Trade fairs and transfer of knowledge – Green energy and home design on display

Author: **Schjønsby, Håkon** (University of Oslo)
Title: Trade Fairs and Transfer of Knowledge
Subtitle: Green Energy and Home Design on Display
Year published: 2009
Supervisor(s): Asuncion Lopez Lopez and Paloma Sanchez

This thesis investigates knowledge transfer at trade fairs and examines how private and official actors are involved in these processes. The thesis analyzes empirical findings from two case studies. Casa Pasarela which is a trade fair for home design, and Genera a trade fair for renewable energy. Both trade fairs took place in Madrid spring 2009 and were arranged by IFEMA. The theoretical approaches used in this thesis are concepts from evolutionary economics which mainly include types of knowledge, buzz, industrial knowledge bases, pipe lines and systems of innovation.
The results demonstrate that knowledge transfer occurs different at trade fairs, and that buzz as a means for knowledge acquisition is diverse in industries. Firms in the design industry generally draw on a symbolic knowledge base. The knowledge in this industry is transferred in aesthetic symbols, images and signs which are related to trends, fashion and culture. Both buzz and face-to-face are relevant inputs for knowledge creation and allow exchange of tacit knowledge and information to take place at trade fairs. Firms in the energy industry draw in general on a synthetic knowledge base. They rely on tacit knowledge in the form of know-how and skills which are transferred face-to-face in formal relations. Informal buzz at trade fairs contains more an exchange of information which is less relevant for knowledge creation in this industry. The results also show that firms, government organizations, universities, trade fair organizers – actors of regional and national innovations systems, use foreign trade fairs to establish relationships for interactive learning and diffusion of innovations across national borders. Governments use trade fairs to present business opportunities in their domestic industry, and facilitate firms' participation by arranging national common stands.

Contents

List of Graphs and Figures

List of Abbreviations

DI_MAD	Association of Designers in Madrid
BWi	Baden- Württemberg International
CMSB	Caja Madrid Savings Bank
CIEMAT	Centro de Investigaciones Energeticas Medioambentales y Technologicas
AHK	German Chambers of Trade
BMWi	German Federal Ministry of Economics and Technology
IFEMA	Institución Ferial de Madrid
IN	Innovation Norway
IDEA	Institute for Energy Diversification and Energy Saving
MCCI	Madrid Chamber of Commerce and Industry
MCC	Madrid City Council
MadrI+D	Madrid Innovation and Research System
MRG	Madrid Regional Government
CENER	National Centre for Renewable Energies
ASIT	Solar Association for Thermal Industry
APPA	Spanish Association of Renewable Energy Producers
ICEX	Spanish Institute for Foreign Trade

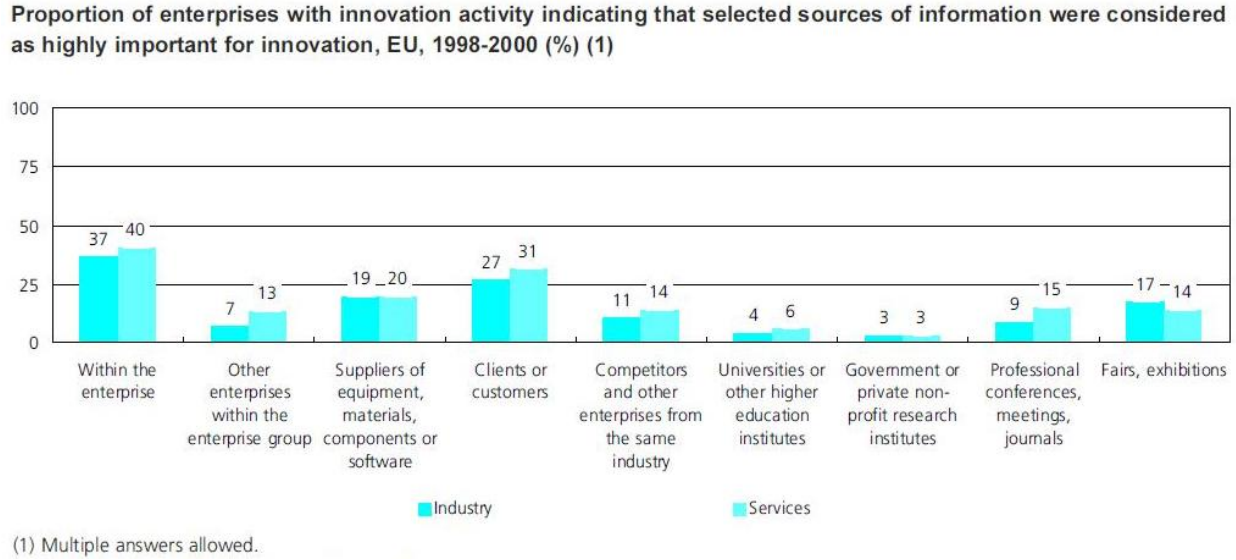
1 Introduction

1.1 Background

Since the 1950s trade fairs has been a popular method to promote new products in home and foreign countries. Firms that intend to establish themselves on new markets often use trade fairs as a platform to meet contacts and diffuse new products. Trade fairs attract key professionals from a particular industry and allow firms to meet relevant customers, suppliers and partners. Trade fairs set the focus on the industry. Television, news papers and industry journals often cover the events and create attention about the industry, trends and innovations. Some trade fairs are also open to the public.

Trade fair events consist mainly of four actors: The trade fair organizers, which are companies that plan, organize, monitor and stage the fairs; the exhibitors that display products and services on their stands, and use the services of the trade show organizers; visitors that attend to the fair to observe products and services on display; and the local or regional government, that often owns a share in the trade fair companies in order to stimulate the regional trade and economic development (Kirchgeorg, *et al*, 2005, p.35).

The modern trade fair focuses on a specific industry or trade and makes it possible for the participators to identify the trends, products and challenges of the industrial sector. In addition to the exhibitions trade fairs also hold conferences, workshops and seminars where influential actors, researchers and experts discuss selected issues of the industry. These events allow key people from industries to meet each other face-to-face and interact. It is therefore argued that trade fairs are an innovation source for the enterprises. According to statistics from Eurostats report on innovation in Europe from 2004 trade fairs make up 17 percent in the industry and 14 in the service sector of the information sources the enterprises consider important to innovate (Eurostat, 2004, p. 25). The statistics on graph 1 show that trade fairs are a relatively important information source for the enterprises compared to other sources such as universities, research institutions and competitors of the same industry. Only customers, suppliers and sources within the enterprise are considered as more important.



Graph 1 Enterprises' Information Sources for Innovation (Eurostat, 2004, p.25)

1.2 Aims and Objectives

The statistics from Eurostat suggest that trade fairs are comparatively important information sources for innovation. Maskell et al (2004) and Bathelt and Schuldt (2008) have set the focus on trade fairs as temporary clusters that support knowledge creation and interactive learning. However, as far as the author knows, there are few works that explore knowledge transfer processes in relation with trade fairs, especially among different industries. At the same time government organizations such as Innovation Norway and Spanish Institute for Foreign Trade (ICEX) are involved in firms' trade fair participations in order to facilitate their internationalization. This indicates that the trade fair is a central issue in the field of knowledge and innovation. Following research questions are suggested:

I. What are the main features of the knowledge transfer processes at industrial trade fairs?

II. How are official and private actors involved in knowledge transfer processes at trade fairs?

This thesis aims to investigate the processes of knowledge transfer in relation to trade fairs, and see how it corresponds to existing theories about knowledge.[1] The investigation will try to identify the knowledge transfer and the government organizations position by looking at characteristics of the trade fair, the specific industries, the organizations and firms that participate and the literature on knowledge and innovation. Identifying the knowledge transfer process means to differentiate the types of knowledge that are being transferred and discuss how important the transfer process at the trade fairs is for innovation in the industries. Official and private actors in this thesis refer to firms, universities, schools, R&D centers, trade fair companies, government organizations and industry associations.

1.3 Casa Pasarela and Genera

In order to answer the research question this thesis will investigate two trade fairs: Casa Pasarela and Genera. These events are arranged by Institución Ferial de Madrid (IFEMA) which is the organization that arranges trade fairs in Madrid. (See chapter 3 for explaining why these fairs)

Casa Pasarela is a trade fair for design and home trends. This industry involves design of furniture, sculptures, lamps, leather, decoration, light design, textile, and other artifacts for household. 2009 was the 5th edition of Casa Pasarela and it was arranged together with the international trade fair 360 Interiorhome which focus on furniture (Casa Pasarela, 2009).

Genera is a international trade fair for renewable energy. Renewable energy includes firms in solar energy (thermal and photovoltaic), cogeneration, biomass, wind energy, hydraulic energy, wastes, hydrogen and fuel cells, coal, gas and crude oil and others. Renewable energy has been a growing industry in Spain the last years and Genera has been increased to an annually event. Genera 2009 was the 12th edition of this trade fair (Genera, 2009).

1.5 Outline of the Thesis

Next chapter will look at the theoretical framework this investigation is based on. Concepts of evolutionary economics such as models innovation, types of knowledge, buzz, knowledge bases and the SI approach will be presented here. Chapter 3 will present the methodology used in the thesis. Chapter 4 will present the results of the analysis of the empirical findings. This includes firms and official and private actors. In chapter 5 the results will be discussed with approaches of the innovation literature in order to identify features of the knowledge transfer process and to see how these actors are involved on trade fairs. The last chapter will summarize the findings and suggest elements for further study.

---

[1] The word "fair" has a wide meaning. Words such as exhibition and show are also often used in relation with trade fairs. Fairs can also be associated with the great world exhibitions of the 19th Century, Spanish flamenco events in Seville and Jerez or fun parks with rollercoasters. Trade fairs are events that focus on a specific industry or trade and are the object of study in this investigation. When using the words: fair, show or exhibition in this thesis the meaning is associated with trade fairs.

2 Theoretical Framework

Since this investigation will focus on knowledge flows at trade fairs and how participators interact with each other, establish contacts, and get external sources of knowledge, the researcher considers it relevant to look at concept related to knowledge transfer: spatial proximity, spillovers, network, buzz, face-to-face, linear and interactive models, systems of innovation based in the framework of evolutionary economics. This chapter aims to present these concepts.

2.1 What about Including Knowledge, Technology and Innovation the Analysis

There are several definitions of innovation. The Oslo Manual uses a broad description: "An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organisation or external relations" (OECD and Eurostat, 2005, p. 46). Pavitt propose a general framework: "Innovation processes involve the exploration and exploitation of opportunities for new or improved products, processes or services, based either on an advance in technical practice, or a change in market demand, or a combination of the two" (Pavitt, 2005, p.88). He also states that innovation is uncertain, and it is difficult to predict the costs and performance of new products. According to Schumpeter innovation also involves"carrying out new combinations" (Quoted in Nelson and Winter, 1982, p. 277) of existing knowledge. The knowledge translation into functioning artifacts and transfer of knowledge between firms plays a central role in innovation processes (Pavitt, 2005, p.88). This help firms to reinforce their capabilities in joint products one another or recombine existing knowledge in new ways (Powell and Godal, 2005 p. 74-5). The way from idea to product may be long. A distinction between invention and innovation is often made. "Invention is the first occurrence of an idea for a new product or process, while innovation is the first attempt to carry it out in practice" (Fagerberg, 2005, p. 4). Schumpeter categorized innovations according to their type: new products, new methods of production, new sources of supply, the exploitation of new markets and new was to organize business. However, process and product innovations are considered as the two major innovation types (Fagerberg, 2005, p. 6-7). Freeman and Perez (1988) discuss innovations according to how radical they are. Radical innovations have dramatic effects and are associated with booms of new industries. An innovation is incremental if it contains continuous small improvements. Learning by doing and learning by using are often factors of incremental innovations (Freeman and Perez 1988, pp. 45-6).

Changes in technology and innovation are recognized as the major reason for economical growth through the history by most economists. However, how technology, knowledge and innovation are included in the analysis and how human behavior is explained are discussed issues in the economic literature.
Neo-classic economic literature is based on the microeconomic presumptions that individuals act rationally and maximize their utility in a framework of perfect information. The economic developments of the market are being made by adding all individual rational decisions together and this result in equilibrium where the suppliers and demanders have optimized their decisions. The goods of the market are distributed by the equilibrium price. Samuelson agrees that history shows that technological change has caused the major economical growth. In the neo-classical growth model technological change is represented by an upward shift in the production curve (see Samuelson, 1992, pp. 113, 553). Technology increases the production efficiency and is therefore a rational decision in order to maximize the outcome. How firms innovate and perform their learning processes to cumulate knowledge is often a "black box" and not a part of the theory. Technology is explained as a given external factor outside the economic models.

Schumpeter saw innovation as the driving force of economic change, but in contrast to the neo-classical school he argued that technological change should be included in the analysis. He borrowed from Marx the idea that capitalist evolution was motivated by technological competition between companies and that the companies had to keep themselves competitive by R&D and introducing more efficient technology. To these ideas Schumpeter included the earlier mentioned categories of innovations and argued that these types do not only strike at the output of present companies, but also their existence and foundations (Fagerberg, 2002, pp.12-29). Schumpeter also combined these ideas with concepts from early neoclassical micro economics. As Fagerberg says it, "Schumpeter saw the neoclassical equilibrium theory as an elegant illustration of the power of the equilibrating forces in the economy" (Fagerberg, 2003, p. 129) and he argued at the same time for integrating theoretical work with historical analysis. According to Schumpeter does one innovation often depends on another. The systemic interdependencies of innovations make an industry or cluster grow faster than the rest of the economy. This growth will at a moment experience a slowdown. With inspiration from Kondratief`s work on long waves, he argued that innovation may be a factor for long cycles in economic activity (Fagerberg, 2003, p. 130).

Despite Schumpeter's work on innovation and growth, the neo-classic economic theories followed by the Keynesian were the dominant theoretic approaches in economics. Keynesian, which is deeply related to neo-classic tradition, was used as economic modeling during the post-war boom of the 1950-60s and would prevent a new depression like in 1930s. However, after the economical slowdown with inflation and unemployment in the 1970 Schumpeter's ideas on innovation were adapted more rapidly (Fagerberg, 2003, p. 126 and Freeman and Perez 1988, pp. 38- 41).

In order to explain economical change, Nelson and Winter (1982) borrow ideas from Schumpeter, Darwinism and literature on organizational behavior. Nelson and Winter reject the neo-classical microeconomic presumptions that individuals always act rational and optimize their decisions, and the existence of perfect information and homogeneous goods (1982, pp. 1-29). They argue that satisfaction and organizational routines (genes) are features that represent firms or groups behavior in markets where goods are heterogeneous. The term "routines" range from technical routines for production to policies regarding investment, ordering new inventory, increase production in high demand, R&D, advertising or business strategies (Nelson and Winter 1982, p.80). The "selection environment" represents mechanisms outside the firm, for example the industry, product demand, factor supply and other firms' activities which affect its well being, expansion or contraction. Groups and firms reproduce knowledge based on routines and the environment. Firms cumulate their growth rates by evaluating own routines and performing "search" in order to find more adaptive ones (Nelson and Winter, 1982, pp. 399-401). The static equilibrium from neo-classic economics has the maximization as a fundamental component. According to Nelson and Winter "The reason is simply that thorough going commitment to maximization and equilibrium analysis puts fundamental obstacles in the way of any realistic modeling of economic adjustment" (1982, p. 27). A constantly changing disequilibrium is therefore suggested.
Knowledge is heterogeneous and differs between firms. Over time technology changes and in the competition firms' survival depends on their capabilities cumulate new knowledge and innovate. The theory of Nelson and Winter (1982) draw parallels to Darwinism and evolutionary biology. In the nature the genes of the strongest species will adapt the environment and sustain by the process of natural selection. The firms that successful innovate or imitate the competitors will increase their chances to survive and their routines (genes) will form the evolution (Nelson and Winter, 1982, p.8 and Dosi and Nelson, 1994). Evolutionary economics has adopted parallel concepts form evolutionary biology. However, as Hodgoson points out "(…) Darwinism contains a broader and more general set of ideas, whose application is not confined to biology. Darwinism involves a general theory of the evolution of all open, complex systems" (2002, p.260). Similarities are often made to biology, but they are analogies.
The work on evolutionary economics has later been used to explain international trade by including technological change. Dosi, Pavitt, Soete (1990) employ ideas from evolutionary economics and discuss the relationship between technological change, innovation, trade and growth. They criticize neo-classical

trade theories such as Ricardo's theory of comparative advantages and the Heckescher-Ohlin model for their treatment of technological data as something exogenous to the economic system. These models do not see importance of technology and innovation to economic growth. The production techniques and technology in these models are given. "Where do these absolute advantages come from? "(Dosi, et al, 1990, pp.3-6). They argue that the degree of innovativeness of each country in any one particular technology is explained by the complex interplay between technology related opportunities, the country's technology-specific institutions which foster/hinder the emergence of new technologies and the nature and intensity of economic stimulation (Dosi, et al, 1990, p. 268).

