

KNOWLEDGE TRANSFER AND INDUSTRIAL CHANGE IN THE JEWELLERY INDUSTRY – AN ECOLOGIES-OF-KNOWLEDGE APPROACH

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Abstract

Researchers within the fields of economic geography and management have rather extensively studied learning and the prerequisites and impediments for knowledge transfer. This paper combines the communities of practice and the learning region approaches, merging them through the so-called ecology of knowledge-approach, which is used to examine the development of the jewellery industry in Finland since the times of the House of Fabergé. We examine the pre-revolution St Petersburg jewellery cluster and the post-revolution Helsinki, and the transfer of knowledge between these two locations through the components of communities of people, institutions and industry. The paper shows that the industrial dynamics of the Finnish modern-day goldsmith industry was inherently shaped both through the transfer and the non-transfer of knowledge.

Keywords: learning, ecologies-of-knowledge, jewellery industry, the House of Fabergé.

Knowledge Transfer and Industrial Change in the Jewellery Industry - An ecologies-of-knowledge approach

Work in Progress

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Suggested track: E Communities of practice, knowledge networks and networking

1 Introduction

At the level of the firm it has been argued that knowledge and intellectual capital are crucial determining factors for creating and maintaining competitive advantage (Winter 1987) and constitute to an increasing degree the value of modern firms. The knowledge is to a large extent tacit and exclusively tailored to the needs of the specific firm (Leonard-Barton 1992), embedded not only in documents or databases, but in the organizational routines, processes and norms of the organization (Davenport and Prusak 1998) These relationships between firms are needed for knowledge diffusion and technology development (Powell 1998). Learning and innovation are considered substantial parts of knowledge exchange, and especially in handicraft-based industries the economic success is largely depending on the transfer of tacit knowledge between employees.

The industrial dynamics of the Finnish jewellery industry serves as an interesting case for studying the transfer of artisan knowledge, and indeed, the non-transfer of knowledge. More specifically we have chosen to study the transfer of knowledge from The House of Fabergé and the jewellery cluster in St Petersburg to the jewellery industry in Finland. The House of Fabergé has represented the pinnacle of design, organisation and technique in the history of the jewellery industry. Yet its impact on the Finnish jewellery industry has been modest (Vainio-Korhonen 1994). This apparent gap in the knowledge flow between the two locations becomes even more perplex on the face of it, by the fact that a large part of the metalsmiths and jewellers, who worked for the House of Fabergé were Finns, many whom returned to Finland as the Russian revolution shut down the jewellery cluster in St Petersburg in 1917. We examine this case from an ecologies of knowledge approach, where we combine both the communities-of-practice approach and the learning region approach for explaining and analysing the knowledge transfer within the industry and the industrial dynamics since 1917.

It would of course be rather ill-advised to study the changing fortunes and industrial dynamics without considering the aspect of market and finances. Noteworthy is that the House of Fabergé was not only supplying for the local market, but for a large number of international clients as well. It is clear that by the overthrowing of the tsar and by the declining influence of the royalties in Europe, the market and the demand

for the kind of extravagant jewellery as produced by the House of Fabergé was declining rapidly. However, it would be just as ill-advised to overlook the importance of knowledge creation and diffusion when trying to explain regional industrial dynamics (Pinch et al. 2003).

The empirical part of this paper relies on archival data. A transcript of an interview with leading Finnish metalsmith Heikki Seppä was downloaded from the Smithsonian Archives. As this is a transcript from an actual interview conducted May 2001, it is easily analyzed and categorized as such. Also secondary material with statements from several other Finnish metalsmiths active in Finland is used. The term metalsmith is in this paper used to cover several kinds of smiths working with precious metal, being both silver- and goldsmiths, and jewellers actually working with precious metal and gems.

1.1 The failure of a dichotomy

There exists a seemingly ever increasing tug-of-war between those downplaying the spatial dimension of knowledge transfer (Hendry et al. 1999) and those amplifying it (Asheim 1995; Lundvall and Johnson 1994). This tends to create a dichotomy of global versus local, where the usage of global networks equates the transfer of ubiquitous knowledge, and local clusters equates the transfer of tacit knowledge (Allen 2000).

