.3.2 Firms' Strategy, Structure and Rivalry

The aim of this sub-chapter is, as for the factor conditions analysis, to filter out a subset of countries in Central Europe that are more competitive than the others regarding supplier base location. This subset will form the input for the regional clusters analysis. The key output of this sub-chapter is that the industry structure of the fabricated metal products manufacturing industry is more suitable in Poland, Czech Republic, Hungary and Slovakia than in Italy and Austria. This is mostly due to appropriate scale of firms and complexity of products.

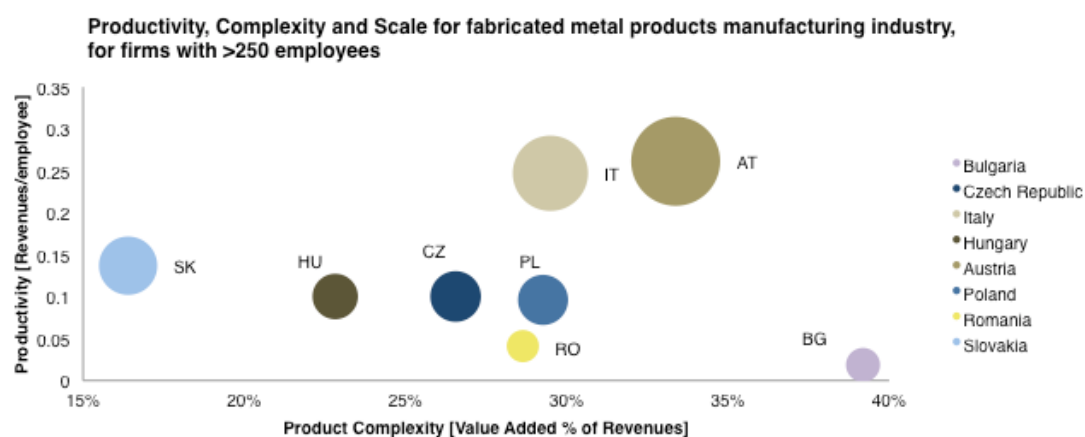


Source: Interviews with metal team trading area Central Europe consisting of business developers and business developer manager, interviews with metal leader

Illustration 4.3.2.1 Productivity, Complexity and Scale for firms with >250 employees within the fabricated metal products manufacturing industry

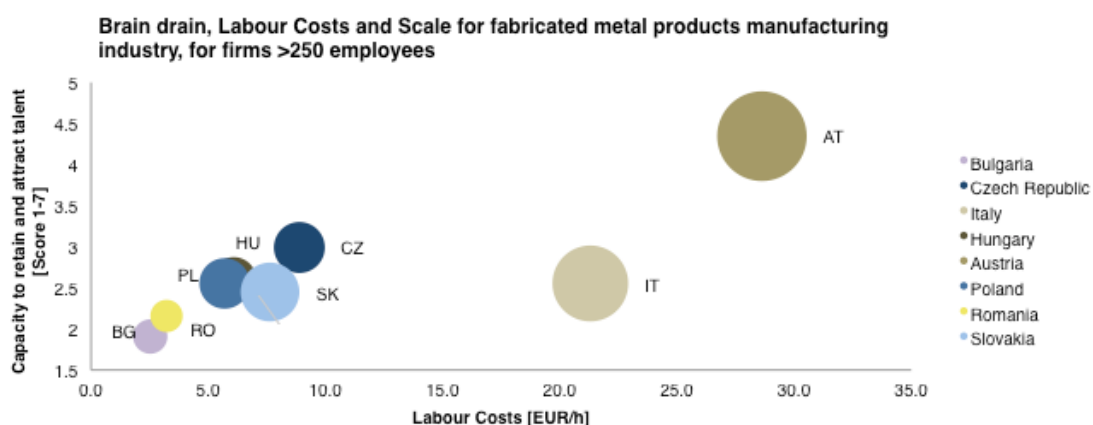
Firms' strategy, structure and rivalry data

Below are these aspects shown in two graphs, where the first one is considering scale, productivity and complexity and the second one is putting scale in relation to capacity to attract/retain talent together with average labour costs. “My experience of seeing fabricated metal products manufacturing is that Czech Republic is more automated and has higher productivity than Slovakian firms”. (2014, Business Developer Manager, June) This is in clear contrast to Illustration 4.3.2.1, which rather shows that Slovakian firms enjoy higher productivity than its peers.



Source: EUROSTAT (2014)

Illustration 4.3.2.2 Productivity, Complexity and Scale for firms with >250 employees within the fabricated metal products manufacturing industry



Source: EUROSTAT (2014)

Illustration 4.3.2.3 Brain drain, labour costs and scale of firms with >250 employees within the fabricated metal products manufacturing industry

Firms' strategy, structure and rivalry assumptions

What is then a feasible scale and productivity of a firm and what is a feasible complexity of products? Considering the scale, the aim is to grow from 6 MEUR to 30 MEUR. The key current supplier as the proxy firm has ~40 MEUR in revenues. The carbon steel category leader (2014, June) stresses that "...a new supplier would only be started if the purchasing volume is > 10 MEUR". The total purchasing volume growth needed is ~25 MEUR (from 6 MEUR to 30 MEUR 2014-2020), assumed to be split between current suppliers and potential players within the food packaging industry and the automotive metal tier-2 industry. Given that, a purchasing volume of ~10-15 MEUR per player would make sense. The IKEA share of supplier revenues (i.e. purchasing volume) is assumed to range from ~30-90 %. "In the automotive industry, there are typically shares between 30-40 % and two automotive players as key customers, learning from each other". (2014, Metal Leader, June) On the other hand, there are current IKEA suppliers that are 90 % dependent on IKEA as a customer. (2014, Technician, April) Thus, a feasible scale would be ~10-50 MEUR ($10 \text{ MEUR}/90 \% < X < 15 \text{ MEUR}/30 \%$) in revenues, give or take. Productivity is measured against the key supplier's current 0,1 MEUR/employee and product complexity, i.e. value added, is measured against current value added of the four key product groups. This is the complexity and productivity level that is believed to be good for this purpose.

Firms' strategy structure and rivalry analysis

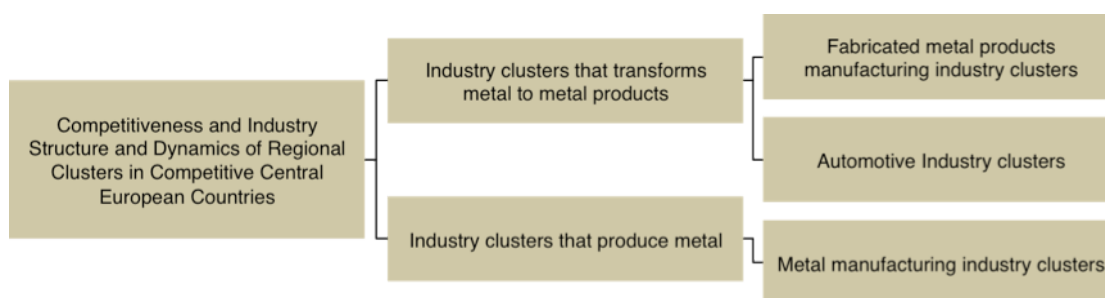
This analysis covers three aspects. Firstly, Czech Republic, Poland, Hungary and Slovakia are believed to be more in line considering scale, productivity and complexity (see *Illustration 4.3.2.2*). As stated above, the business developer manager of the metal team in Central Europe believes that Czech firms are more automated than Slovakian ones, which although not stand in conflict to the insight above. The scale is in line with assumed feasible scale, the productivity is in line with the proxy firm and the value added percentage is significantly lower than for Italy and Austria. The value added is a measurement of product complexity, since products in the carbon steel sheet forming segment is processed through low complexity operations. Italy and Austria are believed to produce more complex fabricated metal products than needed.

Secondly, when putting capacity to retain talent and labour costs from preceding analyses as axes (see *Illustration 4.3.2.3*), Poland, Czech Republic, Hungary and Slovakia get more similar. Czech Republic is better regarding attracting talent; the price is although slightly higher average labour costs. Austrian and Italian firms are too large compared to the proxy firm and this purpose, and the labour costs are significantly higher than for the other Central European countries. To conclude, Poland, Czech Republic, Slovakia and Hungary are more suitable than Italy and Austria due to appropriate scale, labour cost structure and product complexity.