2.2 Types of Knowledge, Transfer and Spatial Proximity

Knowledge exists in different forms. Foray and Lundvall make a distinction between two different types of knowledge, "knowledge as more or less complex information, and knowledge as a set of competences and skills"(Foray and Lundvall, 1998, p. 115). It can be codified. This means that the knowledge can be documented with a symbol system, whether linguistic, mathematical, or articulated into *information* (Storper and Venables, 2003, p. 6). This makes it easy to reproduce and the information can be transferred over internet, telephone, books etc. Codified knowledge is often linked to know-what which refers to facts such as: What is the capital of Norway? How many tourists visited Oslo in 2009? In these situations it is similar to information and appears in bits (Foray and Lundvall, 1998, p. 116). Knowledge differs from information in the sense that it is based on "the cognitive features of the individual" as a required element to exist (Asheim, et al 2005.p 20). As Foray points out "Mobilization of a cognitive resource is always necessary for the reproduction of knowledge, while information can be reproduced by a copy machine" (Foray, 2004, p.4). Codified knowledge is also associated to know-why which refers to"scientific knowledge of principles and laws of motion in nature, in the human mind and in the society" (Foray and Lundvall, 1998, p. 116). One example of know-why is scientific articles and books written by scientists at universities.

However, knowledge also appears tacit, which means that it cannot be articulated and codified in an explicit form. It is complicated to document it on a written paper or exchange it over long distances. The reproduction requires those who have it to take deliberate or voluntary action to share it (Foray, 2004, p.73). Tacit knowledge is primarily refried to skills and competences such as know-how and know-who. The master who teach the apprentice practical skills by observing, imitating and listening (learning by interacting or doing) is a classical example of how tacit knowledge is reproduced. Some know-how can be explained codified, but regular interaction with the master is also necessary. Tacit and codified knowledge are complementary forms in knowledge transfer. Foray and Lundvall also argue that in a modern economy know-who has becoming increasingly important. This knowledge includes a mixture of social skills for networking and information such as "who knows what" and "who knows how to do what" (Foray and Lundvall, 1998, pp. 115-116).

The significance of spatial proximity in order to interchange knowledge is a known concept in the literature of knowledge transfer. Companies in the same industry tend to be located relative close to each other, for example in regions. One reason for this is the nature of knowledge. The access of relevant knowledge in industrial regions is easier. Due to its tacitness individuals often need to meet each other physically face-to-face in order to transfer such knowledge. Spatial proximity is therefore often essential for firms that perform R&D (Foray, 2004, Bathelt 2003, Storper and Venables 2003, Maskell, et al, 2004, Asheim et al, 2005). Foray argues that geographical proximity, face to face contact and real meetings have an unquestionable advantage in the field of knowledge exchange and collective intellectual creation, and he points out that geographical proximity is significant for spillovers of knowledge. Spillovers are knowledge that becomes accessible to external agents. This knowledge is absorbed by another person or a group than the inventor. Spillovers help knowledge to be used in new dimensions and this stimulates economical growth (Foray, 2004, 91-101). On the other hand, Torre (2008) argues that the distinction between tacit knowledge and codified knowledge is not totally clear. Face-to-face meetings and

geographical proximity is not the only way to exchange tacit knowledge, and therefore less important in knowledge transfer. Due to computer technology is long-distance sharing or co-producing of tacit knowledge possible (Torre, 2008, p.2).

The literature uses various concepts to explain how types of knowledge are exchanged between firms. In *Sources of Innovation* Von Vippel introduces a concept called Informal know-how trading. This is described as a form of informal cooperative R&D between engineers from different companies and it sometimes occurs between competing rivals. It involves routine and informal trading of proprietary information. This exchange process often occurs on conferences and other professional meetings. When specialized know-how is not available in-house of a company, this information is usually difficult to obtain written. In-house development can therefore be time consuming and expensive. Von Vippel argues that this creates incentives for professionals to get information from colleges in other companies (Von Vippel, 1988, pp. 6, 76-8).
Nevertheless, the access to knowledge does not necessarily mean that individuals can benefit from it. A firm or a person's ability to utilize, recognize and assimilate external knowledge also depends on their absorptive capacity. Cohen and Levinthal argue that the capacity to make use of external knowledge is a function of the level of prior related knowledge. This prior knowledge includes basic skills, shared language and also knowledge about the last scientific and technological developments. New knowledge that is less explicit or codified is more difficult to assimilate (Cohen and Levinthal, 1990, pp. 128-9, 15). The importance of prior learning and spatial proximity may therefore relevant in the transfer process. Companies that ignore investments in R&D or do not keep themselves up to date on prior information may fall behind, and not be able to follow the technological development.

A notion known as *buzz* is also used to explain how ideas are exchanged. There are many definitions of buzz. Bathelt, Malmberg and Maskell argue that:

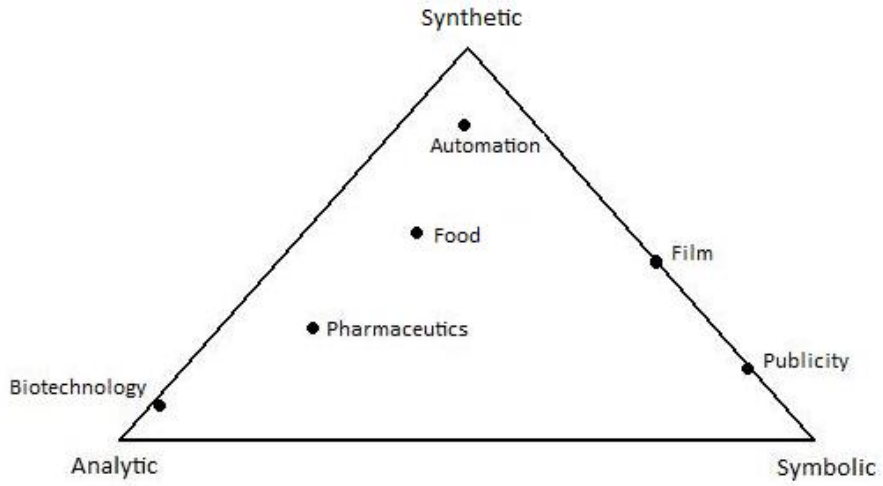
> Buzz refers to the information and communication ecology created by face-to-face contacts, co-presence and co-location of people and firms within the same industry and place or region. This buzz consists of specific information and continuous updates of this information, intended and unanticipated learning processes in organised and accidental meetings, the application of the same interpretative schemes and mutual understanding of new knowledge and technologies, as well as shared cultural traditions and habits within a particular technology field, which stimulate the establishment of conventions and other institutional arrangements. Actors continuously contributing to and benefiting from the diffusion of information, gossip and news by just 'being there' (Bathelt, et al, 2002, p. 11).

Persons in a buzz environment work together and interact with other skilled individuals. They share complex ideas and are highly motivated. These dynamic processes of creating, combining and sharing information are a key to generate new knowledge (Bathelt, 2003 and Storper and Venables 2003).
On the other hand, the literature on the buzz concept has been criticized. Asheim, Coenen and Vang (2005) argue that much the literature treats two different concepts, buzz and face-to-face, as if they were one. It also fails to distinguish between the importance of face-to-face and buzz for different industries. (Asheim, et al, 2005 p.2) Buzz is more a mode of information exchange instead of knowledge exchange for learning and innovation in industries that depend on complex tacit knowledge. The only industry that may exchange knowledge in buzz situations, and not only information, are people working in creative industries such as media, advertisement, film, fashion etc (Asheim, et al, 2005, p. 21).

To understand Asheim, Coenen and Vang's arguments when criticizing the buzz literature it is necessary to be aware of the diversity of knowledge bases in industries. How firms innovate depends on their existing knowledge bases. "A knowledge base refers to the area of knowledge itself as well as its embodiment in techniques and organizations"(Asheim, et al, 2005, p.11). Industries can be divided into

three different types of basic knowledge bases: *Analytic knowledge base*, in this base scientific knowledge about formal theoretic models is important for innovation. Nanotechnology and biotechnology are examples of analytic knowledge bases. (Asheim, 2007, 65-68) *Synthetic knowledge base* refers often to engineering. Innovation is often related to solving problems and occurs mostly through the application or new combinations of existing knowledge (Hansen, 2005, pp. 8-9). Automation, plant and machine engineering are industries that belong to this knowledge base. In the *symbolic knowledge base* are usually referred to as creative industries. New combinations of existing knowledge about design, image and esthetic view are relevant features for innovation. Examples of such industries are media, publicity, film and fashion (Hansen, 2005, p.13).

The knowledge bases include combinations of tacit and codified knowledge. However, the importance of tacit knowledge and face-to-face is different in industries in order to innovate. Learning skills and know-how by doing in a formal face-to-face setting is more relevant in the knowledge reproduction for synthetic knowledge based industry than informal buzz (Asheim, et al, 2005). As mentioned the buzz literature fails to distinguish between the importance of face-to-face and buzz for different industries. Buzz is more an information transfer in industries where analytic and synthetic knowledge bases are relevant for innovation. Nevertheless, in industries where symbolic knowledge bases are essential, buzz represents both an information and knowledge transfer (Asheim, et al, 2005).



Graph 2 Graphic representation of knowledge bases and industries (Asheim, 2007, p.70)

2.3 Temporary Clusters, Collaboration and External Links

To avoid lock-in the technological development it is argued that clusters and regions are dependent on external linkages of information in order to have a long term growth potential (Bathelt, et al 2002 and Ramirez, 2007). Maskell, Bathelt and Malmberg use the metaphor pipe lines which mean communication channels between firms together with buzz, and argue that companies establish trans-local and global pipelines to external knowledge owners in other regions and countries. This allows a global Interaction with other firms and knowledge can be pumped back to the cluster and the local buzz (Bathelt, et al 2002, p.14). Bathelt and Schuldt (2008) take these ideas of geographical proximity, buzz, and global pipelines further and explore trade fair as a temporal cluster. During trade fairs actors and firms from permanent clusters in other parts of the world share technology, focus, ideas and visions. Bathelt and Schuldt describe this as a global buzz. After the trade fairs new pipelines are being established to other clusters around the world and this stimulates innovativeness and competitiveness- the local buzz- in the permanent cluster. They argue that temporary clusters support processes of interactive learning, knowledge creation

and the establishment of international networks and are a complimentary information source for companies together with permanent clusters. Buzz can therefore appear local in permanent clusters as well as global in temporary clusters (trade fairs) (Bathelt and Schuldt, 2008).

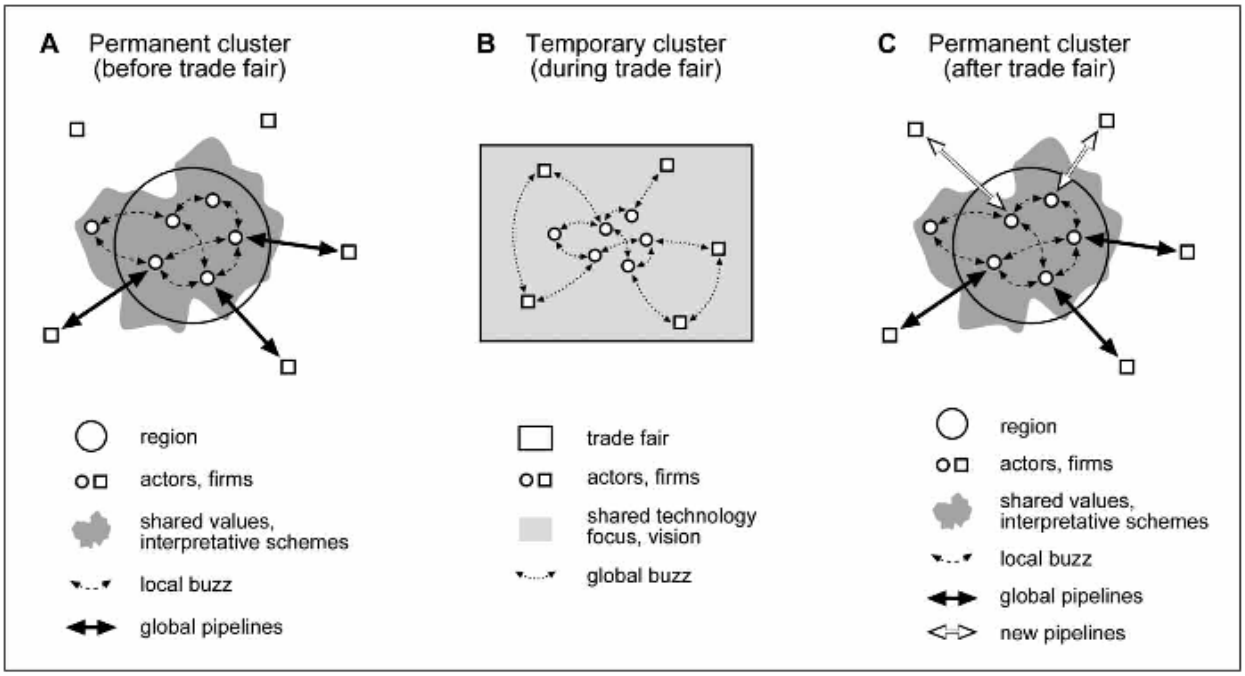


Figure 3 Pipeline creation and the complementary relation between temporary and permanent clusters (Bathelt and Schuldt, 2008, p. 856).

External linkages to other knowledge bases in a form of a network facilitate the exchange of information and skills. Powell and Grodal argue that "Parties that develop a broader bandwidth for communication are in turn, more capable of transferring complex knowledge" (2005. p. 60). There are many reasons for a firm to collaborate in networks. First of all a heterogenic set of collaborators in a network make it possible for a firm to learn from a wide collection of knowledge, and have access to diverse activities, experiences, and knowledge bases. Second, networks facilitate recombining existing knowledge in new ways when external actors get access to it. Third, innovation is also often associated with high risks since the firms do not know the market demand or how the final product will perform. When participating in an alliance the firms can share the risk and uncertainties with other partners (Powell and Grodal, 2005, p. 68-75). Powell and Grodal claim that younger and smaller firms may gain more from cooperation in networks than larger firms.

Transport and communication technologies such as plains, railways and roads have made it possible to travel longer distances in less time. Actors can therefore enter into collaboration agreements and exchange certain types of knowledge in a framework of temporary geographical proximity (Torre, 2008, p.25). The cooperation can later be followed up by communication technologies such as internet and telephone. Torre argue that the mobility of transport technologies is crucial and has made trade shows, conventions and conferences to spaces and events that are specifically designed and organized to establish collaboration between firms and facilitate information exchanges between actors.