We strongly posit for the view that there is no dichotomy of tacit and articulated (explicit) knowledge, following Brown and Duguid (2001) in their interpretation of (Polanyi 1962). In this view Polanyi was not contending for the existence two types of knowledge, but rather for two mutually interdependent dimensions, as the explicit dimension (or rather *articulated*, according to Polanyi) is based on the previously interiorized, implicit or tacit dimension (Allen 2000; Brown and Duguid 2001; Gertler 2003) There is thus not an automatic equation between tacit knowledge bound to local learning and diffusion, and the diffusion and spread of articulated knowledge shackled to global networks. This is not to say, however, that there is not a strong spatial dimension to knowledge transfer.

1.2 The learning region approach

"Learning Regions" is a concept coined by academic authors in the fields of innovation studies and economic geography (Florida 1995), where regions are

defined as collectors and repositories of knowledge and innovative thinking. It is closely connected to Lundvall's term "learning economy" which is based on an idea that the ability to innovate and relate knowledge is one of the cornerstones of economic competitiveness (Lundvall and Johnson 1994). Florida (1995) underlines the significance of not only the learning of individuals, but also of learning taking place within and between different institutions, may they be firms, research institutes or universities, for example. The core of the learning region approach is the idea that "tacit knowledge does not travel easily" as shared contexts and norms, eye-to eye communication and personal relationships are needed in order to successfully transfer knowledge from one individual to another. The approach implies that a firm or individual in need of knowledge is likely to first search for it locally, among those they have a relationships and knowledge about. (Gertler 2003) Recently doubts have been raised about the connection between the tacit knowledge and the localness, and ideas presented that relationships that span organizational boundaries and geographical distances may be just as useful for transferring tacit knowledge (Allen 2000) This view is drawing the field of economic geography closer to the communities of practice approach presented below

1.3 The communities of practice approach

The term "Communities of Practice" was coined by Etienne Wenger and his team while doing research on apprenticeship as a learning system. Nowadays apprenticeship is to a large extent not just a master teaching a journeyman or apprentice, but rather a relationship between an entire community of people where you may have masters and apprentices at diverse stages. According to Wenger, (2003) they opted for this term since the one issue that united the practitioners in a certain field together is the knowledge, practice, they share. Brown and Duguid (1991) later matched Wenger's terms with Orr's ethnographical study on service technicians and developed the aspects further. The communities of practice were a social construction, as the individuals included shared the same conceptions and view of the work, and through informal collaboration could help each other with problem solving. They are fluid and self-organizing with members changing in a straightforward way as individuals retire and new are employed, and they often cross formal boundaries of the organization

1.4 Ecologies of knowledge

The ecologies of knowledge approach may be seen as combining the theories of the learning region from economic geography from management's communities of practice into a fruitful fusion. In general researchers seem to increasingly acknowledge the importance of studying both the effect of and the need for both geographical proximity and external networks for the knowledge transfer process. In our view studies of internal networks transcending national borders and clusters are not necessarily mutually exclusive when it comes to transfer of knowledge and the learning process of the firm. This view is seemingly embodied in the so-called "ecology-of-knowledge" advocated by Morgan (2001) and coined by Brown and Duguid (2000). This approach is neither shackled by the spatial nor the organizational fetishism as it acknowledges the firm as the focal actor, but without trivializing the role of proximity. As Morgan (2001 p. 15) puts it:

"The spatial core of these ecologies of knowledge may be a regional cluster, but the outer boundaries might straddle multiple spatial scales, from the local to the global, because some of the firms which constitute the ecology will be multi-locational organizations."

This approach will be used in the empirical study of ecologies of knowledge. The spatial core being a regional cluster of metalsmiths in the Helsinki region. In the study we compare and describe both the possible business network and geographical benefits and detriments, in regards of knowledge transfers in and between different forms of organizations within the regions.