Thirdly, when looking at value added of > 50 % for bin & box key product group, one needs to think about why there are no Central European countries with such high value added. The proxy product and others within the bin & box product group, are “...processed manually to a large extent and thus we are leveraging comparatively low labour costs in China currently”. (2014, Sourcing Developer, June) Recall the labour cost indices of 100 in Poland and 45 in China 2011. A key insight is that there is a need to rethink the way these products are processed if these products were to be produced in Central Europe towards 2020, despite converging labour costs. Thus, it makes sense to assess whether food packaging players are suitable for processing bin & box products.

4.4 Competitiveness and Industry Structure and Dynamics of Regional Clusters in Competitive Central European Countries

This sub-chapter aims at finding the most competitive regional clusters within Poland, Czech Republic, Slovakia and Hungary and thus answering the second research question. There are three types of clusters that are in focus; fabricated metal products clusters (the focal industry), metal manufacturing clusters (one step upstream the supply chain) and the automotive clusters (supporting and related industry and to some extent overlapping with the focal industry). The chapter is broken down into three parts; firstly clusters data and assumptions, secondly an analysis of the clusters data and thirdly a particular analysis of Czech clusters, since these are shown to be comparatively strong.



Source: Own interpretations; Sölvell et al (2008); EUROSTAT (2014)

Illustration 4.4.1 Relevant cluster types to isolate competitive regional clusters

4.4.1 Clusters data

Empirical data of regional clusters on the industry level is limited to demographic data. Thus, clusters are evaluated on different demographic dimensions such as number of employees and share of industry employment of the certain industry in the certain region. In the fabricated metal products manufacturing industry, there is a high concentration of strong clusters in Poland and Czech Republic (i.e. Prague, Brno, Ostrava, Katowice, Krakow, Warszawa, Wroclaw, Lodz, Bydgoszcz). Slovakia has one cluster, Kosice, which is considered as a top-scoring cluster.

Table 4.4.1 Strong fabricated metal products manufacturing clusters in Czech Republic, Poland, Slovakia and Hungary 2012

Cluster Region	Sub-region	Empl. In cluster	Share [%] of manufact. total	Growth pre-post-crisis
Prague (CZ)	Jihozápad	21899	14,2	4%
Prague (CZ)	Severovýchod	25505	11,8	2%
Prague (CZ)	Jihovýchod	31742	14,9	1%
Brno cluster (CZ)	Stredni Morava	29389	16,8	3%
Ostrava (CZ)	Moravskoslezsko	20973	13,9	0%
Katowice (PL)	Region Poludniowy	68530	13,1	2%
Katowice (PL)	Region Poludniowo-Zachodni	33416	11,9	4%
Katowice (PL)	Slaskie	46050	13,6	1%
Warszawa (PL)	Region Wschodni	39626	11,2	4%
Krakow (PL)	Malopolskie	22480	12,1	2%
Wroclaw (PL)	Dolnoslaskie	23641	11,1	4%
Lodz (PL)	Region Pólnocny	46397	12,2	0%
Bydgoszcz (PL)	Kujawsko-Pomorskie	20152	14,3	3%
Kosice (SK)	Západné Slovensko	32625	15,5	16%

Metal cluster in same cluster region

Source: EUROSTAT (2014); Sölvell et al (2008)

Assumptions for a top cluster in the fabricated metal products manufacturing industry cluster analysis below is that the region has more than 20 000 employees within the

fabricated metal products industry, that the share of total manufacturing employees is above 10 % and that this share didn't drop during the European crisis (growth pre-post-crisis). The latter is believed to tell if the cluster has shown strength (attracted and retained labour) even through a crisis and is measured as the growth of share of total manufacturing employees from 2008 to 2012. The above is although based on historical data. The key assumptions for the future are kept specialization and kept globalization: if a cluster is stronger than others today, it is believed to be stronger than others tomorrow. This is due to knowledge and technological spill over concentrated to the cluster thus enhancing competitiveness, secured labour availability and greater potential of subsidies as priority for the European Union and the states in the global competition against other regions. Porter (1998) stresses that cluster development should be among the key competitive priorities of countries. Thus, it would make sense from the perspective of institutions, to help clusters that are strong today to be strong tomorrow.

Sölvell, Lindqvist and Ketels (2008) have previously scored metal and automotive clusters on a three-point scale. The score is broken down into three components (similar to data and assumptions on the fabricated metal products manufacturing clusters above); total employees in the certain industry in the region, a specialization quotient which tells if this particular region is more specialized than other regions in the same country and thirdly the share of employees in the certain industry out of the total number of employees in the region. As a major takeaway, Czech Republic and Slovakia have strong metal clusters (i.e. Ostrava, Olomouc, Kosice) while Czech Republic and Hungary have the strongest automotive clusters (i.e. Liberec, Prague, Székesfehérvár, Győr).

Table 4.4.2 Metal and automotive clusters within Central European countries Czech Republic, Poland, Slovakia and Hungary according to Sölvell et al (2008)

Cluster	Region	Empl. In cluster	Specialization quotient	% of empl. in region	Score
Metal manufacturing	Katowice (PL)	46707	1.4	3%	1
	Plzen (CZ)				2
	Olomouc (CZ)	21907	2	4%	3
	Ostrava (CZ)	52465	5	10%	3
	Kosice (SK)	31133	2.89	6%	3
	Székesfehérvár (HU)				2
	Miskolc (HU)				2
Automotive	Zilina (SK)				2
	Katowice (PL)	45000			2
	Plzen (CZ)	15000			2
	Wroclaw (PL)	23000			1
	Poznan (PL)	23000			1
	Liberec (CZ)	31311	3.44	5%	3
	Praha region (CZ)	26449	3.68	5%	3
	Nitra (SK)	22000			2
	Bratislava (SK)				2
	Székesfehérvár (HU)		-	-	3
	Győr (HU)		-	-	3

Source: Sölvell et al (2008)

Recalling chapter 4.2.1.1 treating raw material, the raw material is bought at market prices and thus, the difference lies in the transportation costs between the sheet/coil producer and the processing actor, i.e. the carbon steel sheet products player. Thus, to generalize, a comparative study of the total distance between the sheet/coil producers and the IKEA logistics clusters in Lubawa in Poland and Prague in Czech Republic is made. The sheet/coil producers are the main actors that the automotive tier-2 metal suppliers are using for pressed products currently.

Table 4.4.3 Distances between major coil/sheet producers, through competitive clusters, to logistics cluster Prague in Czech Republic

Distance [km]	Arcelor Katowice	Arcelor Ostrava	Thyssen krupp	Voetstapline	Salzgitter
Katowice	458	556	1411	622	1186
Prague	462	371	658	410	449
Plzen	650	559	720	597	589
Olomouc	471	380	1216	437	1007
Zilina	570	520	1478	410	1254
Kosice	993	1028	1940	923	1716
Miskolc	1122	1084	2069	979	1864
Ostrava	469	371	1367	481	1143

Source: Google maps, Own calculations

Table 4.4.4 Distances between major coil/sheet producers, through competitive clusters, to logistics cluster Kalisz in Poland

Distance [km]	Arcelor Katowice	Arcelor Ostrava	Thyssen krupp	Voetstapline	Salzgitter
Katowice	237	335	1190	401	965
Prague	911	820	1107	859	898
Plzen	1100	1009	1170	1047	1039
Olomouc	568	477	1313	534	1104
Zilina	513	463	1421	353	1197
Kosice	867	902	1814	797	1590
Miskolc	1062	1024	2009	919	1804
Ostrava	382	284	1280	394	1056