2.4 Linear and Interactive Models of Innovation

The literature mainly divides innovation into two models for understanding its occurrence. The linear model characterizes innovation as a process where research and science come first, followed by development, production and marketing as a consequence of technology-push or market pull pressures (Morgan, 1997, p.493). However, there are several problems with the linear model. An important part of

innovation is the market demand. Firms usually perform search for new knowledge since they believe there exists a customer demand behind the products or processes. The model also ignores the importance of incremental innovations which often occur in situations such as learning by doing and user-producer relations (Fagerberg, 2005, p.9). According to Kline and Rosenberg innovation is a complex process of several factors and uncertainties which not necessarily occur the linear way.

> Models that depict innovation as a smooth, well-behaved linear process badly misspecify the nature and direction of the casual factors at work. Innovation is complex, uncertain, somewhat disorderly, and subject to changes of many sorts. Innovation is also difficult to measure and demands close coordination of adequate technical knowledge and excellent market judgment in order to satisfy economic, technological, and other types of constraints – all simultaneously. The process of innovation must be viewed as a series of changes in a complete system not only of hardware, but also of market environment, production facilities and knowledge, and the social contexts of the innovation organization (Kline and Rosenberg, 1986, p. 275).

The interactive model suggests that innovation does not always occur chronologic where research and science come first. Of course there are examples of innovations which appear the linear way. However, this model also sees innovation as interactive learning processes between individuals or groups which help actors to recombine existing knowledge in new ways. The innovation sources involve situations such as user-producer relations and learning by doing and interacting where individuals transfer, reproduce and recombine existing knowledge (Lundvall, 1992, pp. 9-11).

2.5 Systems of Innovation and Internationalization

The ideas that were presented in the last part focus mainly on the knowledge flows and spatial proximity and how these are linked in networks in order to get external knowledge. However, they do not use a system perspective to describe the process of innovation and see how politics influence the innovation processes and knowledge transfer.

The idea of the system is that the knowledge creation and innovation occur in collaboration of components and the relations between them. The system of innovation approach was developed during the 1980s. Freeman (1987) was the first to use the term national innovation system. He defined a national innovation system as "the network of institutions in the public and private sectors whose activities and interactions initiate, import and diffuse new technologies" (Quoted in Edquist, 2005, 183). This work was followed by Lundvall (1992) and Nelson (1993). Lundvall based his work on microeconomic concepts from evolutionary economics and focused the analysis on interactive learning and innovation with a broad system approach. Knowledge creation is a socially embedded process and cannot be understood without an institutional set up and a cultural context (1992, p.1-11). He looks at user-producer relations, learning processes and how the institutional system set up defines the trajectories. Nelson uses more narrow systemic approach, and focuses on R&D facilities in firms and research laboratories as the dominant locus in the research part of innovation, where university trained scientists and engineers work together with universities and government agencies (Nelson, 1993, pp. 1-9).

According to Edquist an innovation system contains components that interact in a relation to each other. Organizations and institutions are normally referred to as components of the system. Organizations are formal structures that have an explicit purpose (2005, p. 187). This can be companies, government organizations, venture capital organizations, research institutions, universities etc. They are the actors and players of the system.

The institutions of the system influence the innovation processes of the components. The meaning of the term institution is discussed in the literature. It is used as organizational actors by some authors and institutional rules by others (Malebra, *et al*, 2004, p. 326-31 and Nelson, 1993, p. 5). Edquist defines institutions as "sets of common habits, norms and routines, established practices, rules or laws that regulate the relations and interactions between individuals, groups and organizations" (Edquist, 2005, p. 182). These laws, rules, norms and routines constitute incentives and obstacles for innovation (Edquist,

2005, p.182). Knowledge bases are heterogeneous between firms and industries. Nelson points out that, institutions that support innovation in one field such as biotechnology, may support innovation differently in another, for example aircraft industry (Nelson, 1993, p. 5).

The boundaries of the system involve which components that should be included in the analysis. The system approach has been criticized for being too broad and flexible in its definition of boundaries. Regional and sectoral systems of innovation are other perspectives inspired from NIS and they approach the boundaries differently. Due to the regional differences inside countries such as Germany and Italia the national boundaries does not always identify innovation processes. The institutional infrastructure supporting the innovation within the production structure of a region defines the boundaries of a regional innovation system (Asheim, 2005b, p.299-303).
Innovation processes occur differently across sectors. Sectoral systems of innovation discuss the specific borders of knowledge and technology of sectors to define the boundaries. Institutions, actors and network can be regional, national and international (Malebra, *et al*, 2004, p.16-18, 33-34).
Lundvall (1992) uses a broad definition and argues that the boundaries of an innovation system or subsystem are a task of involving historical analysis and theoretical considerations. A certain degree of the definition must be kept flexible and be a matter of discussion. In discussing the boundaries of NIS Lundvall says that "Both globalization and regionalization might be interpreted as processes which weaken the coherence and importance of national systems" (1992, p. 3). However, institutions such as laws and rules are mainly created on the national level and this bears the national level as a definition. Nelson (1993) with a more narrow approach points out that politics, national research programs, common language and culture define an inside and outside that can affect the innovation processes. According to Edquist the boundaries of the system can be identified by looking at the causes or determinants of innovation and he mentions three ways in which boundaries of the system can be identified: geographically, sectorally and in terms of activities (2005, p. 199).

Globalization, international trade and foreign investment have increased the last decades. Firms cooperate in R&D activities across national borders through networks and alliances. This has led to a discussion on internationalization of innovation systems and their boundaries. Carlsson argues that most R&D activities remain mainly on the national level. However, most work on innovation systems is done on the national level and because of this is it not surprising that little direct evidence is found that innovation systems are becoming global (Carlsson, 2006, p.65).
Due to the nature of knowledge, spillovers and geographical proximity, the innovation is influenced by regions, clusters and the national institutions. This is a barrier to internationalization of innovation systems. However, Carlsson clams that, evidence shows that over time companies learn to transfer knowledge within their organizations and in the external networks and alliances in which they take part. These companies become vehicles for internationalization of innovation systems (Carlsson, 2006, p.63-4).

2.6 Summary

This chapter has presented concepts of evolutionary economics. Knowledge is fundamental in the formation of technologies and plays an important role in innovation. In contrast to neo-classic economics evolutionary ideas include knowledge in the analysis. Information and knowledge are imperfect, heterogeneous and differs between firms and industries. Types of knowledge, buzz, knowledge bases, linear and interactive models and the systems of innovation are central approaches that will be used to investigate the knowledge transfer processes at trade fairs.

3 Methodology

3.1 Why Qualitative Methodology?

Qualitative and quantitative methodologies are not competing methods in analysing research questions. They are complementary methods used to analyze different types of questions. This thesis will employ a qualitative approach. The trade fair is a social event where human beings come together and interact. The author believes that qualitative methodology will provide a better understanding of human behaviour at trade fairs. Firms act according to their intentions and strategy, and the aim is to understand these actions. Human actions cannot always be understood with numbers and statistics of quantitative methodology. This work seeks the intentions and reasons behind the actions of the trade fair participators, not necessarily the results of their actions. A qualitative analysis provides the contextual answer that explains the reality and why participators at trade fairs act like they do. A qualitative approach also makes it possible capture the in-depth holistic understanding that characterises reality at the trade fair (Punch, 2005, p.238).

Despite the capture of high complexity and god understanding of human behaviour qualitative analysis has its weaknesses. This approach meets challenges when it comes to objectivity and neutrality, and difficulties in generalizing (Punch, 2005, p.237-43). Religious and ideological views, background and culture of the author may have influence on the results.

3.2 Cases of What?

Why using a case study in this investigation? The aim of the thesis is to identify the main features of the knowledge transfer process at trade fairs and how government organizations are involved in this process. Due to the focus of the investigation and the structure of the research question a case study appear to be the most suitable. Case studies are often related to research questions that begin with why and how (Yin, 1984, p. 18). A case study offers a holistic understanding of an event and its complexities (Punch, 2005 p. 144). The case is a bounded system (Stake, 2000, p.436). This means that it has boundaries and the investigator has to describe and identify the boundaries of the case as clear as possible.

Another advantage is that the case study provides an in-depth perspective of one single case. It allows patterns of data to be analyzed to see the complex, situated, problematic, relationships (issues) that the case contains, key findings to be placed, interpreted and compared with a larger number of units and interpretations, and a new or existing theory may be defined (Stake, 2000, pp. 440, 448).

However, a case study has its critical issues. The problem of objectivity makes it vulnerable, and particularly statisticians are disbelievers in generalizing with a case study "How can you generalize from a single case?" (Yin, 1984, p. 21, 39). One case makes it problematic to generalize. "Single or a few cases are poor representation of a population of cases and questionable grounds for advancing grand generalization" (2000, p. 448) argues Stake.

In order to meet this criticism investigators argue that case studies are not for statistical generalization. "Case studies-, like experiments, are generalizable to theoretical propositions and not to populations or universities" (Yin, 1984, p.21). Punch argues that case studies may not prove generalization in their findings, but it can indicate or suggest a generalization that can give concepts for further study (Punch, 2005, p. 146).

In selecting a case study it is important to see what the single case is in a broader set of cases. Gerring asks an essential question: "What is this a case of?" (Gerring, 2007, p. 13). This thesis will use two case studies. The cases aim to indentify the knowledge transfer process at two trade fairs. One for design and home trends another for renewable energy. After conducting interviews with ICEX, Innovation Norway and AHK and looking at different trade fairs in Spain on internet, Casa Pasarela and Genera were selected due to the diversity these industries represent, the date of the events, and the practical location in Madrid. Casa Pasarela and Genera are also well established events with 5th and 12th editions. It is important to emphasize that these two trade fairs do not represent all existing trade fairs. However, the broader results of the discoveries can be associated with knowledge transfer processes at trade fairs.

3.3 Data Collection

The collected data in this research consists of primary and secondary sources. From February until May 2009 the investigator conducted interviews with designers, engineers, artists, professors, directors, coordinators and other employees from participating firms, universities and government organizations. These interviewees were selected since they according to the trade fair catalogues and Kirchgeorg (2005) are the main actors at Casa Pasarela and Genera (at trade fairs), and are relevant in order to provide the empirical data needed to answer the research question. In order to arrange interviews the author studied the trade fair catalogues and firms' internet pages in time before the arrangement and send out request for interviews to participating firms. The response by mail was low. However, during the fairs most of the intended interviews were conducted on the stands. Other primary sources include direct observations conducted during the two exhibitions, trade fair catalogs, internet pages of firms, government organizations, private organizations and trade fair companies. Secondary sources include articles from journals and books.

Unstructured interviews have been used to collect the data. Pre-established open ended questions were prepared (See appendix) and during the interview there was used tape recorder or note taking to document the conversation. The interview questions were made out of the object of study (knowledge transfer and trade fairs) and information available from firms' internet pages, trade fair catalogues and literature. The aim of using unstructured interviews was to get the in-depth perspective that is necessary to understand the interview objects and at the same time to have the flexibility in asking follow up questions that unstructured interview has (Punch, 2005, 172). Due to the heterogeneity among firms, products and interviewee background unstructured interviews with open ended questions were the preferred method. Open ended questions include all alternatives of answers and reflect this heterogeneity. Structured interviews have little flexibility with preset-response categories (Punch, 2005, p. 170). Unstructured interview was therefore chosen. It may be a weakness of the data that open ended questions does not allow a quantification value of opinions, arguments and comments in the same degree as questions with response categories. However, after many interviews some statements appeared more frequently than others. The time used on each interview was around 10-15 minutes. More time with interviewees was usually difficult to obtain.

Direct observations were conducted by visiting exhibition stands, observing and touching the presented products. At the same time informal conversations with personnel were conducted. Notes of observations and conversations were written down on a paper.

Due to the accumulative learning process about trade fairs, methodology and literature during the investigation the author has made some changes in four of the open ended questions after Casa Pasarela. Interviewees from Casa Pasarela have been called by phone and asked these changed questions. However, not all were available.

3.4 Reliability and Validity

The quality of the empirical findings is controlled in terms of validity and reliability. Validity refers to how relevant the data is in order to tell anything about the research question (Punch, 2005, pp. 95-6). Punch argues that the validity can be checked by asking the question: "how reasonable is the inference from indicator to concept?"(Punch, 2005, p.97). Reliability concerns to how exact the data is and in what degree the same data would give the same outcome by doing the same procedures again. The aim of reliability is to reduce the errors and biases in an investigation. Several measurements will give the data a higher accuracy and reliability (Yin, 1984, p.40 and Punch, 2005, p 95-96).

There may be several problems and limitations linked to the interview collected data. An Interviewee provides personal information about their observations. How representative are the interviewees in relation to the research question? Kvale makes a distinction between *informants (witnesses)* and *representatives* (the objects of study) in validating of data from interview objects (2001, p. 48). At the trade fairs all kinds of employees from different organizations were present. Designer, engineers, and scientists who are directly involved in the R&D process, but also sales managers, agents and directors.

Does sales manager have the same "representativeness" as an engineer or a designer when investigating knowledge transfer? Questions were asked about the interview objects position and activities. It is difficult for the researcher to know in what extent interviewees are involved in R&D. However, all of the interviewees participated at the trade fairs and can be considered as representatives since this investigation try to identify the knowledge transfer among participators. The interviewees from Spanish Institute for Foreign Trade (ICEX), Innovation Norway, and Spanish-German Chamber of Commerce (AHK) are not directly involved in organizing Casa Pasarela and Genera and can only be considered as informants.

Another weakness regarding to reliability is when poorly constructed questions lead the answers in to a particular direction (bias) where the "interviewee gives what the interviewer wants to hear" (Yin, 2003, p.86). Problems in communicating and articulation may have influenced the reliability of the data. The interviews were conducted in English, Spanish, Danish, Norwegian and German. The author does not manage these languages as good as the native Norwegian. This can influence the researchers interpretations of the data and interview questions may have been articulated in a different meaning than indented. On the other hand, most of the interview objects spoke their native language during the interview. This may have helped them to express themselves directly as intended. Parts of the conducted interviews have been transcripted. When statements were unclear, the investigator has contacted the interviewees to get a more exact explanation.

Direct observation has provided additional information to the investigation. Yin points out that multiple observers increase the reliability of the observational evidence (1984, p.86). Resources were low and using more observers was not possible in these case studies. This is a weakness for this investigation.
However, there are ways of solving problems related to validity. Triangulation is a method to check the validity of the data. A conclusion that is based on "*multiple sources of evidence"* will be more accurate and convincing (Yin, 1984, p.91). This means that the findings from one investigation can be compared with other findings. This allows the investigator to see if the different data sources leads to the same conclusion (Punch, 2005, p.241). In order to obtain triangulation some parts of the data were validated to available external sources of data provided by ICEX, AHK, Innovation Norway (the informants), journals and internet pages.
This investigation contains two case studies. If the same procedure is used in both cases it should be possible to compare the collected data from the two fairs (Yin, 1984, p. 51). Questions of the conducted interviews from the two fair have been compared to each other and this has increased the validity of the data. There were also differences in the findings that later will be discussed.

3.5 Analytical Strategy

The collected material was analyzed by sorting the pieces of information from interviews, observations, web pages, etc. into categories. The several headings in chapter 4 present more or less these categories. Some categories are related to the interview questions, others appeared when collecting or looking through the material. In the discussions in chapter 5 categorized findings are being compared, analyzed and generalized to a "higher level of abstraction" (Punch, 2005, p. 203) in light of concepts from the theoretical framework.
Some statements given by the interviewees have been controlled to firm's web pages, information papers, observations and vice versa. Most of the theoretical approaches were known before the data collection. The author has tried to be open-minded for rival evidence and interpretations in the analysis. The figure is inspired by Punch (2005, p. 203) and illustrates a simplified model of the analytical strategy in this thesis.