2 Tacit knowledge and learning in the artisan industry

Following Polanyi (1962), a large part of human knowledge is personal, and difficultly codified. Transferring tacit knowledge is only possible through close interaction between individuals in an environment of mutual trust and understanding. The acquirement of knowledge occurs through so-called "learning by doing", as for example in the relationship between master and apprentice.

According to (Argyris 1977), the learning and knowledge leveraging activities of the individual may be either facilitated or repressed by what he calls "an ecological system of factors that may be called an organizational learning system." (Huber 1991) follows the same line of thought arguing that an individual learns something only if its behaviour is altered through processing available information. Learning

according to Huber is thus close to (Argyris and Schön 1978) idea of single and double loop learning. They argue that single loop learning occurs when schema remains unchanged despite the acquisition of new skills. Double loop learning, on the other hand, causes the changes in the current schema and does hence produce a fundamental change in the behaviour. Watkins and Marsick (1993) join the arguments about learning as a systematic change, also on an organizational level. The value of learning on an aggregate level within and across organizations has been supported by a large number of researchers, including Brown and Duguid (2001; 1991 1996) Wenger (1998) and Wenger and Snyder (2000), discussing Communities of Practice, from which part of the the fundamental arguments of this paper are developed.

Many artisan industries are also regarded as having a high degree of tacitness in its learning process (Lazzeretti 2003; Storper and Salais 1997). It has been argued (Santagata 2004) that some cultural industries, such as the jewellery industry cannot be delocalized: the ideas and aesthetic designs are rooted in the local culture. Its intellectual properties and intangible capital cannot thus be delocalized.

2.1 Different kinds of knowledge

Lam (2000) suggests a further division of knowledge based on the dimensions of tacit-explicit and collective-individual. We find this separation worthwhile discussing despite the fact that Lam seems to distinguish between tacit and explicit knowledge, a distinction that is not made in this paper. This division has been made earlier by Collins (1993) and Blackner (1995).

The first type, *embrained* knowledge is more individual and explicit. An example of embrained knowledge could be that held by the scientist, where his cognitive and conceptual skills determine the understanding of abstract, theoretical knowledge. The second type of knowledge, so-called *embodied* knowledge is still on an individual level but more tacit than explicit. This is the kind of action oriented personal knowledge described by Polanyi (1962), which is accumulated by experience and practical understanding of occurrences. It is according to Barley (1996) context specific, and is not understandable or transferable outside the situation. (Lam 2000) However, as pointed out in Ancori et al. (2000), when we as individuals apprehend a piece of "objective" information we are likely to give different meaning to it depending on our cognitive capabilities. This, in turn, results in the fact that processing

knowledge makes it personal and specific, and “embrained” knowledge would rather be the use of cognitive capabilities in order to turn give a more tacit dimension to originally explicit knowledge (as, for example, scientific knowledge).

Encoded knowledge is the collective and explicit kind of knowledge often referred to as information. This kind of knowledge can be stored in and spread through databases, blueprints or written documents. *Embedded* knowledge is collective and tacit, and may be found from organizational routines and from the shared norms of a firm. Brown and Duguid’s “communities of practices” are formed in order to leverage and transfer this knowledge, as it is relationship specific and dynamic. (Lam 2000) Thus this kind of knowledge that is difficultly transferred over organizational boundaries since it is constrained by a given network of social relationships (Gibbons et al. 1994). The organizational routines (Nelson and Winter 1982) are viewed as the genetic substance of the organization, where the knowledge is embedded. The organization as such functions as a context where knowledge with both more tacit and explicit dimensions is leveraged in routines mainly important for new employees.

2.2 The jewellery industry in Helsinki: Artisanal argonauts or high-tech laggards?

A traditional artisan industry embedded in a high-tech society makes an interesting case for knowledge transfer studies. The jewellery industry is one of the oldest craft based industries, and it featured prominently in Marshall’s studies of industrial districts (1920) and in studies of Italian industrial districts (Lazzeretti 2003; Santagata 2004). It makes a distinct contrast to the high technology sector in the sense that it is often based on what might be referred to as “culture-based goods” (as opposed to “knowledge-based” goods). In terms of innovation, these industries are seldom seen as high-tech industries. When following OECD classification they rank within medium-low technology industries (OECD 2003). However, within the E.U there is still recognition that handling and manufacturing of products from precious metals still are considered “technically very complicated” (EU 2002). The OECD sectoral classification notwithstanding, the jewellery industry, like many of the artisanal industries, should not be seen as lacking in innovation of technology, techniques, or design. As the classification is based on R&D intensity, an industry which is classified as low-tech does not necessarily equate it not being innovation or knowledge intensive (Asheim 2001).