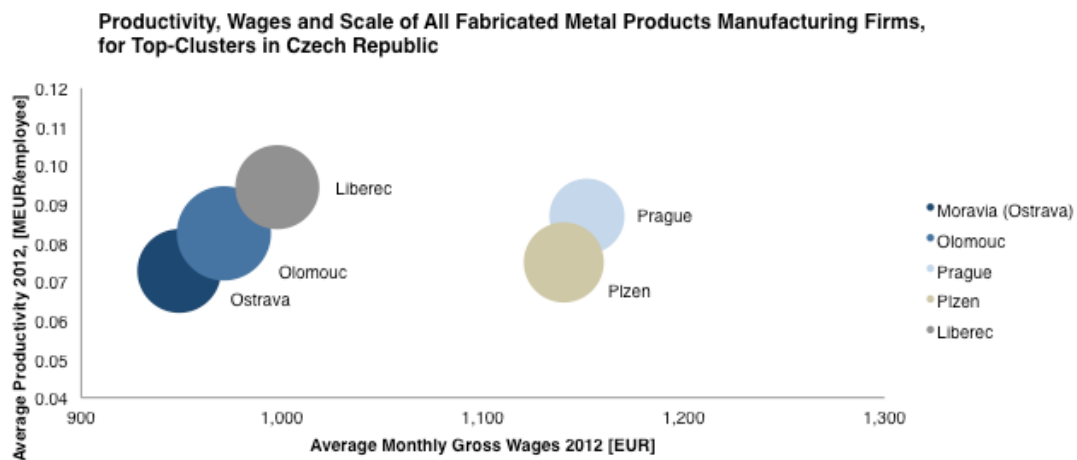
Source: Google maps, Own calculations

4.4.2 Clusters analysis

The strongest fabricated metal products manufacturing clusters are concentrated to Czech Republic, Slovakia and Poland. Additionally, these three countries have strong metal and automotive clusters, which are considered to be related and are supporting the industries to the focal fabricated metal products manufacturing industry. A location of suppliers within these strong cluster regions would make sense due to three key reasons. Firstly, labour availability is believed to be stronger in a metal products cluster than in regions where the metal products manufacturing footprint is weaker. Secondly, technology spill over between these firms is a driving force of innovation, which certainly will drive competitiveness of firms within these clusters. Thirdly, European subsidies earmarked for metal products manufacturing, are logically more probable to end up in such clusters than in clusters specialized on wood or plastics, since these subsidies actually enhances European players compared to other world regions in the increasing global competition. Porter (1998) states that cluster development should be among the key priorities of countries. Fourthly, to make the supply chain shorter has positive impact on transportation costs, sustainability and responsiveness. One interesting aspect is that the current key supplier "...source from a range of different actors" (2014, Key supplier, April) Thus, to view table 4.4.3 and 4.4.4 horizontally would make sense. For instance, Ostrava, Prague and Olomouc have at least three different large coil providers to source from to make the chain short.

4.4.3 Czech clusters data and analysis

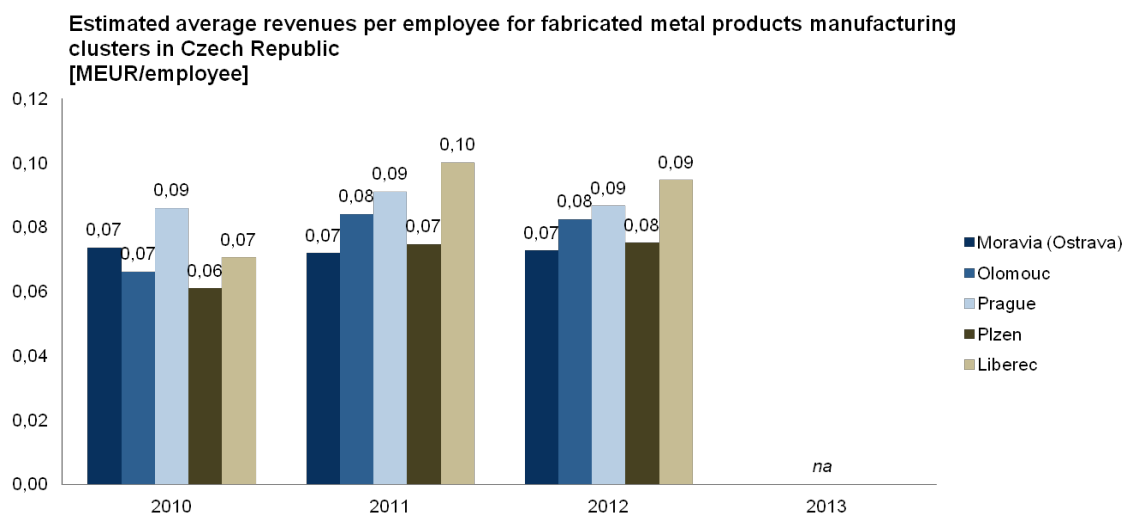
Since Czech Republic is showing strong clusters both within metal manufacturing and fabricated metal products, it makes sense to further look at this country and isolate the most competitive region within Czech Republic. Olomouc and Ostrava are located in east Czech Republic, while others are located closer to the west and therefore wages are different between these clusters. The scale of firms is measured on all registered firms and therefore the result is substantially below the proxy firm with ~40 MEUR in annual revenues.



Source: Regional Office of the Czech Statistical Office in Ostrava, regional data on Moravia, Olomouc, Prague, Plzen and Liberec (2013)

Illustration 4.4.3.1 Productivity, wages and scale of all fabricated metal products manufacturing firms for top-clusters in Czech Republic, 2012

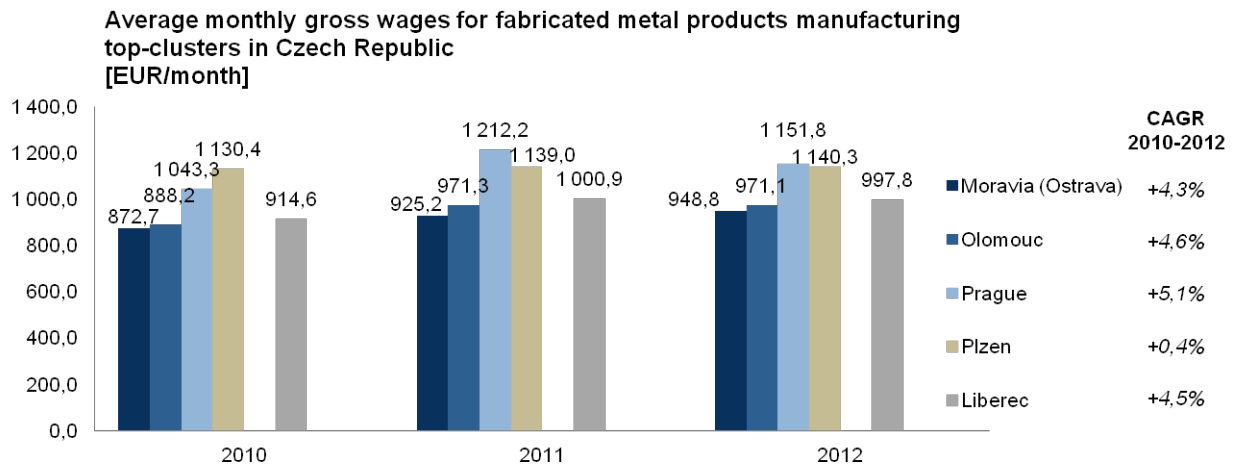
Productivity differences are not significantly different between these regions and all are in line with the proxy firm within carbon steel sheet forming (0,1 MEUR/employee).



Source: Regional Office of the Czech Statistical Office in Ostrava, regional data on Moravia, Olomouc, Prague, Plzen and Liberec (2013)

Illustration 4.4.3.2 Productivity over time of all fabricated metal products manufacturing firms for top-clusters in Czech Republic, 2010-2012

Considering wages, there is still a gap between east and west regions of Czech Republic. There is therefore some room for leveraging lower labour costs in eastern Czech Republic.



Source: Regional Office of the Czech Statistical Office in Ostrava, regional data on Moravia, Olomouc, Prague, Plzen and Liberec (2013)

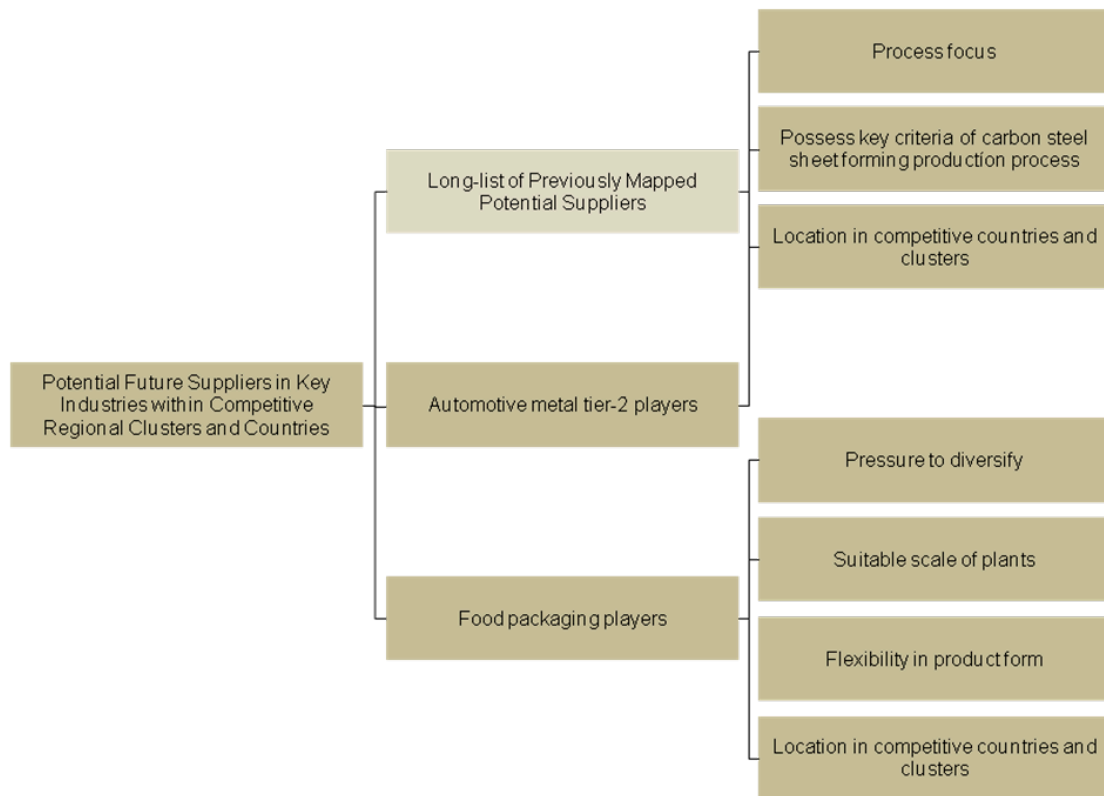
Illustration 4.4.3.3 Wages over time for all fabricated metal products manufacturing firms for top-clusters in Czech Republic, 2010-2012