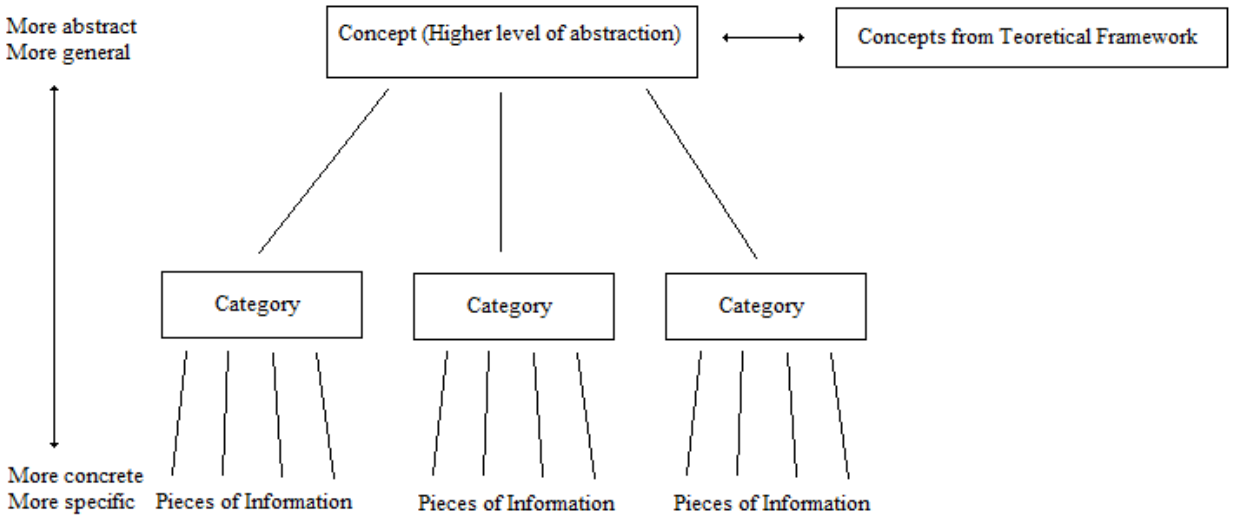


Figure 4 Analytical Strategy

3.6 Limitations of the Investigation

Due to lack of resources and time this investigation contains many limitations. Casa Pasarela and Genera are events that go over a few days. 28 interviews were conducted during the events together with other observations and conversations. However, Casa Pasarela and Genera had together over 500 exhibitors with several employees. It was therefore difficult to cover everything that happened on the events. Things did not always go after the plan. Some of the planned interviews were not conducted since firms were occupied and did not have time.

The energy industry at Genera contains many different sectors. Data from solar (thermal and photovoltaic), bio and gas engines, engineering services, and wind energy has been collected. Most of the firms at Genera were active in the solar and wind sector. However, sectors such as wastes, hydrogen and fuel cells, coal, cogeneration and crude oil have not been covered with interviews. The thesis is therefore not able to say anything about these sectors. At Genera these sectors were small in numbers compared to solar and wind.

It turned out difficult and time consuming to find and identify relevant visitors (professionals) that were willing to conduct an interview. The thesis contains only interviews from exhibitors. Informal conversations were conducted with exhibitors and visitors on stands. However, lack of visitor data is a major weakness of the thesis.

3.7 Summary

Case studies provide an in-depth, holistic understanding of events and are generalizable to theoretical propositions. Casa Pasarela and Genera were selected as two cases to investigate the knowledge transfer processes at trade fairs. The empirical findings consist of unstructured interviews, conversations and direct observation together with catalogues, internet pages, books and articles. The overall quality of the findings has been controlled in terms of reliability and validity. In the analysis the material have been categorized and discussed on a “higher level of abstraction” in review of existing literature. Due to lack of visitor data, time and resources this thesis has several limitations.

4 Empirical Findings

This chapter aims to present an overview over the empirical findings form Casa Pasarela and Genera. The first part will focus at firms and describe the interaction between them. Based on the overall findings from the two case studies, the activities are divided into five main categories: information about the markets; evaluation and comparison of products; presentation of firms; informal conversations and meetings, and establishment of networks. Many activities overlap, depend and correspond to each other across these activities. The second part of the chapter will look at findings form government organizations, trade fair companies, industry associations, universities and R&D centers and describe how these actors collaborate with firms.

4.1 Information and Knowledge Flows

4.1.1 Information about the Markets

The collected data from Casa Pasarela and Genera indicates that the two trade fairs are instruments for trade of products and services on foreign markets. The main objectives for many participating firms at the two trade fairs were to expand or maintain their commercial activities. An objective for participating firms was therefore to obtain information about the market. Exhibiting firms at Casa Pasarela and Genera can be divided in two groups. Producers that develop their products and services, and distributors that works for foreign producers. The distributors that were interviewed at Casa pasarlea and Genera were not directly involved in the R&D process behind the products they are selling. However, some agents reported that they give feedback information from clients back to the producers. Both groups of firms use the trade fairs to diffuse and sell their products. IFEMA does not allow exhibitors to trade products directly on the stand during the fairs. The aim of the events is to obtain orders or strategic trade agreements between professional participators after the trade fairs.

At Genera firms of the Spanish market for solar, wind, bio and water energy were gathered in one place for three days. Most interviewees at Genera reported that the trade fair provides general market information about different market segments of the Spanish and Portuguese industries. This was information such as: who are the competitors in the market for boiler tanks, gas engines or solar collectors; what services and products do the firms provide; and what are the prices. Some exhibiting firms reported that the trade fair helps to identify who are the costumers.[2] By talking to costumers dropping into the stand the exhibitor can analyze and understand their needs. This market information was useful for firms and investors that intended to enter the Spanish markets or for firms exploring new market segments of the industry by introducing new products.

Exhibitors at Genera informed that by speaking to colleagues from other firms during the fair they could obtain information about the present market situation. The activity in the market at the moment, are things looking good, which direction the market takes and if people are optimistic. Many interviewees said that due to the financial crisis the market activity was low at the moment.

Casa Pasarela was a much smaller trade fair than Genera and contained many small designer firms from the Madrid region, Spain and a few foreign countries. The products and services were highly differentiated. It was therefore difficult to identify any exact market segment or major actors of the design industry. None of the firms reported that they were searching for information about the market during the fair.

[2] Costumer refers to professional costumers at trade fairs, not to household costumers.

Some markets segments, especially among sub suppliers, were specialized industry products. Firms at Genera stated that it is difficult to find the relevant costumers. Not all industrial products can be sold in a normal store since the costumers are only a few specialized firms from a few places in the world. One firm told that the advantage with the Genera trade fair was that it allows identifying the relevant customers from a specialized industry market.[3] On the other hand, the findings from Casa Pasarela imply that this form of specialized trade did not occur in the same way since the fair contained home design products for wider segment of household clients.

4.1.2 Evaluation and Comparison of Products

The trade fair is a place where firms evaluate their products. First of all, the firm can explore the attention, interests and general product demand from costumers in a face-to-face setting. This feedback is crucial to decide whether the product should be further developed and commercialized or the firm should abandon the project. Second, some designers on Casa Pasarela argued that constructive critics from colleagues facilitate the development of prototypes. This critic involves details that should be changed, alternative solutions of problems related to the prototype, colors and form.

Both Casa Pasarela and Genera allowed the firms to compare their products with the competitors. By walking through the exhibitions and observe the firm can examine information about the latest products of an industry.

Firms in the solar sector at Genera reported that they in general observe the products of the competitors during trade fairs. However, most firms argued that there were usually small improvements and a few had already seen it on trade fairs in Italy and France in the months before. In most cases the inside structure of the products was not visible. The outside solutions were usually the conducted observations the firms did during the fairs. Among solar collectors many engineers told that the inside system is simple and not a secret to other firms. One engineer pointed out that if a firm has a solar collector which has improved efficiency, the competitors normally buy the product after the fair, open it and look at the solutions inside."Everybody does it."

Two engineers pointed out that the design, color and look of the solar panels also is relevant when observing panels. Design is important in order to sell to private costumers since the system is often monitored on the roof of a building and is visible to everybody. The importance of design in the solar sector is confirmed by a Chinese firm at Genera. iXtasun writes on their internet pages when presenting vacuum tubes solar collectors: "An elegant design for a harmonious integration in the building architecture" (iXtasun, undated).

Firms in the gas engine sector notified to have 6-8 competitors on Genera. However, only two companies brought real size machines to Genera. Little of the inside solutions was visible and the interviewed firms said it was complicated to obtain any technical information. The interviewed firm that provided engineering services informed that it was specialized and did not had any direct competitors.

Among designers at Casa Pasarela the findings on comparison of innovations were also diverse. A few designers argued to never compare their products with others, and that they get their inspiration from the nature, in their mind and other places. "I try to follow my own line, this gives original design." stated one designer. Other designers always compare, and look at the esthetic aspects, typology of product groups, combinations, colors and materials. Comparing the products identifies the trend and ideas that later can be used in R&D. This does not necessarily mean to copy the ideas. But use them in a new dimension, on products that belongs to other categories. A few designers were asked whether copying of products occurs at trade fairs. All of them said that it happens. Some exhibitors at Casa Pasarela did not allow visitors to take photos of their products to prevent pirates. However, between exhibiting firms it is important to point out the heterogeneity among products. Many of the products were highly differentiated. The design included different types of lamps, light combinations, tables, sofas and chairs for dissimilar segments of

[3] The argument of meeting specific industry costumers at trade fairs was confirmed by an informant at ICEX

household costumers. Most of the firms cannot be seen as direct competitors. One designer told that due to the differences among the products it was impossible to compare.

4.1.3 Presentation of Firms

Almost all interviewees at Casa Pasarela and some at Genera stated that publicity was the main objective in participating at the fairs. Publicity includes presenting activities, projects, products, services and the employees of the firm. At Casa Pasarela many of the designers presented prototypes and the aim of the participation was to get the firm and products known among professionals and the public. The trade fairs allow many key actors of the industry on a relative small area during a few days. This increases the chances of meeting costumers and producers and to get the prototypes commercialized. On both trade fairs journalists from television, newspapers, magazines and industry journals covered the events and sat a focus on the industries and the latest innovations. Getting publicity in the media also facilitate the commercialization. At Casa Pasarela two interviewees reported to have been mentioned in industry journals and several national newspapers before and during the fair.

All of the interviewees said that physical meetings and face-to-face conversations have an advantage when presenting their products. This allows the costumers to touch the product and see the functionalities, form, design and size of it. At the same time the exhibiting personnel can clearly explain the ideas and concepts of their products. At Genera one engineer in the solar collector sector said that it is easier to explain how the products work face-to-face. "You have to write a whole book in order to explain everything written by e-mail" (Translated from Spanish)

Many of the interviewees on both trade fairs reported that presenting products over internet or by phone did not have the same advantage, since the costumers do not pay the same attention to the products.

The publicity of the firms and their innovations at trade fairs has a long term effect and creates an image and reputation in the industrial sector. One firm also stated that the participation at Genera was more an obligation in order to maintain its position on the Spanish market. Regular participation at trade fairs facilitates cooperation with partners and trade activities.

4.1.4 Informal Conversations and Meetings

Both Casa Pasarela and Genera represented an informal environment where personnel on the stands talked to visitors and other exhibitors at the fairs. IFEMA arranged gatherings, conferences and seminars for the exhibitors where issues of the industry were discussed. According to the collected data informal conversations occur among participators in the cafeteria, conferences, on the smoking corner, exhibition stand etc. In these conversations colleagues talk about things they have in common such as the industry, the market and what they are doing.

Findings from Casa Pasarela indicate that ideas, solutions of problems, and advices are exchanged in informal conversations during the fair. Many of the presented products were prototypes and still not developed. In this development process designers ask colleagues for advice on how to employ and form materials. Some of the designers at Casa Pasarela were specialized on certain types of materials. One firm had developed a prototype of a coat and hat stand with hooks that automatic moved inside the structure when not used.[4] However, the mechanism that moved the hooks inside was not working properly. Solutions of how to employ a proper mechanism was discussed with other colleagues on the last day of Casa Pasarela. Another designer pointed out that a leather designer gives advice on how to do products in leather and designer specialized on wood gives advice on how to form wood.

Informal conversations at Casa Pasarela included constructive critics of the prototypes, proportions for further development and solutions, discussions about how to use materials and techniques, and conversations about new ideas and trends in the industry. A few designers said that the informal

[4] Coat stand is an upright pole with pegs or hooks on which to hang clothes, and should not be conflated with an exhibition stand.

conversations and face-to-face contact included touching and looking at the prototypes and physically point out and explain solutions and details related to materials, form and techniques

Conversations also include how to manage business. Some of the designers had newly established their firms and noted that they had little experience in negotiation, presentation of products and practical activities in managing a firm. Designers learn from more experienced colleagues how to negotiate and present the prototypes to costumers by directly ask or talk informal.

Data from Genera do not indicate any directly exchange of technical ideas between firms like at Casa Pasarela. Two engineers reported to have discussed technical issues at other trade fairs earlier, but both stated that it is unusual. Engineers in the solar panel industry said that the technical systems were simple, that there were few new products and all the colleagues in the industry already knew how it works. Another engineer in the gas engine sector told that it is difficult to obtain technical information directly from competitors and that comments from users is the major source of innovation. In general personnel at Genera reported to exchange information about projects, the market and the situation of the market with colleagues in other firms. (See the Information about The Market part)

4.1.5 Establishment of Networks

Most of the firms interviewed at Casa Pasarela and Genera informed that the establishment of networks and contacts was a major objective for participation. During the trade fair hours participators visit the exhibitions. The exhibitors present the firm and the products, conduct informal conversations, and exchange business cards with potential partners. Further meetings with partners may take place during the trade fair or after the event.[5]

The primary object for most design firms at Casa Pasarela was to establish relationship with firms in order to develop and produce prototypes. As earlier mentioned many of the design firms were newly established, and did not have a large network of partners. Participating at a trade fair would therefore facilitate the development of networks. Small design firms were usually not willing to take the risk to produce and sell products on their own. One designer said that he can take the production risk if for example a hotel or wholesalers order a larger amount of the prototype. However, normally the design firms were looking for partners that were willing to finance further development and production.

At Casa Pasarela partnerships also take place between small design firms. One firm specialized in leather design were planning to develop products together with firm specialized in designing furniture. This allows combining the knowledge of both firms to make new products.

The cooperation with the new partners takes place after the trade fairs. This includes R&D and changes of the prototype to make it more suitable for production and the final costumers. It is a much closer interaction between partners and is over a longer period of time.

4.2 Official and Private Actors at Casa Pasarela and Genera

4.2.1 IFEMA – The Practical Organizer of Trade Fairs

Institución Ferial de Madrid is the trade fair organizer of both Casa Pasarela and Genera. The role of this organization is primarily practical tasks such as organizing, planning, hosting, coordinating and monitoring trade fairs. This includes services such as renting exhibition areas, create publicity about the events, and services for participating firms. IFEMA was founded in 1980 and is located in Campo de las Naciones, close connected to transport facilities such as the metro and the Madrid airport. The site contains 14 exhibition halls, two convention and congress centers, 45 meeting rooms, hotels and restaurants. This allows easy access to the site and trade fair participators can visit the fair, hold meetings and conferences (IFEMA, 2009).

[5] Informants from Innovation Norway and ICEX confirm that firms` establishment of network is a central activity at trade fairs.

IFEMA is owned and operated by four partners: The Madrid Regional Government (MRG); Madrid City Council (MCC); Madrid Chamber of Commerce and Industry (MCCI); and Caja Madrid Savings Bank (CMSB). MRG and MCC are actors with political influence and all aim to increase the economic activities in the Madrid region and Spain. IFEMA collaborates with its owners. Madrid Chamber of Commerce and Industry which represents, promotes and defends the general interests of more than 370,000 Madrid-based companies, works closely together with IFEMA and have developed programs to attract groups of firms and exhibitors to the trade fairs (Camara Madrid, 2009). In 2007 IFEMA organized 79 different trade fairs with 21,052 exhibitors and attracted Spanish and foreign firms, investors and professionals to Madrid (IFEMA, 2009).

4.2.2 Industry Associations

In order to organize Genera IFEMA worked in collaboration with associations and research organizations from the energy sectors such as the Institute for Energy Diversification and Energy Saving (IDEA), The Spanish Wind Energy Association (AEE), Spanish Association of Renewable Energy Producers (APPA), the Solar Association for Thermal Industry (ASIT), the National Centre for Renewable Energies (CENER) and many more. These private and official organizations consist of key people that provide the specific industry information needed to organize the trade fairs for the sectors. The associations took part in the trade fairs organizing committees. Their role in these committees was to provide support and decide which specialized conference programs, theme exhibitions and important industry issues for discussion Genera would contain (Neolectum, 2009). The associations consist of networks of firms, research institutions, universities, government organizations that are potential participators on the fairs (IFEMA, 2009). Industry associations such as APPA work to develop the energy sector and defend its interests. This includes lobby activities with the government and participation on trade fairs to present the interests of the sector (APPA, 2009). At Casa Pasarela IFEMA collaborated with experts of the design industry in order to decide which concept exhibitions the fair would contain.

4.2.3 Government Organizations

Since leading firms, investors and key people from specific industries are accessible at trade fairs, government organizations use international trade fairs in foreign countries as an instrument to present the domestic and regional industries. At Genera government organizations from Germany, Austria, Czech Republic, Poland, Denmark, Cyprus, Korea, and Cyprus were presented with own exhibitions. The objectives of these organizations were mainly to support and advice firms in their internationalization process, investments and trade activities. Another objective included to present business opportunities in regions, clusters in the home country. Trade fairs are a part of some government's strategy for international trade. In preparation for Genera the German Federal Ministry of Economics and Technology (BMWi) wrote on its internet pages "As one of the leading industrial and trading countries, the Federal Republic of Germany uses the opportunity of fairs and exhibitions at home and abroad to meet its commitments as an international economic and trading partner" (BMWi, 2009).

On the government stands officials provided information about firms of the energy sector, their activities, experience and specialties. Some of these officials work close with firms in home country in a specific industry and have often contacts in these firms. Firms searching for a specific collaboration partners in a region or foreign country could obtain information about which firms know to do what, an overview of technologies and potential matching firm profiles from these officials (BWi, 2008 p.6).This information makes firms search and access to collaboration partners less frictional.[6]

Government organizations facilitate the trade fair participation for firms from home country. A frequently used method is to arrange a national common stand. Government organizations from Cyprus, Denmark, Greece, Austria, and Germany had organized common stands for domestic firms at Genera. In the months before the German Federal Ministry of Economics and Technology (BMWi) rented an exhibition area

[6] Interviewees from ICEX and Innovation Norway also confirm such information activity on trade fairs.

from Feria de Madrid. This area was divided into eight smaller exhibitions for small and medium-sized German firms. Relevant firms in the energy sector could buy a packet with a constructed exhibition stand included from the German Ministry. Younger or smaller firms sometimes do not have resources to exhibit products at trade fairs alone. By arranging a national stand and reducing the costs of the exhibition the German government increases the German firms' participation incentives. The firms are able to exhibit their latest products, obtain information and establish contacts on the foreign market. This increases the chances of economical activity across the national borders which are the objective of the German government (BMWi, 2009). Regional actors also participated on national common stands. Baden-Württemberg International (BWi) is an agency for international economic and scientific cooperation of the Baden- Württemberg region in Germany and was presented on the German national stand. This semi official organization fosters cooperation in business, education and research in the region (BWi, 2008, p.3).

The Danish Trade Council was also among government organizations that organized common exhibitions for firms of the home country. The Danish national stand had together 20 firms, some of them represented by local partners from Spain. Due to the Conference of United Nations against Climate Change (COP-15) that Denmark would host in December 2009 the Danish government hold a relative high profile at the event to promote Denmark as a green energy contributor. The Danish Minister of Foreign Affairs was in Madrid to see the Danish participation at Genera and to speech about the upcoming COP-15. The Danish Trade Council recommend common stands for their national firms and writes on their internet pages that since a common stand is bigger it creates a synergy effect that facilitates the presentation.

> Our experience shows that a good way to enter the Spanish market is to participate on a Danish common stand at important trade fairs in Spain or participation on seminars/congresses for Danish activities. By doing this each participator can utilize a synergy effect, that a bigger stand creates, and at the same time present the firms products in a targeted and visible way, without requiring greater economical investments." (Danish Trade Council, 2009b)(Translated from Danish)

Casa Pasarela had common exhibitions. These were concept exhibitions presenting products of young designers related to the theme "low-cost design" and "Econciencia" and were organized by IFEMA. Most of the design firms that exhibited products on this stand had their own exhibition other places at the fair. At Casa Pasarela a few design firms from the Madrid region were selected to participate on sponsored common stand in Milan arranged by PromoMadrid.

4.2.4 Universities and R&D Centers at Casa Pasarela and Genera

R&D centers and universities participated at Casa Pasarela and Genera. Escuela Superior de Humanidades y Negocios is a private school that works together with universities in the Madrid region and offers studies in design, communication and management. Some projects of the students had been selected to be exhibited at Casa Pasarela. According to a director at the school the major object with the participation was to let the students present the projects, meet contacts in the industry and obtain practical experience. The school had been established one year earlier and with the participation the school aimed to promote itself among designers, firms of the industry and potential students for the future. The two interviewees from the school reported that informal conversations and comparing products give inspiration and understanding about the esthetic look, design and new ways of using materials.

The University of Leon which works in collaboration with the firm Isolux Corsan was selected to present a process for the application of biocatalysed electrolysis to wastewater treatment on the innovation gallery of Genera. The University of Leon is also investigating the production and purification of hydrogen via the fermentation of bio waste (Genera, 2009).

A technological transfer officer from Universidad Rey Juan Carlos reported that the aim of the participation at Genera was to make the university's R&D activities visible to firms and industry. This included letting the firms know that they are not obligated to finance all of the costs in the R&D processes in collaboration with the university. Universidad Rey Juan Carlos collaborates and exhibited together with MadrI+D. MadrI+D is a part of the Madrid Regional Governments department of R&D and education and

coordinates the R&D infrastructure and technological transfer between universities, R&D centers and firms in the Madrid region. On the exhibition stand MadrI+D presented catalogs with profile information about universities, firms and their specialized R&D activities.(MadrI+d, 2009) MadrI+D also hosted a seminar about innovation and cooperation incentives in the field of renewable energy. Representatives from the European program Eco-Innovation and Madrid Regional Government presented information about how firms can obtain financial support for development of ideas and the renewable energy objectives of the Madrid Region.

CIEMAT is a public Spanish research center which investigates energy and environment related activities. The research center performs R&D activities in collaboration with universities, firms and the industry according to the Spanish National Plan for Scientific Research, Development and Technological Innovation. A major objective for the center is knowledge transfer, which aims to make knowledge, capabilities and technology applicable to production systems, industry and the society. CIEMAT make following statement of their objectives:

> To study the strategy and manage the mechanisms necessary to make the knowledge and technology developed at the CIEMAT available to other agencies of the National Innovation System (businesses, OPIs, universities), so the effort of the Organism's researchers can be reverted to the benefit of society (CIEMAT, 2009).

According to an interviewee at the stand and CIEMATs internet pages was the major objective for the trade fair participation to present the scientific capabilities and technologies to the energy industry and the public (CIEMAT, 2009b).

4.3 Summary

During Casa Pasarela and Genera employees in participating firms exchanged ideas and information about trends, markets, prices, products and competitors in informal conversations. A firm can evaluate its own product by looking at the general attention of the costumers and observing products of other firms. The events also offer the opportunity to identify potential collaboration partners and obtain information about them. IFEMA is the practical organizer of Casa Pasarela and Genera and collaborate with industry associations to arrange the events. Government organizations facilitate firms' participation by arranging national common stands and provide information about firm profiles and opportunities in home country. Universities, schools and R&D centers present projects and technological transfer offices provide information about R&D projects where firms can collaborate.

5 Discussion

5.1 What are the Main Features of the Knowledge Transfer Process at Trade Fairs?

This part aims to discuss and analyze the overall findings in review of existing literature. In order to identify features of the knowledge transfer process the investigation will study the knowledge bases of the industries at the two trade fairs and see how information and knowledge flows occur for these industries during the events.

5.1.1 Buzz, Knowledge Bases and Tacit versus Codified Knowledge

Casa Pasarela and Genera are events that allow interaction between firms, universities, government organizations, associations in a face-to-face environment. However, trade fairs are temporary events that only last a few days and do not allow daily interaction between actors over time like in clusters. How and to what extent can knowledge be transferred at trade fairs such as Casa Pasarela and Genera?

Maskell et al (2004), Bathelt and Schuldt (2008) describe trade fairs as temporary clusters and use the notion *global buzz* to explain information and knowledge flows at trade fairs. Findings of information and knowledge flows described in chapter 4 from Casa Pasarela and Genera suggest several similarities to the buzz concept. First of all, IFEMA and industry associations brought key professionals to the fairs which attract talented designers, engineers and firms. Second, by "being there" participators identified, observed and compared products of the industry, presented products, held informal conversations and meetings and made plans for further collaboration. One firm in the gas engine sector reported that "being there" was "more of an obligation" in order to maintain its industry possession. There are also rival findings that illustrate that some designers at Casa Pasarela never compare their products with others and use other inspiration sources than trade fairs. However, most empirical data can be associated with what Bathelt and Schuldt describe as global buzz:

> Global buzz helps to identify potential future partners, acquire information about them and make initial contact. It refers to the constant flows and updates of information about competitors, suppliers and customers and their respective technological and strategic choices. New ideas and projects in the industry or technology field can be identified through observation and monitoring. On different occasions and through different routes, information and knowledge exchange occur in scheduled meetings with business partners and in accidental meetings with former colleagues, as well as in systematic scouting for trends (Bathelt and Schuldt, 2008, p.856).

Buzz can easiest be transferred in face-to-face occasions, but can also be transferred global in virtual networks and by e-mail (Asheim, et al, 2005.p 10). As earlier mentioned Asheim, Coenen and Vang (2005) argue that industries contain different knowledge bases: Synthetic, analytic and symbolic. How firms perform R&D of new products depends on their existing knowledge base and prior learning. (Cohen and Levinthal, 1990) Global and local buzz represent more an information exchange in industries which draw on synthetic and analytic knowledge bases (Asheim, et al 2005). The only industry where buzz can be exchanged as knowledge is in industries which rely on symbolic knowledge bases.

Empirical evidence from the design firms indicates that the symbolic knowledge base can be related to the design industry. First of all, many designers mentioned that the form, esthetic aspects, typology of product groups and projects, combinations, colors, materials, and visual look was relevant when observing prototypes of other designers and get inspiration. Concepts and ideas from observed products could be used to develop new projects and collections. Second, informal conversations between designers contained discussions about how to employ materials, form, colors and techniques which mainly were related to the visible structure of the prototype. Third, interviewees told that informal talking with colleagues on Casa Pasarela helps to identify the trends of the design industry. The constantly changing trends consist of cultural interpretations of designers which can be related to everyday life in society.

According to Asheim aesthetic elements are significant for knowledge transfer in industries which contain the symbolic knowledge base.

> In industries drawing on a symbolic knowledge base the input tends to be aesthetic rather than cognitive in quality. This demands rather specialized abilities in symbol interpretation rather than mere information processing. Symptomatically, the knowledge involved is incorporated and transmitted in aesthetic symbols, images, (de)signs, artifacts, sounds and narratives. This type of activities is strongly tied to a deep understanding of the habits and norms and 'everyday culture' of specific social groupings. Due to the cultural embeddedness of interpretations this type of activities is also characterised by a strong tacit component (Asheim, et al, 2005, p.17).

Findings suggest that the buzz and face-to-face communication at Casa Pasarela contain transfer of codified and tacit knowledge. First of all, at the exhibitions all of the prototypes were visible to other designers. The visible was in focus. The synthetic knowledge is transmitted in aesthetic symbols, images and signs which the designers observe directly and discuss in face-to-face conversations with colleagues. Second, the buzz at Casa Pasarela includes informal meetings and conversations where designers talked about how to employ colors, materials, form, techniques and esthetic look on artifacts. This refers to skills and non-deliberate knowledge about trends and everyday culture obtained by watching others and social interaction. A regular participation at trade fairs, conferences and other professional gatherings is necessary for learning such skills. Third, the buzz provided know-who and identification of designers, architects and decorators, their activities and access to their know-how which could be used in joint projects. Forth, designers said that it was easier to explain their ideas face-to-face, touch the product and see it in a three dimensional way. This way the costumers better understand the value of the idea. The development of prototypes in the home design industry includes uncertainties. In face-to-face conversations designers can see the reactions of costumers and in this way evaluate the prototype.

Innovation in home design is not necessarily connected to improved technical solutions, but rather understood in contexts of trends, fashion and culture which come from different social groups. Learning which combinations of colors, forms and materials that are related to trends requires social interaction with other designers, architects and costumers for learning. As Hansen points out "The tacit nature of the knowledge is often linked to the tacit nature of new trends in subcultural communities" (Hansen, et al 2005, p. 14). One designer of lamps and textile stated "You get to see what others are doing and what is the general trend line" Trends are constantly changing and not always codified when they are trendy. Nelson and Winter (1982) make a point when arguing that individuals decide whether to codify or not. "Codifiable but not yet codified knowledge" (Quoted in Foray, 2004, p. 82). The degree of tacitness of such knowledge is therefore discussible. Much of the symbolic knowledge at Casa Pasarela can be transferred codified by using pictures, letters and symbols. However, findings suggest that it is certainly easier to learn concepts, ideas of products and "the design way of thinking" by interacting face-to-face. For example, it is difficult to understand how a light designer from the firm Teknica chooses the right combinations of light colors and brightness to create a certain atmosphere by codifying it into information. By being there and observe the exhibition's colors, brightness in combination with the surroundings, and simultaneously talk to the designer, it is less complicated to learn the ideas (Teknica, 2008).[7]

On the other hand, to describe the design industry at Casa Pasarela as a symbolic knowledge base is a very general description. Some of the design was furniture and contained mechanical mechanisms which were improved after some testing of the prototypes. As earlier mentioned solutions of the problems using the hook mechanism on the coat stand were discussed with other designers. This was more a mechanical

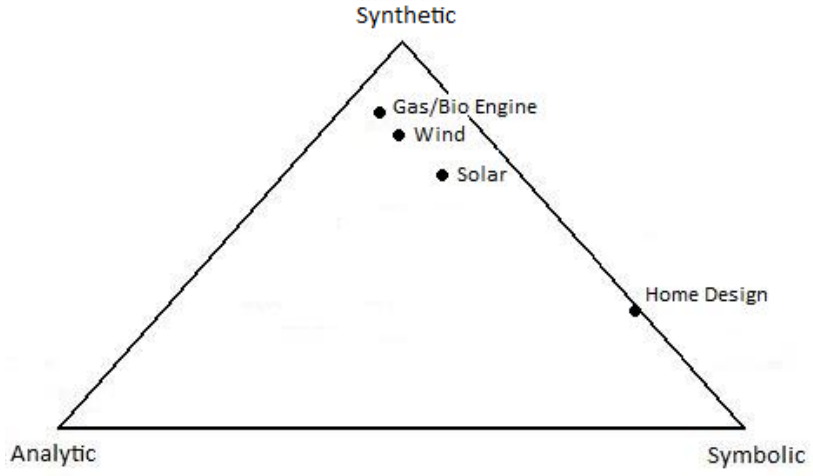
[7] Asheim, Coenen and Vang (2005) refer to a similar example in their article.

solution based on ideas such as rubber bands, springs and hinges. This mechanism cannot be related to the esthetic aspect of the product and suggests a more synthetic knowledge base. Asheim, Coenen and Vang point out that solving technical problems with users face-to-face is relevant for innovation in a synthetic knowledge base.