Czech Republic has in previous analyses shown strong or similar performance as Slovakia, Hungary and Poland regarding scale of firms, productivity of firms and complexity of products and capacity to retain skilled labour and to conclude, Ostrava is believed to be a strong cluster to locate the supplier base in. Other clusters that have strong potential are the fabricated metal clusters in south Poland (i.e. Katowice, Krakow), Czech clusters close to Ostrava (i.e. Olomouc, Liberec) and to some extent Slovakian clusters (i.e. Kosice). This set of clusters is the degree of freedom that the subsequent player scan will have, when looking into the automotive metal tier-2 suppliers industry and the food packaging industry. Although, players that are located within competitive countries (Czech Republic, Poland, Slovakia, Hungary) and close to competitive clusters (Ostrava, Olomouc, Liberec, Katowice, Krakow, Kosice) are taken into consideration.

4.5 Potential Future Suppliers in Key Industries within Competitive Regional Clusters and Countries

This sub-chapter aims at answering the third research question by pointing on a set of players that has the potential of becoming the future competitive supplier base of carbon steel sheet forming products. The sub-chapter has three components: previously mapped suppliers, automotive metal tier-2 players and food packaging players. The first two are connected to the cabinets and pressing line key product groups, while food packaging players are connected to bin & box products. Considering the main purpose, there is a need of growing purchasing volume from 6 MEUR to 30 MEUR from 2014 to 2020 and given previous insights, this growth should be driven by players located within clusters close to the Ostrava cluster in Czech Republic, south Poland and Kosice in Slovakia.

The player scan is structured with the resource-based view of the firm (Barney, 1991) with emphasis on valuable and to certain extent rare resources. To generalize the player scanning part, the single most important dimension of becoming a future supplier of carbon steel sheet forming products for IKEA is an understanding of the business model, i.e. strategic fit. The business model is, simply put, cumulative causation; higher volumes lead to lower costs which lead to lower prices which lead to higher volumes. “If the supplier lowers prices, possibly more than expected, in order to generate future higher volumes that the supplier will profit from, the supplier has understood the model” (2014, Material Leader, July). To assess a large set of players on this dimension is although inefficient; nevertheless this dimension is possibly the only source of a sustained competitive advantage according to the resource-based view. The aspects considered in this player scan rather isolate feasible options, among a large set of players. Thus, these aspects are considered to be valuable and to some extent rare, but neither in-imitable nor non-substitutable. Conclusively, the three proceeding sub-chapters are therefore filtering players on feasibility and potential competitiveness.



Source: Interviews with Metal Leader, Own structure

Illustration 4.5.1. Elements to assess potential of players to become part of the future carbon steel sheet forming products supplier base

The illustration above (see illustration 4.5.1.) states valuable and to certain extent rare resources, capabilities or aspects, which are assessed and analysed in forthcoming sub-chapters. The long-list of previously mapped potential suppliers is a list that the authors got from start, while all other players are collected by the authors.

The long-list of previously mapped potential suppliers and the automotive metal tier-2 suppliers (both connected to cabinets and pressing line products) are assessed and analysed on three aspects: process focus, key criteria of the production process and location in competitive countries and clusters. Firstly, the process focus/specialization is a rough proxy for strategic fit. Compare the two quotes “we’ll continue with process improvements to be the technological leader of what we’re doing” (2014, Supplier, April) with another supplier commented by a business developer manager saying that “...these guys seem to be very happy with making money on the cabinets that they sell to their customers today and are not willing to increase the current IKEA business” (2014, Business Developer Manager, July). There is a difference between

making money on high volume and making money on high margin. To switch behaviour between those to different ways of making money is believed to be harder than taking on other behavioural challenges. Think about where the bulk of the value is added in the IKEA supply chain and how that is different from, for instance, the automotive industry, the food packaging industry and the cabinet manufacturing industry. Since IKEA delivers in flat packs, the bulk of the value is added in the living room of the customer when the customer assembles the product. The corresponding point in the other value chains are when the car is assembled to a car at the automotive OEM, when the food can is filled with food or put in the shelf and when the six metal components are assembled to a cabinet by the cabinet manufacturer. Thus, this aspect is assessing players on their process focus and specialization rather than product focus. For the mapped and automotive players, an assessment of what the players show on the website is done. Therefore, the authors separate players that show cabinets, lockers, and safes with the ones that show and promote pressing, welding, powder coating. Secondly, the key criteria of the production process is a go/no-go filter explaining whether a certain player currently has the right production setup and machines required for making carbon steel sheet products. Thirdly, the location filter is based on the countries and clusters analysis in previous chapters, thus motivated earlier in the thesis.

Considering the food packaging industry, players are assessed and analysed on four aspects that are considered valuable and to certain extent rare: a pressure to diversify from their current food can business, a suitable scale of plants, a certain flexibility in form and location in competitive countries and clusters. Why is process focus not one of the key aspects considered? The players in the food can industry are significantly more process specialized and thus, it is rather a question of if some of these players have flexibility enough. Firstly, the key aspect is the pressure to diversify from the food cans into new unexplored markets. Secondly, the suitable scale of plants is an assessment of the future importance of IKEA as a customer to a certain food can player. Thirdly, the flexibility in form is a way of analysing whether a certain player has certain products that are not that standardized, indicating that a flower pot could be manufactured by the player. Fourthly, the location filter is based on the countries and clusters analysis in previous chapters, thus motivated earlier in the thesis.

The players in the food packaging and automotive metal tier-2 industries are both divided into three parts: above-mentioned player scanning, industry dynamics and key differences and potentials. The purpose of the second part, industry dynamics, is to gain a rough understanding of what is of importance in these industries and thus, this part is pure quantitative and qualitative empirical findings. The third part, key differences and potentials, is a general assessment of potentials, risks and change drivers of using these industries as the future supplier base of carbon steel sheet products and is thus a pure analysis.

4.5.1 Players within the Long-list of Previously Mapped Potential Suppliers

This sub-chapter aims at assessing previously mapped potential suppliers. Below is a list of the players and the potential carbon steel sheet forming products that possibly could be produced by these players. “A lot of these suppliers have not been that competitive in earlier rounds” (2014, Category Leader Europe, July). A business developer manager continues with “...one of the suppliers here is actually a current supplier, but when we’re trying to increase the volume, these guys seem to be very happy with making money on the cabinets that they sell to their customers today and are not willing to increase the current IKEA business”. Below is an assessment of previously mentioned three important filters where data is available.

Table 4.5.1.1 Assessment of previously mapped suppliers (where “High” location in competitive clusters = good, High process specialization = good, yes on fits carbon steel sheet forming key criteria = good)

	Mapped Supplier	Location in competitive country	Location in competitive cluster	Process specialization	Fits CS Sheet forming key criteria
	Supplier A	PL	Low	Low	Yes
	Supplier B	SK	Med	Low	Yes
Failed in earlier RFQs	Supplier C	PL	Med	Low	Yes
	Supplier D	CZ	Med	High	Yes
	Supplier E	CZ	Low	Low	Yes
Failed in earlier RFQs	Supplier F	CZ	Low	Low	Yes
	Supplier G	CZ	Low	Medium	Yes
	Supplier H	CZ	Low	Medium	Yes
	Supplier I	CZ	Med	High	Yes

Source: Company websites, Google Maps

There are three key insights to draw from the table above (see table 4.5.1.1). Firstly, most of these players are product-focused, i.e. not what was searched for. Most of the

mapped potential suppliers are currently adding the margin in their production plant, assembling cabinets and therefore putting a high margin on the metal parts that now have become a product. Secondly, none is located within a strong cluster. The medium-scorers are located close to strong clusters or within medium-strong clusters. Thirdly, all these players have the key criteria of carbon steel sheet forming. Thus, a guess is that these players were mapped solely on these criteria, rather than together with the competitive countries and clusters aspect and process specialization aspect.

4.5.2 Players in the Automotive Metal Tier-2 Supplier Industry

This sub-chapter aims at pointing on a set of automotive metal tier-2 players that have the potential to be part of a competitive supplier base of carbon steel sheet products, by supplying cabinets and pressing line products.

Player scanning of the automotive metal tier-2 industry

Below is an assessment of automotive metal tier-2 suppliers on the same aspects as for the previously mapped suppliers.

Table 4.5.1.2 Assessment of automotive metal tier-2 suppliers (where “High” location in competitive clusters = good, High process specialization = good, yes on fits carbon steel sheet forming key criteria = good)

Automotive Tier-2 Supplier	Location in competitive country	Location in competitive cluster	Process specialization	Fits CS Sheet forming key criteria
Boltjes Group	CZ	Medium	High	No
Tawesco	CZ	Medium-High	High	Lacks powder coating
Essa	CZ	Medium-High	High	Yes
Futuba	CZ	Medium	Medium	
Klein & Blažek spol. s r.o.	CZ	Medium	High	Yes
WITTE Nejdek, spol. s r.o.	CZ	Medium	Medium	
Karsit	CZ	Medium	High	Yes
KIRCHHOFF AM GmbH	PL		Medium-Low	
csaba-metal	HU	-	-	-
ajkaelektron	HU	Medium	High	
Unipress AG	HU	Medium	Medium	
Meccanotecnica Centro s.r.l.	IT	Low	High	
Scanferla	IT	Low	High	
Comax TT	SK	Medium-High	High	No
Huhn Press	SK	Medium-High	High	Yes
Clamason	SK	Medium-High	High	Yes
Kovovýroba		Medium	High	Yes

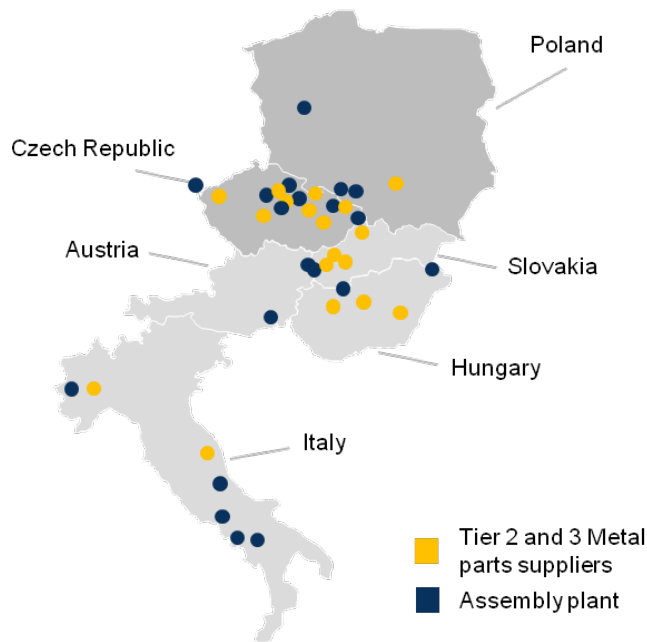
Source: Company websites, Google Maps

The interesting thing when looking at this analysis is that most of these players are scoring medium or high on the cluster filter and on the process specialization filter.

Thus, these players are better suited for being a part of the future competitive supplier base of carbon steel sheet products in Central Europe than the previously mapped suppliers. In particular, five players stand out in this list: Tawesco, Essa, Klein & Blazek spol. S.r.o., Huhn Press and Clamason.

Dynamics of the automotive metal tier-2 industry

Central Europe mainly produces high-volume low-cost vehicles: Hyundai (KIA), Volkswagen, IVECO, Fiat. Thus, it is a price sensitive industry in Central Europe, with similar competitive pressure. There are five key aspects of the dynamics of the automotive metal tier-2 suppliers industry. The first thing is that these players are working with fixed quantities. One of the current carbon steel sheet products suppliers is delivering components for the automotive industry, although not pressed products, but explain the difference as "...more proactivity and time before the production start, and we are feeling more safe due to fixed quantities". (2014, Supplier, April) Secondly, the metal tier-2 suppliers are competing with quality and innovation over price, since there is a strong focus and pressure from automotive manufacturers on quality partly due to safety standards. (2014, Production Developer, July) Thirdly, these customers have high technological knowledge since these customers are system providers to the OEMs that in turn also have knowledge of how to produce a car. Fourthly, from the perspective of the metal tier-2 suppliers, they have a diverse customer base and revenues of ~20-100 Million annually, since they are supplying a range of different automotive brands with standardized products. This drives technology spill-over between automotive manufacturers. Below is an illustration of assembly plants and tier-2 and tier-3 metal components suppliers.



Source: ACEA (2014)

Illustration 4.5.2.1 Location of automotive assembly plants and tier-2 and tier-3 metal suppliers in Central Europe

As the fifth aspect, similar to the food packaging industry, production is located close to assembly. While the rationale for the food packaging industry is non-stackable cans, the rationale for metal tier-2 suppliers is heavy components and just in time thinking to reduce working capital. (2014, Production Developer, July) As the illustration shows, there is a strong tradition of automotive manufacturing in Czech Republic and Slovakia. These countries function mainly as an export base to Western Europe.

Key differences and potentials

Given that above-mentioned automotive metal tier-2 suppliers have potential to form a competitive supplier base for the future, there is a need to look at differences in way of working. The two most important differences of working with automotive metal tier-2 suppliers compared to current sourcing are; fixed quantities annually rather than uncertain quantities and a diverse customer base rather than letting the supplier have a very high dependency on IKEA. The fixed annual quantities are a key difference since IKEA currently has an option to switch supplier in a couple of months. “Since IKEA’s growth is strong, large investments are required. If the customer has a chance of leaving the supplier with all these previous investments in a couple of months,

these suppliers might not want to enter such relationships”. (2014, Metal Leader, July) One current supplier thinks that it is “more certain and comfortable to work with the automotive industry as the customer”. (2014, Supplier, April) Secondly, a diverse customer base is a trade-off between learning from other customers and having control and power over the supplier. Higher revenue share makes you more important and thus powerful, while lower revenue share opens up for other customers to teach you things. These differences are further treated in the forthcoming discussion chapter.

4.5.3 Players in the Food Packaging Industry

This sub-chapter aims at pointing on a set of food packaging players that have the potential to be part of a competitive supplier base of carbon steel sheet products, by supplying bin & box products. The annual quantity of proxy products within the bin & box group is ~20 Million units of which European demand accounts for ~70 %. (Internal MIS) To simplify, a flowerpot is a cylindrical body with a welded seam and a bottom. A three-piece food can is exactly the same, but with the top as an exception. Below are the European top players within the food packaging industry.

Table 4.5.3.1 Main food packaging players in Europe

Supplier	Estimated EU food can industry market share 2013	Estimated EU food can quantity 2013, [in Millions]	Quantity/plant [in Millions]	# of TACE plants
Crown Holding	32,70%	8175	235	5
Ardagh	20,50%	5125	120	14
Silgan	2,50%	625	35	5
Auxillar	1,80%	550	-	-
Massilly	1,50%	450	-	2
G&M	1,50%	375	-	-
CanPack	1,30%	375	-	1
MetaRus	0,90%	325	-	-
Sicom	0,90%	225	-	-
PikoPack	0,80%	200	-	1
Kalininggrad	0,80%	200	-	-
Sarten	0,40%	100	-	1
<p>Total: ~25 Billion, including Others (16,6 %) and "Self-make" (12,1 %)</p> <p>■ Estimated European Food Can Market Share 2013</p>				

Source: Crown Holding Inc (2014), Ardagh Group (2012), Silgan Holdings Inc (2013), Company websites, Google Maps

Given ~20 Million units in the Bin & Box group within the carbon steel sheet forming segment, the European food packaging industry produces ~1000 times more units annually (~25 Billion, 2013). It is a highly concentrated industry, with the two largest players accounting for > 50 % of the market. These two players have mainly grown inorganically and the latest merger was between Crown Holding and Mivisa, resulting in a > 30 % market share of Crown Holding. (Crown Holding, 2014) The biggest players are producing billions while IKEA are producing millions. Thus, smaller players have more potential regarding suitable scale, producing ~10 to ~30 times more food cans than global annual Bin & Box group quantity.