> Industries drawing on a synthetic knowledge base rely on face-to-face communication due to the importance of customized solutions and the partly tacit nature of the know-how competencies involved. Given that the aim of synthetic knowledge creation is to develop and improve technical systems, the focus of the knowledge creation process can often be boiled down to concrete problem-solving related to the envisaged solution of specific problems presented by users and customers (Asheim, et al, 2005, p.16).

Genera contained a wide specter of firms in different field of renewable energy such as bio engines, solar panels and collectors, bio energy, engineering services, wind turbines etc. Empirical findings from Genera indicate that much of the knowledge the firms contain is based on engineering, know-how and solutions of practical problems which can be associated with synthetic knowledge. According to interviewees improvements of products such as solar panels and gas engines had occurred "little by little" the last years and happen normally when the producer received feedback from the users about typical operating problems. Wind turbines have critical mechanical parts such as the gearbox where user-producer relations are necessary for maintenance and service. The firm Tecopysa, where one interviewee is employed, conducts typical engineering projects such as construction of gas pipe networks, solar collector parks and electrical installations (Tecopysa, 2009). These are services which require know-how and practical skills.
Of course analytic knowledge and know-why about physical and chemical laws and principles that explain why sunlight are being reflected and absorbed, why sun and wind energy can be transformed into electric energy and principles of thermal energy also forms basic part of the firms knowledge base (MadrI+D, 2009). This is fundamental scientific knowledge which is necessary in the R&D processes. However, findings show that innovation mostly occur by testing and improving operational problems in formal user/supplier-producer relations.
On the other hand, engineers in the solar sector reported that design, color and look were important when observing products of competitors during Genera. This suggests that a symbolic knowledge also is relevant in the solar panel industry.
The figure is inspired of Asheim (2007, p. 70) and illustrates a graphic example of knowledge bases of some sectors at Genera and Casa Pasarela. The location of the bases is set by interpretations of the empirical findings.

The home design industry contains most symbolic and some synthetic knowledge. Gas/bio engine, wind



Graph 3 Graphic suggestion of knowledge bases at Genera and Casa Pasarela

and solar draw towards a synthetic knowledge base. However, analytic and in some cases symbolic are also significant in these sectors.

Findings imply that buzz has a different significance for firms representing a synthetic knowledge base at trade fairs. First of all, firms drawing on a synthetic knowledge base are based on a dominance of tacit knowledge, practical skills, know-how which are transferred face-to-face (not by buzz) in formal user/supplier-producer relations that usually have been developed over several months. The improvements are incremental and are often related to problems by using the artifacts over a longer period (Asheim, et al, 2005). Genera is a trade fair that goes over three days. Despite social interaction with costumers and colleagues in a face-to-face setting are these relations not formal user/supplier-producer relations which go over a longer period. This is limited time for transfer of complex tacit knowledge. Second, much of the internal technical structure of engines, solar panels, and wind turbines was not visible to other firms and visitors at Genera. Some firms did not even bring their products to the fair. Observations of internal technical structure of products were therefore difficult. The trade fair provides more a first identification of a new product, service, costumer or partner.
Only a few engineers reported to discuss technical issues with colleagues from other firms and pointed out that it is uncommon. Of course there may be producers that receive some product feedback from users and regular participation at trade fairs allows closer interaction with costumers. However, the empirical findings suggest more an information (codified knowledge and bites of information) exchange between firms than exchange of skills and know-how. This is information about the market, market situation, prices, products, performance of products, competitors, customers and suppliers.
Information that can be classified as know-why was also available at Genera. Some exhibitions had posters and papers where basic principles and functions of products or processes were explained written and by illustrations. For example basic principles of biocatalysed electrolysis to wastewater treatment developed by University of Leon were explained written on a poster at the innovation gallery. CIEMAT presented a written model with illustrations of renewable energy consumption in buildings.
These information flows and identifications of actors can be recognized as buzz. However, how important are the buzz for knowledge creation at Genera? According to Asheim buzz is less important as a mean of knowledge acquisition in industries that draw on synthetic knowledge and represent more a form of information exchange (Asheim, et al 2005, p.22). Empirical materials show that Meetings and face-to-face conversations are important and provide a closer communication in order to gain trust, evaluate the product, understand the costumer and make plans for cooperation after the fair. However, anything that indicates exchange of tacit knowledge in form of practical skills and know-how about technical issues has not been found. On the other hand, firms that develop solar panels reported that design, look and color were observed during trade fairs. This suggests that some symbolic knowledge is relevant for innovation in the solar panel sector and that Genera also may contain some transfer of symbolic knowledge.
Whether firms exchange information or tacit knowledge at trade fairs depend on their knowledge base and prior learning. At both trade fair exhibitions the visible factors such as the form, outside structure, colors and design are important when observing and comparing products. Inputs for innovation in the symbolic knowledge base are knowledge transmitted in the visible way such as aesthetic symbols, sings, images, colors etc. (Asheim, et al, 2005). Face-to-face and buzz are relevant features in creation of symbolic knowledge. In synthetic knowledge bases tacit knowledge is important for innovation and formal face-to-face interaction over a longer period is necessary in order to transfer know-how and practical skills. The buzz at trade fairs of industries based on synthetic knowledge contains more an information exchange.

5.1.2 Informal Know-how Trading

Casa Pasarela contains findings that can be associated with Informal know-how trading (Von Vippel, 1988). Some of the designers had studied in the same school in Madrid, worked together in projects and helped each other in many occasions. Again, it is the problem with the hook mechanism on the hat and coat stand where colleagues of other firms discussed solutions that can be related to this concept (See

chapter 4). Informal know-how trading can also be linked to how to manage business. Designer asked experienced colleagues for advice about how to negotiate, present and do practical activities related to managing a firm. One designer was observed when she asked a colleague how he calculates the price of prototypes when costumers ask. In "*The Sources of Innovation*" Von Vippel writes that informal know-how trading occurs in some industries and is absent in others (1988, p. 83). Empirical findings from Genera do not indicate anything that can be related to informal know-how trading where technical issues or problems were discussed. Findings suggest more an informal know-what trading which includes information such as the market situation, prices, products, competitors etc.

5.2 How are Official and Private Actors involved in Knowledge Transfer Processes at Trade Fairs?

Casa Pasarela and Genera contained actors that preformed activities in a specific sector and across sectors on a regional, national and international level. The empirical findings identify the activities of actor such as IFEMA, universities, R&D centers, government organizations and associations. This part aims to discuss how official and private organizations are involved in the knowledge transfer process by analyzing their role and relations in a systemic perspective.

5.2.1 System Boundaries and Trade Fairs

Which components should be included when analyzing official and private actors at trade fairs with a system of innovation approach? As earlier mentioned Lundvall (1992) says that defining the boundaries is a matter of discussion and the definition must to a certain degree be flexible. Edquist (2005) points out that by focusing on the determinants of innovation the boundaries of the analysis can be defined. These are: geographically, sectorally and in terms of activities. This investigation will analyze the actors at trade fairs in terms of geographical borders and activities of participating actors. At Genera and Casa Pasarela participators such as universities, government organizations, associations and firms were form different countries and regions. How do we define the boundaries when analyzing trade fairs with a systemic approach?

Genera is an international event. As mentioned government organizations such as German Ministry of Economics and Technology, Danish Trade Council and the Austrian Embassy which are linked to foreign countries were presented at the trade fair with firms of their national industry. Officials also provided information about the national energy industry and about business opportunities in home country. This suggests an international and national approach since the components act with interests on a national level and activities in a foreign country. However, there are also findings that also indicate regional actors. Baden- Württemberg International conducts international activities with regional interests. "Our mission is to support a sustainable improvement of the social and economic situation in states and regions that are possibly of interest to the economy in Baden-Württemberg" (BWi, 2008, p.7).[8] MadrI+D collaborate with universities and firms in the Madrid region and presented themselves as a part of the regional innovation system of Madrid. The activities of IFEMA stimulate firms' activities in the Madrid region and at the same time at the national level.

Casa Pasarela is smaller trade fair than Genera. Private and official actors such as PromoMadrid, DI_MAD, and Escuela Superior de Humanidades y Negocios were from the Madrid region. Design firms participating at the fair were from Madrid, Spain and a few from foreign countries. The milieu can mainly be considered as regional and national.

Casa Pasarela and Genera contain actors of different innovation systems on regional and national levels inside and outside Spain. In order to analyze and discuss the role of the official and private organizations

[8] For more information about the Baden-Württemberg region see Asheim, 2005, p.301

in the knowledge transfer process this investigation will focus on the organizations activities and interests. The international activities of several organizations at Genera can be related to interests on a regional or national level in home country. This analysis will use a broad systemic approach.

5.2.2 Actor Interaction

In the interactive model the relationship between actors and institutions is crucial when sharing and producing knowledge. The system of innovation approach sees interactive learning and innovation as a process that occurs in collaboration between actors (Lundvall, 1992). These actors are components of the system such as firms, universities, government organizations and associations (Edquist 2005). Innovation is a result of the relationships between actors and the institutions which foster and hinder the emergence of technologies (Dosi, et al, 1990). Casa Pasarela and Genera are events that provided the opportunity for actors of innovation systems to come together and interact. Official and private organizations were among the actors and conducted activities according to their objectives. How do official and private actors interact at trade fairs?

IFEMA performs activities on a regional, national and international level. As already mentioned IFEMA has close relations with its owners such as the MRG, MCC, MCCI and CMSB which are political, financial and economical actors in the Madrid region.[9] Findings indicate that the owners have created IFEMA as an incentive to stimulate the regional economical activity. The trade fair organization's activities foster innovation by providing practical services that facilitate the interaction between actors. Esperanza Aguirre Gil de Biedma, the Governor of the Madrid Region states in the IFEMA annual report that:

> IFEMA is an institution which contributes very positively to Madrid's economic growth because it facilitates the business of the many companies and professionals who participate in its events and because it boosts many industries in the economy, through the auxiliary industries which support the Institution's activities and the business tourism they imply (Biedma, 2007, p.9).

In organizing trade fairs IFEMA collaborates with industry associations and experts. In this process the industry associations and experts provide the knowledge about industry issues.

Genera allowed interaction of foreign actors such as government organizations and firms from other innovation systems. Countries such as Germany, Denmark and Austria use trade fairs as a tool in their international trade policy. Which government organization that organizes national common stands depends on the organizational setup of the specific country's innovation system. In Germany and Austria it is the BMWi and the Austrian embassy, in Denmark it is the Danish Trade Council. Empirical findings show that these government actors support firms from their home countries. The use of national common stands can be seen as an institution that responds to the countries trade policy since it facilitates the establishment on foreign markets and collaboration across national borders. BMWi manages a foreign trade fair program and states in its annual economic report from 2008 that "The Federal Government will continue to support the activities by German companies abroad with the "Export Initiative on Renewable Energies", e.g. with consultancy, trade fairs and visits abroad for delegations" (BMWi, 2008, p.40). The established practice of using common stands at trade fairs provides incentives for participation which allow diffusion of innovations and buzz interaction with actors from other countries.

The government organizations also take part in the buzz by providing information about firm profiles, investment opportunities and support programs to foreign actors of other national innovation systems. The trade fairs are events that allow the governments to interact with relevant actors from a particular industry.

Universities and R&D centers are other actors that produce knowledge in systems of innovation. (Lundvall 1992 and Nelson 1993) Findings show that universities and R&D centers on Genera collaborate mainly on a regional and national level in Spain. Contacts with firms and industry are

[9] For information about the regional innovation system of Madrid see Buesa, et al, 2007.

necessary to transfer knowledge into technology and commercialize it. The trade fairs offer many key actors of the industry on one place and are a platform to meet these contacts. Actors such as technological transfer offices provided general information about projects and R&D activities during the trade fair (MadrI+D, 2009). However, how important are the relationship between firms and universities for the industries at Casa Pasarela and Genera?

Practical skills and know-how in form of tacit knowledge is dominant for innovation in synthetic knowledge bases. Face-to-face interaction between actors is the most efficient way in order to innovate. Close relation between universities and industry is therefore necessary for the universities when developing and producing innovations. Genera offered the opportunity to create such relations. MadrI+D`s Genera *2009 catalogue of technological opportunities* presented universities, their R&D projects and what type of collaboration partner the universities are searching. Findings from the catalogue show that universities mainly search for a producer of the technologies they develop (developer-producer relations).

On the other hand, Asheim, et al (2005) and Hansen, et al (2005) argue that firms drawing on synthetic and symbolic knowledge bases are less dependent on universities in order to innovate. Practical skills and know-how in form of tacit knowledge are more important for innovation. Formal user-producer relations are typical innovation sources in synthetic industries. In industries which draw on symbolic knowledge bases are both buzz and face-to-face important for innovation. Scientific knowledge and know-why about scientific laws are considered as less important. This weakens the significance of universities in these industries since these actors in general provide more analytic knowledge. The universities, R&D centers and schools at Casa Pasarela and Genera held relatively low profile compared to participating firms. None of the interviewees of participating firms reported to cooperate with universities in R&D. However, these interviewees represent a small number of over 400 participators at Genera. It is difficult see the importance of these actors in the industries from the findings. The universities role at trade fairs may be stronger in industries that lie on an analytic knowledge base since universities in general is more a contributor of know-why knowledge. Due to the limitations of the analysis it is difficult to make any conclusions on this topic. This issue should be further investigated.

5.2.3 The Role of Trade Fairs in Innovation Systems

In evolutionary economics information is seen as imperfect. Firms and organization possess different combinations of knowledge and information, they are often competitors and will not always share the information and knowledge they manage. Schumpeter argues that due to the technological competition the firms' survival depends on their capabilities to innovate (Fagerberg, 2003). Firms perform search for new and more efficient routines in order to not fall behind (Nelson and Winter, 1982). However, for a firm to innovate in isolation requires time and resources. Collaboration in alliances is therefore an option. The interactive model illustrates that innovation also includes reusing existing combinations of knowledge in new ways. However, firms need to obtain information and access to other knowledge bases in order to innovate. Where do actors find collaboration partners and get access to external knowledge? How do the actors of innovation systems develop their relationships?

Empirical findings show that by participating at trade fairs actors are able to obtain information and access to external knowledge by identifying potential collaborators. Participators at Casa Pasarela and Genera could get information about what technologies and services firms offer, identify "who knows how to do what" (Foray and Lundvall, 1998, pp. 115-116) and in some cases obtain knowledge that could be used in R&D. The buzz and know-who at trade fairs such as Casa Pasarela and Genera facilitates establishment of relations. Actors recommend other actors with the right skills. Government organizations provide information about firm profiles, support programs and possibilities in home regions. Universities and R&D centers inform firms about how firms can participate in joint R&D projects. These relations may again provide access to new knowledge of other actors which is necessary in the interactive R&D process. Maskell, Bathelt and Malmberg (2004) use the term pipe lines to describe the transfer of knowledge and the relations between firms (or clusters), and argue that trade fairs are typical places where pipe lines are established. Actors at Casa Pasarela and Genera reported that trade fairs are typical

places where they establish relationships with other actors. These relations allow closer interaction in the R&D process and can be seen as pipe lines. For example designers and manufactures establish developer-producer relations and discuss changes in the prototype for production. On the other hand, findings also demonstrate that many relationships are more a logistic diffusion of products by trade. These are producer-wholesaler/distributor and distributor-user relations, not necessarily joint R&D projects.

An important part of innovation includes diffusing innovations in the society and making them available to other actors of innovation systems. Trade fairs such as Casa Pasarela and Genera let the firms, universities and R&D centers present information about their innovations and diffuse them into the market. Innovation is complex and uncertain (Pavitt, 2005). By participating actors are able to evaluate the market demand of their innovations and decide whether it should be further developed or not. Other actors are able to use these innovations together with their knowledge, technologies and in some cases create new ideas. For example, one firm presented a crystal glass at Genera that had been developed to cover the solar panels and prevent the absorbed sun energy to escape. According to personnel at the stand the crystal glass would provide 5% more energy efficiency (Alfasolar, 2009) Information about this innovation became available to other actors of innovation systems.