Player scanning of the food packaging industry

The food packaging players are filtered through four key aspects previously explained. These aspects are shown below and evaluated for the five key players in Central Europe. CanPack is believed to be a competitive starting option when going into initial discussions while Massilly and Silgan are ranked higher than Crown and

Ardagh. This is since the pressure to diversify is the single most important aspect that will tell if this player is interested in making business at all.

Table 4.5.3.2 Assessment of food packaging players (where High pressure to diversify = good, High suitable scale = good, High flexibility in form = good, High plants located in competitive countries/clusters = good)

Factor	Proxy	Food can player				
		Crown Holding	Ardagh Group	Silgan	CanPack	Massilly
Pressure to diversify	[European market share]	Low (high share)	Low (high share)	Medium	High (low share)	High (low share)
Suitable Scale	[Estimated quantity per plant]	Low	Low	Medium	Medium	Medium
Flexibility in Form	[Customized segments]	Medium	Medium-High	Medium	Medium	Medium
Plants located in competitive cluster/country	[Location]	Medium	High	Medium-High	High	Medium

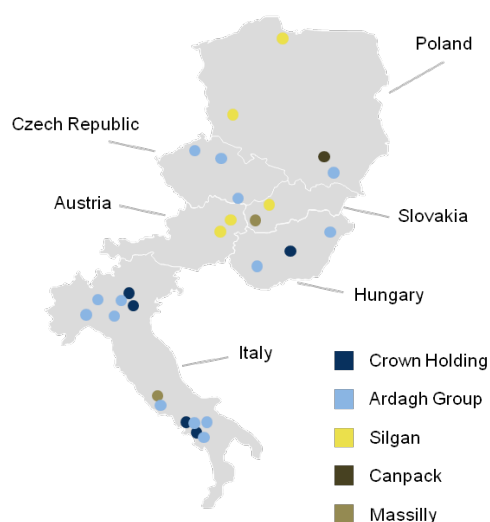
Source: Crown Holding Inc (2014), Ardagh Group (2012), Silgan Holdings Inc (2013), Company websites, Google Maps

Dynamics of the food packaging industry

Considering dynamics of the food packaging industry, there are four important aspects to gain further understanding of. Firstly, cans are not stackable and therefore produced close-to-market i.e. close to actors that fill the cans with food. (Case No COMP/M.7104, 2014) In Europe, 200-500 km distance allows suppliers to be competitive in general. “Most customers estimate transportation costs of 1,5-4 % of total can price per 100 km.” Secondly, there are low switching costs and thus a widely used strategy is customers threatening to switch suppliers. Products are standardized and customers generally multi-source with two or three metal can suppliers. Contracts last for ~1 year. Threat of entry could be considered high since access to raw material, production technology and distribution services are easy, together with no role of intellectual property. Thirdly, economies of scale is received on the level of the production line and in raw material sourcing but not on the supply chain level. Capacity flexibility is high and production lines are frequently moved to be close to demand. “All competitors state that they have had experience with moving production lines from one plant to another and that it is relatively easy and quick, taking from one

to six months.” (Crown Holding, 2014) Although, investments in a new plant or additional production lines in a new location would only be undertaken once customers’ commitments are secured. (Case No COMP/M.7104, 2014) Fourthly, spare capacity is periodic and ranging from 10 to 40 %. Demand peaks between July and October and thus, spare capacity potential occurs in the first half of the year. To conclude, smaller players are under competitive pressure and might need an extra leg to stand on. For those players, a relationship with IKEA would be considered valuable.

Plant locations of the top players within Central Europe are shown below, where Silgan, Canpack, Massilly and Ardagh Group have plants in competitive countries (Czech Republic, Poland, Slovakia) and to some extent in competitive clusters.



Source: Crown Holding Inc (2014), Ardagh Group (2012), Silgan Holdings Inc (2013), Company websites, Google Maps, Interview with CanPack

Illustration 4.5.3.1 Food packaging player’s plants in Central Europe

Key differences and potentials

There are significant cost reductions potentials and therefore potentials of significantly lowered prices of bin & box products, together with sustainability improvements potentials. This is due to one thing: reduced sheet thickness. A proxy flowerpot has a thickness of ~0,4 mm while these players are aiming for 0,1 mm in the near future. This is a food packaging supply chain innovation reducing weight in the supply chain and therefore reducing raw material cost, transportation cost and CO2 emissions. “Count with ~2,5 kg CO2 emissions reduction per kg raw material reduction”. (2014, Category Leader Europe, August) Secondly, the flexibility in

moving capacities creates potential for lowering transportation costs and therefore also CO2 emissions. Additionally, over- and under capacities can be managed more efficiently. Thirdly, these players use continuous quality control through vision, which enables eliminated waste a la lean production. Fourthly, the knowledge level of surface treatment is higher since food requires more advanced treatments than furnishing.

While these potentials are significant, key differences lie in the difference between a food can and a flowerpot. Although both of these consist of cylindrical bodies and a bottom, food cans are produced in a more standardized, less flexible way and with a limited sheet thickness. Below are potential dimensions of food cans to use as a starting point when producing Skurar and other bin & box key products. What Table 4.5.3.3 is also showing is the actual flexibility in different dimensions, opening up for interesting potentials of using the food packaging industry as IKEA supplier.

Table 4.5.3.3 Dimensions of food cans in the product range of CanPack, in relation to a proxy product of the bin & box segment

Segment	Diameter [mm]	Height [mm]	Material	Similar to Skurar
Three-piece food cans of CanPack	70	47	T/P	-
	70	55	T/P	-
	70	57	T/P	-
	70	80	T/P	-
	70	101	T/P	-
	70	102,5	T/P	-
	70	108,5	T/P	-
	70	110	T/P	-
	73	38	T/P	-
	73	43	T/P	-
	73	57	T/P	-
	73	80	T/P	-
	73	101	T/P	-
	73	108,5	T/P	-
	80	85	T/P	-
	96	47	T/P	-
	96	51	T/P	-
	96	63	T/P	-
	96	74	T/P	-
	98	118,2	T/P	Yes
	98	174,8	T/P	Yes
	99	48	T/P	-
	99	60	T/P	-
	99	114	T/P	Yes
	153	152	T/P	-
	153	179	T/P	-
	153	247	T/P	-
	153	260	T/P	-
	153	289	T/P	-

Source: Company Website, Interview with sourcing developer

Above-mentioned aspects are viewed as the degree of freedom that these players have currently. The second difference is the inexperience of being a home furnishing producer. There is a need to be clear and use sharp descriptions of customer wants and needs, an issue that is brought to the discussion chapter.

4.6 Knowledge and supplier Integration in the New Product Development Process

This chapter is divided into two main sub-sections based on supplier integration in new product development. The first most handles the characteristics of knowledge and supplier integration in the new product development process at IKEA and the second handles the same topic but in other industries. It is based on data collected through interviews with IKEA sourcing developers and IKEA employees with previous experience from other industries.

The interviews with the sourcing developers were designed for the respondent to indicate to which degree the supplier is integrated in each step of the NPD-process. Within each step there were also follow-up questions to more clearly see the purpose of the integration in each step. The interviews also handled questions regarding how the suppliers are chosen to be integrated in new product development.

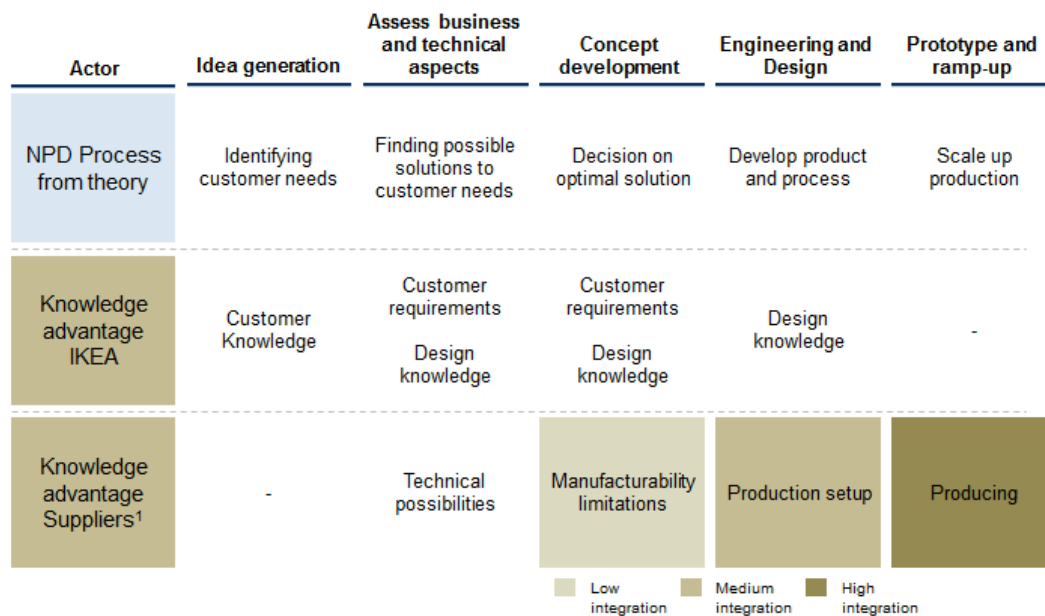
4.6.1 Characteristics of knowledge and supplier integration at IKEA

The general unanimity among the sourcing developers is that the right supplier in most cases is selected, and is selected due to complementary skills to the internal business unit. There are, however, some concerns about the process of selecting the right supplier, which in some cases were expressed as being too slow.

IKEA's suppliers are mainly integrated in the later phases of the NPD-process. Due to IKEA's competitive bidding process, where different suppliers are quoted on price, there is a need for precise drawings in order to make the quoting comparable. This seems to be parts of the reason why the supplier is integrated rather late in the process. It has also been expressed that the majority of the quoted prices differs from the final price and the design is also in some cases altered after quotation. Suppliers are however occasionally integrated earlier to develop prototypes, in the majority of

those cases it is before the decision on which supplier that will produce the final product.

Table 4.6.1.1 Supplier integration at IKEA, the steps most to the right is where the suppliers are integrated at IKEA



The integration of the supplier is in the majority of cases initiated in the engineering and design phase. This is where the technical performance measures and targets are communicated to the supplier. IKEA is the actor who sets the targets and measurements, which is based on customer requirements. The suppliers' role in this step mainly consist of describing how they will reach the targets set by IKEA. Drawing from theory and knowledge integration as a process for creating new knowledge one could conclude that knowledge is only transferred between the actors and little or no new knowledge is co-created. Furthermore, the sourcing developers state that the level of technological knowledge is greater at their suppliers than at IKEA.

The level of integration in setting business targets and measures is similar to the technical assessment. It does however vary from supplier to supplier, but in general the supplier has limited influence in setting business related targets.

The study handled three types of outputs of IKEA's supplier integration in new product development. Product financial performance, supplier production

performance and product design performance. The answers in the study shows that the main output from the supplier integration are in financial performance. More detailed in development cost reductions. It was further expressed that the supplier had a small degree of influence on the outcome of the design and function of the final product. The impact on the supplier's production setup and performance were also described as low.

4.6.2 Characteristics of knowledge and supplier integration in other industries

When comparing the aspects of knowledge and supplier integration between IKEA and the automotive industry one could conclude many similarities in the process and timing of integration. The main difference lies in the knowledge level and distribution of knowledge between the customer and supplier. In the case of IKEA and as stated in the previous section, the supplier has a greater technological knowledge than IKEA. This is rather the opposite in the automotive industry, where the system providers or OEM's has greater technological knowledge than their suppliers. They see their lower tier suppliers more as capacity providers rather than complementary knowledge bases. Furthermore, the automotive manufacturers are also using a competitive bidding process, but the designs and drawings are final once the quotation is initiated.

4.6.3 Analysis of knowledge and supplier integration

The essence of integrating a supplier would most presumably lie in finding complementary knowledge and integrating this in the right step of the product development process, consequently also in reducing knowledge overlaps when integrating a supplier. It would therefore be beneficial to integrate a product-focused supplier earlier and quite extensive in the NPD-process to contribute with knowledge about customer needs. However, this would in the case of IKEA be considered as a knowledge overlap, since IKEA has a great deal of knowledge of their customers. This is also the case with the previously stated mapped supplier, where majority were product-focused and hence provides overlapping knowledge to IKEA.

When assessing process-focused suppliers, another approach is needed for IKEA to gain the most out of these suppliers. Not least in how the supplier is integrated in the NPD-process. As was found from interviews with sourcing developers, and previously stated, the current suppliers are integrated rather late in the process. This is reasonable to reduce knowledge overlap with suppliers that already have knowledge

about the customer. However, with process-focused suppliers there is a need to transfer the knowledge about the customer from IKEA to the supplier.

The strength of a process-focused supplier is in this case the knowledge of how to most efficiently refine metal sheets into a specified product. In order to utilize these suppliers' full potential the most important aspect of the supplier integration is to transfer the degree of freedom of the product design based on customer needs to the supplier. The role of the supplier will then be to optimize the product based on their production setup and manufacturing knowledge within the borders of the customer needs. This is essential when creating new knowledge and not merely transferring knowledge between the two actors.

Because of the competitive bidding process the suppliers cannot be fully integrated in earlier steps. However, since the supplier holds a technological knowledge advantage towards IKEA one could furthermore argue that the suppliers' knowledge is needed earlier in the NPD-process. In contrast to the automotive industry, where their suppliers' have lower or similar degree of technological knowledge the late timing of supplier integration is more motivated.

Even though the complexity of the products could be considered similar in both industries one cannot in general terms state when suppliers' are integrated in new product development of low-complexity products. The timing of integration is more related to which complementary knowledge that is needed in the different steps of the NPD process rather than the complexity of the product.

5 Discussion

The first interesting area to discuss is whether a top-down approach assessing countries, clusters and players, starting with a clean paper miss out on good player options, since one can argue that there are thousands of interesting bottom-up approaches. One can play around with four approaches: top-down given IKEAs current sourcing in Central Europe, top-down with clean paper, bottom-up given IKEAs current sourcing in Central Europe and bottom-up with clean paper. The interesting thing is that a top-down clean paper approach that the authors have used more or less, initially putting all countries, clusters and players on a par, essentially led to an assessment that the current key supplier of carbon steel sheet products is located in a competitive Czech Republic and a competitive Ostrava and is what is called a process specialist, although not within carbon steel sheet forming. The bottom-up clean paper approach would certainly have been to identify all players that possibly could produce carbon steel sheet products in Central Europe and based on request for quotations and interviews assess the future competitiveness of all players and then select the best two-three options. Somewhere, maybe in Hungary, there might be a hiding product-focused player that is competitive despite location in a non-competitive cluster and non-process specialization. Although, what can be argued is that the top-down clean paper approach is maximizing the chances of taking the right decision quickly without being biased towards IKEAs current sourcing. Fourthly, a bottom-up approach given IKEA's current sourcing is somehow where the thinking started; with the list of previously mapped potential suppliers located mostly in non-clusters in Czech Republic. One interesting aspect is whether to take a product-focused supplier that knows about customer wants and needs but teach them how to make money in the right way, or take a process-focused supplier that makes money in the right way but teach them the wants and needs of home furnishing customers. Given that this thesis exists, it is a sign that the first have not been as successful as one might have wanted, and the latter should thus be a better option for the future. This is further discussed in the knowledge integration part of the discussion.

Considering clusters, it is worth discussing if the authors took the right or the wrong decision. The key underlying assumptions for the decisions are increasing specialization and globalization: if the cluster is stronger than the others today, the

authors expect that the cluster is stronger than the others tomorrow. This is due to knowledge and technological spill over, secured labour availability and greater potential of subsidies as priority for the European Union and the states in the global competition against other regions. Porter (1988) stresses that the key priority for states should be cluster development. On the other hand, one can discuss whether institutions, given urbanization and demographic vulnerabilities, instead would focus their efforts on strengthening weaker clusters to balance the internal European competition. Such a conclusion would although be highly uncertain, relying on the unknown. As a takeaway, the authors are confident on the specialization and labour availability parts, while the precise locations and precise players for long-term future subsidies essentially are unknown.