International trade fairs such as Genera allow interaction from actors of different innovation systems. BMWi can be seen as an institutional actor of the German national innovation system. MadrI+D and universities are in general actors in the Madrid region and at the Spanish national level. Firms act on regional, national and international levels. It is important to emphasize that much of the interaction at trade fairs includes diffusing innovations to foreign markets in form of export which government organizations support by using institutions such as national common stands. Findings from the case studies indicate that most of the R&D processes are performed in the home country or region. The products and services are then diffused on foreign markets by using trade fairs. The role of the trade fair can be seen as a link to bring out technologies and know-how to foreign actors of other innovation systems.

The illustration is based on the buzz figure of Bathelt and Schuldt (2008, p. 856) and the empirical findings. It displays a simplified model of how universities, R&D centers, government organizations and firms are involved and the role of international trade fairs (green quadrangle) in regional and national innovation systems (red and blue circles). The lines (Black, yellow, pink) illustrate participating firms, government organizations and universities traveling to the trade fair from foreign and domestic innovation systems. Government organizations facilitate participation for firms in their own national or regional system by using institutions such as national common stands. Technological transfer offices represent universities (pink) at the fair. At the trade fair actors interact in a buzz and face-to-face

environment (see the small arrows).

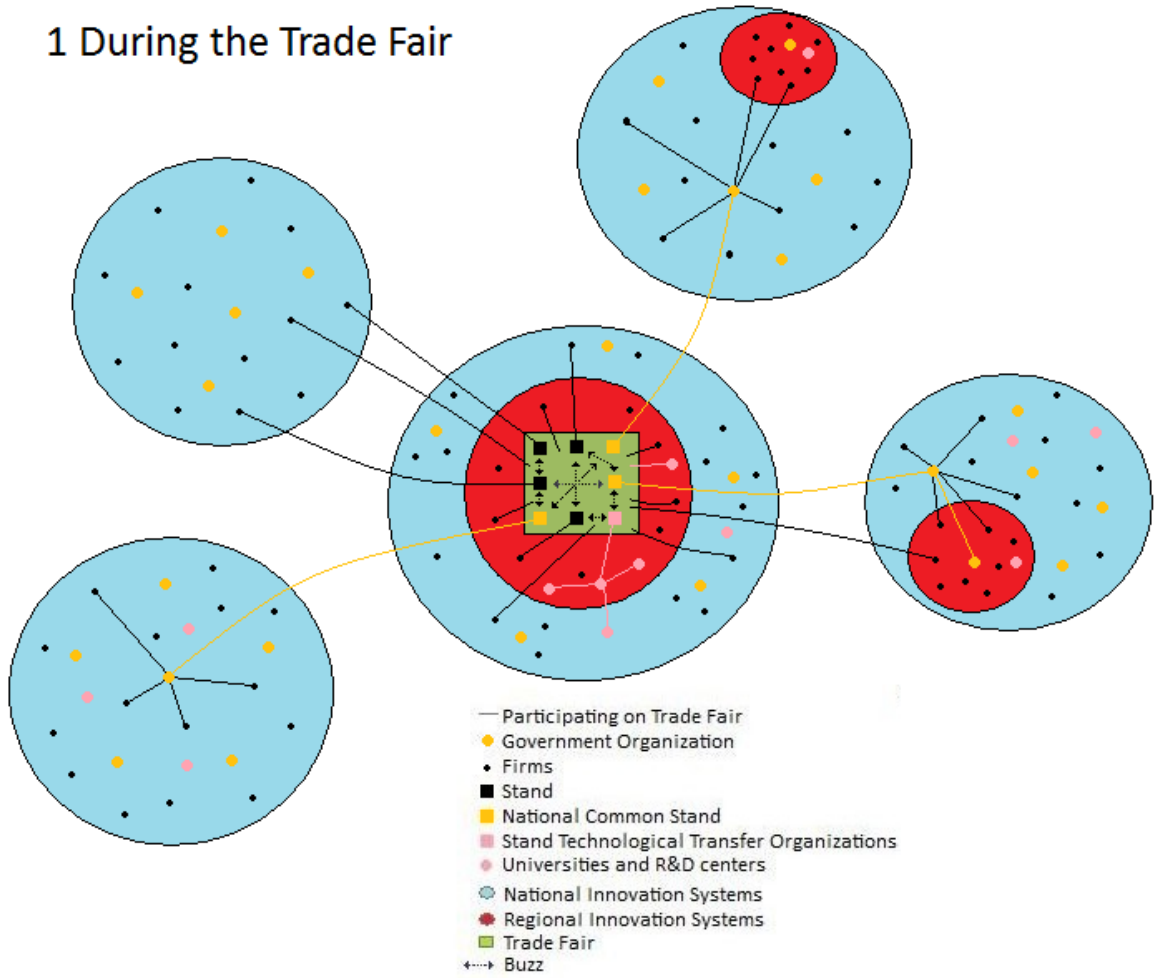


Figure 5 Trade Fair and Innovation Systems

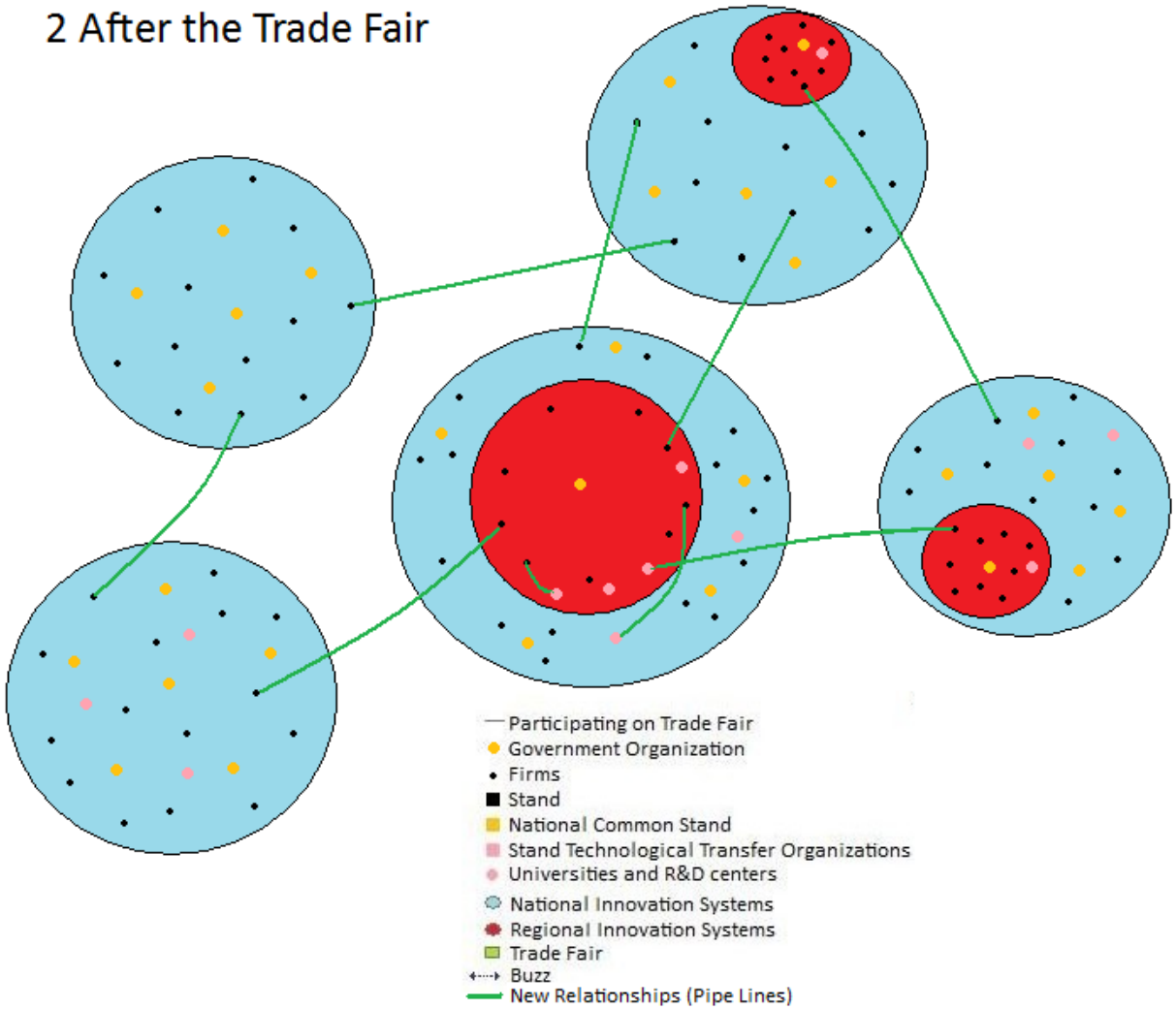


Figure 6 Trade Fairs, Innovation Systems and New Relationships

Buzz and face-to-face contact during trade fairs help actors to identify each other and establish relationships (Pipe lines or producer-wholesaler). The relationships allow further interaction and transfer of knowledge and diffusion of innovations across national and regional innovation systems. The green lines illustrate new relationships across national and regional innovation systems after the trade fair.

Carlson (2006) discusses the internationalization of innovation systems. He argues that due to the nature of knowledge most of the R&D structure remains on the regional or national level. However, over time actors learn to transfer knowledge within the organizations and external networks. Trade fairs role in facilitating relations among actors across national borders can be seen as a contributor to internationalization of innovation systems. As mentioned after the trade fairs the relationships (pipe lines) allow closer interaction over time and knowledge to be transferred. Communication technologies such as plains, railways, internet, and telephone make interaction possible (Torre, 2008). Government organizations also cooperate on international level. MadrI+D collaborates with Enterprise Europe Network which is an organization of European Union that facilitates R&D on a international level. On the other hand, not all evidence points this direction. The universities and R&D centers at Casa Pasarela and Genera are actors of the Madrid region and the Spanish national level and collaborated mostly with firms from Spain.

5.3 Summary

How types of knowledge and buzz are transmitted at trade fairs depend on the industry's knowledge base. The home design industry at Casa Pasarela which mainly draws on a symbolic knowledge allows transfer of information and tacit knowledge due to the importance of aesthetic symbols, signs and images in relation to trends, fashion and culture. The energy industry at Genera which in general consists of synthetic knowledge allows more an information buzz about market situations, costumers, partners and products.

IFEMA organize practical services that make interaction between actors possible. Government organizations facilitate and stimulate the trade activities, knowledge flows and collaboration between firms. National common stands is an established practice which responds to governments' policy of increased trade and can be seen as an institution that create incentives for innovation. The role of the trade fair in innovation systems is to establish and maintain relationships among actors across and inside regional and national innovation systems.

6 Conclusion

This chapter aims to summarize the results of this study. The main objective of this thesis was to investigate the main features of knowledge transfer process at trade fairs and how official and private organizations are involved in this process. In order to answer these questions two trade fairs in Madrid were selected as case studies: Casa Pasarela which focuses on the home design industry and Genera which is a trade fair for renewable energy. Interviews, conversations and observations were conducted on both fairs and articles, information papers, and internet pages have been analyzed during the investigation process.

The empirical findings of the two case studies have been analyzed and discussed together with concepts such as buzz, knowledge bases, different types of knowledge, and systems of innovation in a framework of evolutionary economics.

The results of the investigation show that knowledge transfer processes at trade fairs contain features that are identified as buzz. The buzz attracts key professionals to the fairs. Potential partners, customers and suppliers are identified at informal meetings. It includes updated information about markets, firms, products and trends, and informal conversations where information and in some occasions tacit knowledge are exchanged.

However, due to diverse knowledge bases at trade fairs the importance of buzz as a mean for knowledge creation appears different. Since the visual and esthetic aspect is a relevant factor for innovation in the symbolic knowledge base the buzz at trade fairs such as Casa Pasarela represents a transfer of information and tacit knowledge. In informal conversations and meetings (informal relations) designers discuss and observe how to use visual elements such as colors, materials and esthetic form on artifacts. This refers to skills and know-how which are linked to trends, fashion and culture and are obtained by interacting regular at events such as fairs, conferences and other social meetings.

On the other hand, the buzz at trade fairs such as Genera represents more a flow of information. This is information about the market, the situation of the sector and identification of partners, customers and suppliers. It also includes know-why were basic principles of products and processes are explained written and by illustrations. Buzz at Genera is less important for innovation. Synthetic knowledge bases rely heavily on tacit knowledge which requires formal face-to-face contact (for example formal user-producer relations) over a longer period of time to transfer know-how and practical skills. Findings also show that the internal structure of the technology, which often is essential, in most cases was not visible to participators at Genera. However, in the solar thermal and photovoltaic sector the outside design of the products are important factors. This suggests that symbolic knowledge also is a part of the knowledge base in this sector and that knowledge about design was transferred during Genera.

Government organizations, associations, universities, technological transfer offices, firms and other private organizations which are actors in regional, national innovation systems were presented at both Casa Pasarela and Genera. The relations among these actors in innovation systems are crucial for interactive learning and diffusion of innovations. This allows combining existing knowledge in new ways. IFEMA provides services that facilitate knowledge transfer for actors. Industry associations and experts collaborate together with IFEMA in order to decide which issues the fairs should discuss and provide background knowledge about the industries that IFEMA needs in the organization process. Government organizations organize national common stands to support domestic firms in the internationalization process. National common stands can be seen as an institution since it is an activity that responds to governments' trade policy. It is an established practice that creates incentives for firms to participate at trade fairs and take part in the buzz, build relations and increase economic activity across national borders. Universities, R&D centers and technological transfer offices participate at trade fairs in order to present their projects to the industries and provide information about how they can participate in collaborations with firms. The literature suggests that the role of the universities as innovators is less important in industries that draw on synthetic and symbolic knowledge bases. Due to the importance of know-how in form of tacit knowledge which in general is transmitted face-to-face

in formal user producer relations. However, this topic requires further investigation to make any concluding remarks

Trade fairs function as an event where actors of innovation systems can establish relationships. The informal buzz contains information that helps actors to identify potential collaborators. By building pipe lines (relations) with other actors, participators can get access to new knowledge which facilitates innovation. These relations are user-producer, supplier-producer, developer-producer and so on, but relations established at trade fairs also represent a logistic diffusion of innovations such as producer-wholesaler/distributor or wholesaler-user. Due to the presence of relevant actors for a particular industry and the international environment at these events trade fairs function as a link to bring out technologies and know-how to foreign actors of other innovation systems.

6.1 Proposals for further investigation

This thesis has investigated the main features of the knowledge transfer process at two trade fairs where synthetic and symbolic knowledge are the dominant bases of the industries. Some industries such as nanotechnology and pharmaceutics draw on analytic knowledge. Analytical knowledge bases, buzz and the importance of universities in these industries are topics that should be further investigated in relation with trade fairs. What identifies the knowledge transfer at trade fairs that draw on analytical knowledge industries? Asheim, Coenen and Vang (2005) argue that know-why is a significant for innovation in analytical knowledge bases. Universities are influential providers of scientific knowledge. What role play universities at trade fairs for analytical knowledge drawing industries?

References

Alfasolar, (undated), [online], Datenblatt Pyramid 54D, available at: http://www.alfasolar.de/fileadmin/editoren/pdf/de/alfasolar/datenblatt_pyramid_54_D_2701.pdf [21.05.2009].

APPA, 2009, *APPA, más de 20 años como referencia en energias renovables*, Information paper at Genera 2009, La Asociacion de Productores de Energias Renovables, Madrid

Asheim, B., L. Coenen, and J. Vang 2005, "Face-to-Face, Buzz and Knowledge Bases: Socio-spatial implications for learning and innovation policy", *CIRCLE Electronic Working Paper Series*, Lund, Sweden.

Asheim, B. 2005b, "The Geography of Innovation: Regional Innovation Systems", Chapter 11 in: Fagerberg, J., Mowery, D., and Nelson, R., 2005, *The Oxford Handbook of Innovation*, Oxford University Press, New York.

Asheim, B. 2007, "Sistemas regionales de innovacion y bases de conocimento diferenciadas: Un marco teorico analítico", Chapter 2 in: Buesa, M., 2007, *Sistemas regionales de innovación nuevas formas de análisis y medición*, Fundacion de las Cajas de Ahorros, Madrid.

Bathelt,H., A. Malmberg and P.Maskell 2002, [online] "Clusters and Knowledge: Local Buzz, Global Pipelines and The Process of Knowledge Creation", *DRUID Working Paper*, no 02-12, Available at: http://www2.druid.dk/conferences/working_papers/02-12.pdf [24.06.2009].

Bathelt, H. 2003, "'In Good Faith'? The 'Distanced Neighbor' Paradox: 'Over-embedded' And 'Under-Socialized' Economic Relations in Leipzig's Media Industry", *Paper* prepared for the Regional Studies Association International Conference 12 –15 April 2003, Pisa, Italy.

Bathelt, H. and N. Schuldt 2008, "Between Luminaires and Meat Grinders: International Trade Fairs as Temporary Clusters", *Regional Studies*, vol 42, no. 6, p. 853-868.

Biedma, E. A. G. 2007, "Madrid Regional Government", In chapter "Madrid and its Trade Fair Partner Organizations." in: IFEMA, (2007), [online],*IFEMA annual report 2007*, available at: http://www.ifema.es/Institucional_01/informacion_general/memoria_de_actividad/index.htm [21.05.2009].

BMWi, (2008), [online], *Annual Economic Report 2008: Staying on Course!*, Federal Ministry of Economics and Technology (BMWi) Public Relations Department, Berlin, available at: http://www.bmwi.de/English/Redaktion/Pdf/annual-economic-report-2008,property=pdf,bereich=bmwi,sprache=en,rwb=true.pdf [02.08.2009].

BMWi, (2009), [online] *Genera*, available at: http://www.german-renewable-energy.com/Renewables/Navigation/Englisch/Service/deutsche-beteiligungen,did=261270.html [21.05.2009].

BWi, 2008, *Discover BW-i: Creating Opportunities for Business, Science, Research and the Arts*, Second edition, Baden-Wurttemberg International, Stuttgart.

Buesa, M., M. Casado and J. Heijs 2007, *El sistema regional de I+D+I de la Comunidad de Madrid*, Instituto de Análisis Industrial y Financiero Universidad Complutense de Madrid.

Camara Madrid, (2009), [online], Official Web Page, available at: http://www.camaramadrid.es/index.php?lang=ES [21.05.2009].

Carlsson, B. 2006, "Internationalization of innovation systems: A survey of the literature", *Research Policy*, vol 35, p. 56–67.

Casa Pasarela, (2009), [online], Official Web Page, available at: http://www.ifema.es/ferias/casapasarela/default_i.html [27.05.2009].

CIEMAT, (2009), [online], Official Web Page, available at: http://www.ciemat.es/portal.do?IDM=250&NM=3 [21.05.2009].

CIEMAT, (2009b), [online], Official Web Page, available at: http://www.ciemat.es/portal.do?IDR=1207&TR=C [21.05.2009].

Cohen, W. M. and D. A. Levinthal 1990, "Absorptive Capacity: A New Perspective on Learning and Innovation", *Administrative Science Quarterly*, Special Issue: Technology, Organizations, and Innovation, vol. 35, no. 1, p. 128-152.

Danish Trade Council, (02.04.2009), [online] *GENERA Madrid: International energimesse med dansk fællesstand*,availableat:http://www.dtcbarcelona.um.dk/da/menu/InfoOmLand/Nyheder/GENERAMadridInternationalEnergimesseMedDanskFaellesstand.htm [21.05.2009].

Danish Trade Council, (05.04.2009b), [online] *Fællesfremstød*, available at: http://www.dtcbarcelona.um.dk/da/menu/Messer/Faellesfremstoed/ [21.05.2009].

Dosi, G., K. Pavitt and L. Soete 1990, *The economics of technical change and international trade*, Hemel Hempstead, Harvester Wheatsheaf.

Edquist, C. 2005, "Systems of innovation: Perspectives and Challenges", Chapter 7 in: Fagerberg, J., D. Mowery and R. Nelson 2005, *The Oxford Handbook of Innovation*, Oxford University Press, New York.

Eurostat, 2004, [online], *Innovation in Europe: Results from EU, Iceland and Norway*, Office for Official publications in the European communities, Luxembourg, available at: http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1073,46587259&_dad=portal&_schema=PORTAL&p_product_code=KS-59-04-257 [21.02.2009].

Fagerberg, J. 2002, [online] *A Layman's Guide to Evolutionary Economics*, Working paper, no 17, TIK, available at: http://folk.uio.no/janf/downloadable_papers.html [21.02.2009].

Fagerberg, J. 2003, "Schumpeter and the revival of evolutionary economics: an appraisal of the literature", *Journal of Evolutionary Economics*, vol 13, no 2, p. 125-159.

Fagerberg, J., D. Mowery and R. Nelson 2005, *The Oxford Handbook of Innovation*, Oxford University Press, New York.

Freeman, C. and C. Perez 1988, "Structural Crises of Adjustment, Business Cycles and Investment Behavior", Chapter 3 in: Dosi, G. 1988, *Technical Change and Economic Theory*, Printer Publishers, London.

Foray, D. and B. Å. Lundvall 1998, "The Knowledge Based Economy: From Economics of Knowledge to the Learning Economy", Chapter 7 in: Neef, D., G. A. Siesfeld and J. Cefola 1998, *The Economic Impact of Knowledge*, Butterworth-Heinemann, Oxford.

Foray, D. 2004, *The Economics of Knowledge*, MIT-press, Cambridge.

Genera, (2009), [online], Official Internet Page, available at: http://www.ifema.es/ferias/genera/default_i.html [27.05.2009].

Genera catalogue (2009), [online], Official Internet Page, available at: http://www.ifema.es/ferias/genera/catalogo_i.html [27.08.2009]

Gerring, J. 2007, *Case Study Research: Principles and Practices*, Cambridge, Cambridge University Press.

Hansen, H. K., J. Vang and B. T. Asheim 2005, [online], "The Creative Class and Regional Growth: Towards a Knowledge Based Approach," Paper given at Regional Studies Association Annual Conference, Aalborg, Available online at: http://66.102.1.104/scholar?q=cache:Zjn4l9icn8EJ:scholar.google.com/+symbolic+knowledge+hansen&hl=no [06.07.2009].

Hodgoson, G. M. 2002, "Darwinism in economics: From Analogy to Ontology". *Journal of Evolutionary Economics*, vol 12, no 4, p. 259–281.

IFEMA, (2007), [online],*IFEMA annual report 2007*, available at: http://www.ifema.es/Institucional_01/informacion_general/memoria_de_actividad/index.htm [21.05.2009].

IFEMA, (2009), [online], Official Internet Page, available at: www.ifema.es [21.05.2009].

iXtasun, (undated), [online],” The solution ecological comfort Antares", available at: http://www.ixtasun.com/vacuum.asp [14.07.2009].

Kirchgeorg, M., W. Giese, W. Dornscheidt and N. Stoeck 2005, *Trade Show Management: Planning, Implementing and Controlling of Trade Shows, Conventions and Events*, Gabler Verlag, Wiesbaden.

Kline, S. J. and N. Rosenberg 1986, “An Overview of Innovation”, in R. Landau and N. Rosenberg (eds) *The Positive Sum Strategy: Harnessing Technology for Economic Growth*, Washington D.C., National Academy Press, p. 275-304

Kvale, S. 2001, *Det kvalitative forskningsintervju*, Oslo, Gyldendal.

Lundvall, B. Å. 1992, *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning*, Pinter Publishers, London.

MadrI+D, 2009, *Catalogue of Technology Opportunities: Brokerage Event in Energy: Genera 2009*, MadrI+D, Madrid.

Malebra, F. 2004, *Sectoral Systems of Innovation: Concepts, issues and Analyses of six Major Sectors in Europe*, Cambridge University Press, Cambridge.

Maskell, P., H. Bathelt and A. Malmberg 2004a, [online], “Temporary Clusters and Knowledge Creation: The Effects of International Trade Fairs, Conventions and Other Professional Gatherings”, *SPACES, Economic Geography*, Philipps-University of Marburg, Marburg, Available at: http://web.uni-marburg.de/geographie/HPGeo.old/personal/Bathelt/spaces/SPACES%202004-04%20Maskell-Bathelt-Malmberg.pdf [24.06.2009].

Morgan, K. 1997, “The Learning Region: Institutions, Innovation and Regional Renewal”, *Regional Studies*, vol. 31, no 5, p. 491- 503.

Neolectum, (20.06.2008), [online], available at: http://www.neolectum.com/energy/events/sun14009forest.html [21.05.2009].

Nelson, R.R. and S.G. Winter 1982, *An Evolutionary Theory of Economic Change*, Harvard University Press, Harvard.

Nelson, R. R. 1993, *National Innovation Systems: A Comparative Analysis*, Oxford University Press, New York.

OECD and Eurostat, 2005, *The Measurement of Scientific and Technological Activities: Guidelines for Collecting and Interpreting Innovation Data (Oslo Manual)*, OECD and Eurostat, Paris.

Pavitt, K. 2005, “Innovation Processes”, Chapter 4 in: in: Fagerberg, J., Mowery, D., and Nelson, R., 2005, *The Oxford Handbook of Innovation*, Oxford University Press, New York.

Powell, W. W. and S. Godal 2005, “Network of Innovators”, Chapter 3 in: Fagerberg, J., D. Mowery and R. Nelson 2005, *The Oxford Handbook of Innovation*, Oxford University Press, New York.

Punch, K. F. 2005, *Introduction to social research: Quantitative and Qualitative Approaches*, Sage, London.

Ramirez, P. M. 2007, *Global Spaces for Local Entrepreneurship: Stretching Clusters through Network and International Trade Fairs*, Ph.D., Vaxjo University Press, Gothenburg.

Samuelson, P. A. and W. D. Nordhaus 1992, *Economics*, Fourteenth Edition, McGraw- Hill Inc, New York.

Stake, R. 2000, “Case Studies”, Chapter 16 in: Denzin, N.K. and Y.S. Lincoln 2000, *Handbook of Qualitative Research*, Sage, London.

Storper, M. and A. J. Venables 2004, "Buzz: Face-To-Face Contact and the Urban Economy", *Journal of Economic Geography*, vol 4, no 4, p. 351-370.

Von Hippel, E. 1988, [online], *The Sources of Innovation*, Oxford University Press, New York/Oxford, available online at: http://web.mit.edu/evhippel/www/sources.htm [21.02.2009].

Teknica, (2008), [online], Official Web Page, available at: http://www.teknicailuminacion.com/ [24.06.2009].

Tecopysa, (2009), [online], Official Web Page, available at: http://www.grupotecopy.es/tecopysa/index.php?option=com_content&task=view&id=5&Itemid=7 [27.08.2009].

Torre, A. 2008, "On the role played by temporary geographical proximity in knowledge transmission", In *Regional Studies*, vol. 42, no 6, p. 869 – 889.

Yin, R. K. 1984, *Case Study Research: Design and Methods*, Sage Publications, London.

Yin, R. K. 2003, *Case Study Research: Design and Methods*, Sage Publications, London.

Appendix A: List of Interviewees

Casa Pasarela

Juan Arroyo, Artist, JAF, Spain.
Juan Navas Perez, Commercial Department, Fire at Home-Chmeneas Econologicas, Spain.
Manuel Angel Hernanz Lopez, Commercial Director, Alfra Feuer, Germany.
Maximo Romani, Designer, Masmax, Spain.
David Garcia Ayensa, Director, Biofuego Design, Spain.
Sara Sal Gonzalez, Designer, G-led, Spain.
Antonio Morales, Architect, Muebles e Inventos, Spain.
Maria Margarita Garcia Munzer, Designer, Tuyo design, Norway.
Pål Jacob Jacobsen, Designer, Tuyo design, Norway.
Juan Gasca, Designer, La Mamba, Spain.
Jon Elejabeitia Cilleruelo, Director I+D+I, Escuela Superior de Humanidades y Negocios, Madrid, Spain.
Jose David Perez Fernandez, Architect student, Escuela Superior de Humanidades y Negocios, Madrid Spain.
Juanmi Juarez Prieto, Designer, Mermelada d estudiocreativo, Spain.

Genera

Angel Carlos Herrero Lastra, Industrial Engineer, Tecopysa, Spain.
Aristodemos Stephanou, Mechanical Engineer**,** Plastikon: Group of Companies, Cyprus.
Michal Fridel, Engineer**,** Schener Technologies S.L, Slovakia.
Pedro Oreja, Engineer**,** Fasten Sistemas, Spain.
Christoph Urbschat, Trade fair organizer, German Federal Ministry of Economics and Technology, Germany.
Jose Angel Souto, Director area electrica y automatizacion**,** Ingenieria Nacarsa, S.L, Spain.
Kim Madsen, Director, Momentum Gruppen A/S, Denmark.
Bernardino Munoz, Technological Transfer Officer, Universidad Rey Juan Carlos, Madrid, Spain.
Carlos Zubizarreta Olea, Engineer and Sales Manager**,** Rolls-Royce Marine Spain SA, Spain.
Nikos Floros, B.Sc Mechanical Engineer/Export Manager**,** Termo Hellas Solar Systems, Greece.
Ramòn Rodrìguez, Engineer & Development**,** Reisol Solar Solutions, OCV Solar–Termica, Spain.
Jesus Heras Rincon, Journalist**,** CIEMAT- Centro de investigaciones energeticas medioambientales y technologicas, Spain.
Jorge Vaz, Mechanical engineer**,** Openplus Energy Systems, Portugal.
Alberto Sampedro, Director**,** Estec Renovables S.L, Spain.

Other interviewees (External validation sources)

Alfonso Janeiro, Head of coordination department for industrial products and technology, Spanish Institute for Foreign Trade, Madrid.

Juan Bergas Negre, Market Manager, Innovation Norway, Madrid.

Monica Sanchez Rubio, Market Manager, Innovation Norway, Madrid.

Luca Bocci, Senior Adviser, Innovation Norway, Madrid.

Eugenia Fierros, Market Manager, Innovation Norway, Madrid.

Markus Kemper, Leader for the Market and Account Department, German-Spanish Chamber of Commerce, Madrid.

Appendix B: Interview Questions

Participating Firms Genera and Casa Pasarela

Please tell me about your organization's/firms activities and your position

1. What are the main objectives for participation at this trade fair?

2. Which characteristics have the trade fair that makes it attractive for your firm?

3. Why is face-to-face contact important when meeting customers, partners and colleagues?

4. How does the trade fair work as an information source for your firm? Which other sources of inspiration/innovation do you have?

5. How does the trade fair facilitate the cooperation with suppliers/customers in order to create new ideas, products and processes?

6. What do you learn from informal conversations with colleges of other firms at a trade fair?

7. Is the trade fairs a place where you compare your products with the competitors?

8. How do you compare? What in particularly are you looking for?

Government Organizations

1. What is your organization's main role in relation to trade fairs?

2. What is the main purpose with a common national stand?

3. How do you organize the trade fair participation for firms?

4. With which private/official organizations do you cooperate in organizing a trade fair participation?

5. What is your relation with these organizations? How do you work together?

Universities and R&D centers

1. What was the main motivation for participation on this trade fair?

2. With which private/official organizations do you cooperate?

3. How does the trade fair facilitate the cooperation with firms/other organizations in order to create new ideas, products and processes?

4. How does the trade fair work as an information source for your organization? Which other sources of inspiration/innovation do you have?

5. What do you learn from informal conversations with colleges of other firms at a trade fair?