An important aspect is the interrelation between research question two and three. Is it certainly the cluster that is strong and thus is driving the competitiveness of automotive metal tier-2 suppliers, or is it the automotive metal tier-2 suppliers that have impact on the cluster data used for cluster analysis? Since the analyses are driven top-down, the authors are certain about finding competitive player options in a strong cluster. Everything else would make no sense. Nevertheless, the main purpose to develop a competitive supplier base driving volume from 6 MEUR to 30 MEUR from 2014 to 2020 requires giving a recommendation of a set of specific players. Whether the authors have used above-mentioned short cuts or not, the output of this thesis is a set of specific players believed to be competitive players. If assuming that these automotive metal tier-2 suppliers have impact on the cluster data and analysis, the future competitiveness of the IKEA carbon steel sheet forming supplier base will be driven by the future competitiveness of the Central European automotive industry. This is an interesting aspect, since it on the other hand requires a certain over capacity of these players if IKEA was to enter a relationship without major investments.

Given above-mentioned discussion, there is room for another crucial question. Make or buy? The authors have only assessed the buy option, when there is a clear potential to let IKEA make these carbon steel sheet products by upstream vertical integration. Connected to the resource-based view of the firm (Barney, 1991), the make option would be a source of a sustained competitive advantage, if the making rather than the buying of these products was valuable, rare, non-imitable and non substitutable. A

key question becomes: Do IKEA believe that they can use their current capabilities and resources to create a production process of these carbon steel sheet products that is rare and non-imitable? To put it simple, to take the make-option there needs to be a clear advantage. Two advantages are cutting the middleman and scaling raw material sourcing, although the key question is if IKEA is the best actor to press components and form cylindrical bodies today and 2020 given the 6 to 30 MEUR scale? The forthcoming discussion on knowledge integration further treats this aspect by considering complementary knowledge.

Moreover, there are fundamental differences in the way of working between the two analysed industries (automotive metal tier-2 suppliers and food packaging players) and IKEA, which consequently will require a changed behaviour to approach these players. Worthwhile is also to discuss what changes in the role of the trading areas that will be expected or required towards 2020. When specialization increases, there needs to be a bridge role explaining the degree of freedom in production for the designers, and on the other hand the wants and needs of customers for the specialized supplier. A key question becomes; what changes in the role does IKEA expect of increasingly specialized process-focused suppliers in the future? And turning this question around, what does the supplier expect from IKEA?

If starting with the concept of knowledge integration between the two actors related to Grants (1996) definition of knowledge integration as specialized, differentiated, but complementary knowledge. In the case of IKEA and its suppliers one can conclude that the level of complementary knowledge is in some cases rather low, especially when looking into one type of supplier, the product specialists. The overlapping knowledge is in this case the knowledge about the customer, which could be avoided by focusing on suppliers who are more focused on their processes.

Berggren et al (2011) also emphasizes that in order for the knowledge to be integrated it does not only need to be transferred, but also be shared and applied. Hence, the previously stated complementary knowledgebase has to be applied in order to be integrated. In the case of IKEA, the competitive bidding process between different suppliers demands exact drawings in order for the suppliers to quote the same product. However, in order to integrate knowledge, a supplier must be involved

earlier where the degree of freedom of the product is greater and changes can be made to increase the manufacturability of the product based on the knowledge of the supplier. One could therefore argue that the competitive bidding process, which purpose is to find the lowest production cost of the product, instead limits the ability to integrated knowledge, which consequently also affects the production cost of the product.

Berggren et al (2011) does however emphasize the need for some degree of overlapping knowledge in order to be able to grasp and utilise the transferred knowledge. In terms of IKEA it is hard to generalise the level of knowledge and compare it to the suppliers since it varies highly between business areas and suppliers. What can be stated however is that the technical knowledge of the suppliers within the segment of carbon steel sheet forming is higher than the internal technical knowledge at IKEA. This further emphasizes the need for the suppliers' knowledge within the new product development process.

As stated previously, the suppliers are integrated rather late in the process when for example developing product prototypes. This is before the product is quoted to other suppliers. It could in a sense be regarded as good timing since the suppliers' knowledge is integrated before the final drawings of the product. However, in accordance to Wagner (2013) one could question the commitment of the supplier integrated if there are no guaranties that they will be the ones producing the final product. There must, as Walter (2003) states, exist a certain level of trust between the two actors for a fruitful relationship to emerge. Furthermore, in those cases that the integrated supplier also is the one producing the final product, if this is not stated or agreed upon before the supplier is integrated the same outcome will most probably occur. One could hence argue that if the two actors should gain most from supplier integration, the supplier's knowledge should be integrated earlier and it should also earlier be stated what supplier that will produce the final product. This will promote the commitment and trust with the supplier and the product can be developed to fit both the customer requirements and increase the manufacturability of the product.

A way to enforce trust has previously been achieved through high IKEA dependency from the supplier point-of-view. This does in a sense force supplier commitment.

However, process specialists tend to have a more diverse customer base than product specialist. This would make it harder to achieve such a high dependency, which further more emphasises the need for a higher degree of trust between IKEA, and it's suppliers. Another aspect that speaks for a lower dependency level is knowledge spill over from other industries, such as the automotive and food packing.

There are many ways to enhance trust between two actors; the one discussed here will be to engage in longer contracts with the suppliers. Longer contracts are used in other industries, such as the automotive. There is however a difference in the characteristics between these two industries. The demand in the automotive industry is more stable and there is to some extent easier to forecast the demand of a car than for example a certain flowerpot. It is hence easier to formulate a contract in the automotive industry. A possibility would, in the case of IKEA, be to formulate a contract based on the processes of the supplier. Even if the demand of a specific metal product is volatile, IKEA's need for pressed metal products in general could be assumed more stable. A contract could hence be formulated around IKEA's need for the suppliers' capacity, rather than around a specific product.

6 Conclusion

The purpose of this chapter is to give a concise answer to the four research questions together with concluding the discussion and thus, there are four proceeding sections treating each question.

Poland, Czech Republic and Slovakia are the most competitive countries within Central Europe for the supplier base of carbon steel sheet forming products to be located in. These three countries are comparatively most competitive due to two key reasons; competitive factor conditions and a competitive industry structure, in particular considering scale and productivity of fabricated metal products manufacturing firms.

The most competitive clusters are those in Czech Republic, south Poland and Kosice in Slovakia, since these have a high number of people, a critical mass, together with a high share of people in the region working in the fabricated metal products industry. These clusters are from a location perspective viable, since the supply chain lengths from coil supplier to logistics clusters is comparatively short together with closeness to the European market. Considering supporting industries, i.e. the metal manufacturing and automotive industries, above-mentioned fabricated metal products manufacturing clusters are within the same region or significantly closer to these than other regions. To locate the supplier base of carbon steel sheet forming within these clusters generate three advantages. Firstly, labour availability is more secured since urbanization and specialization is driving concentration of fabricated metal products into certain regions. Secondly, technology spillover is greater within these than outside these clusters. Thirdly, although based on critical assumptions, viewing Europe as a competitor to other regions, it would make sense to subsidize these regions rather than non-metal regions with European earmarked metal subsidies.

Process focused players are more suitable than product focused players since they are making money by high volume rather than high margin. Thus, these players are more aligned with IKEAs business model; to lower prices and costs through higher volumes. The previously mapped suppliers are in general product focused and have in

some cases failed in request for quotation rounds. There is a higher potential of automotive metal tier-2 suppliers specialized on pressing, in particular Klein & Blazek, Tawesco, Essa, Clamason and Huhn Press. These players are process focused and located in competitive countries and clusters towards 2020. Similarly, CanPack, Silgan and Massilly are high potential food packaging suppliers that are specialists of cylindrical bodies and a bottom and thus suitable for producing bins and boxes for IKEA. These players have a competitive pressure to diversify together with suitable scale, flexibility in form and location to certain extent in competitive clusters and countries towards 2020.

Worth discussing is the need of behavioral changes from IKEA's side to approach these players. Longer contracts than currently are needed to align with the way of working in these industries. From the perspective of these players, there are risks associated with investing in the capability to be a home furnishing manufacturer. Thus, longer-term contracts with mutual investments are change drivers for successful future relationships. Other customers to these industries have technological knowledge and thus, a lower share of the supplier's revenues could open up for knowledge spillover and a win-win-situation.

There is a need for earlier supplier integration than the current status. There is consequently also a need to earlier find the optimal manufacturer of the product. This demands a supplier base with complementary knowledge towards IKEA. Some degree of overlapping knowledge is however also needed in order for both actors to be able to grasp and apply the transferred knowledge. Manufacturing limitations must be identified early when there is room for changes in design within the borders of customer requirements. The proposed next step is implementation of the above and initial discussions with recommended players.

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