The industry does in fact bear some strong resemblance to the high-tech sector, as it is often mentioned as being in the centre of “glocalism” (localized globalism). It is an industry that is highly dependent on the strategic input of creativity and intellectual activity (Santagata 2004).

Especially so-called design knowledge (know-how) is considered tacit to its nature and almost impossible to articulate. This is the knowledge emerged through the design process and is often leveraged only in the mind of the artisan (Wong and Radcliffe 2000). Alexander (1968) (cited in Schön 1983) also describes the knowledge involved in design. He argues that an artisan often is able to recognize and correct a form that does not fit the content, but may not be able to explain why it fits better after the correction. A statement from Vickers clarifies this as “[we] can recognize and describe deviations from a norm very much more clearly than we can describe the norm itself.” (in Schön 1983:53).

Innovation in the jewellery industry. Although the jewellery industry is based on artisanal craft and fostering of traditional skill, it is also an industry, which in many respects has adopted new industrial processes and methods. There exists both the creation of new manual techniques, the combination and development of existing techniques in other industries, and the development of new mass production techniques. Learning occurs through different processes, and it is mostly the practice that shapes and supports the learning (Brown and Duguid 2000) Through formal education the young metalsmith might learn the “know-that”, but without being able to put the knowledge into use. The “know-how” to do something is only acquired through practice. (Ryle 1949) Below an example of what Brown and Duguid (2000:136) would call “stolen knowledge”, acquired by merely observing when somebody is doing their job:

Q: “Did these older men that you admired give any instruction or did you simply learn by observation?”

A: No, no. Just observation. I didn't even learn Danish to that extent.”
[Seppä (2001) on his stay at Georg Jensen's workshop in Denmark]

The young Seppä was in this case supposed to be occupied with something completely else in the workshops of the world famous Danish master Georg Jensen, as he was still in the very early stage of his career. Still, he took advantage of the

situation and acquired skills that later turned out to be very valuable for his development as a metalsmith.

2.3 The jewellery industry in Finland

The jewellery industry in Finland makes an interesting case for rather opposite reasons than the high technology industry. The industry has been rather highly regulated for more than 500 years, as a law passed in 1485 forced the metalsmiths to hallmark their products. In order to facilitate the control all the metalsmiths were encouraged to move to the cities at this time (Vainio-Korhonen 1994). The grounds for firm regulations was that the products were originally used as trade goods, and the value was measured in the percentages of precious metal. However, as their usage has altered, the value is now more dependent on technique, designs and the use of gems. (TaVM 2000)

Export-wise the industry does not feature very prominently although it has recently experienced a spur of growth. Partly of this growth may be attributed to a law passed in 2001, where the percentages of precious metal required was lowered in order to converge Finnish legislation to that of the E.U. A similar change in the Swedish legislation signified an increase in imports. The Finnish law also brought with it changes in the controlling authorities and responsibilities, in so far as some of the earlier obligatory hallmarks now became optional, and the controlling authorities were subject to competition. The alteration brought about in particular declines in the costs for imports and for SMEs manufacturing small ranges of products. (TaVM 2000)

There were about 300 metalsmiths in Finland 1999, of which the majority are running their own or jointly owned workshops producing jewellery as handcraft. The changes were especially notable for these in forms of lowered costs as they could choose between transporting the products to a central institution for hallmarking, or using their own hallmark with the percentages of precious metal and place of production. (TaVM 2000)

3 The failure of knowledge transfer in the Finnish jewellery cluster 1920-1970

Interestingly enough, there were several positive conditions in place from the 1920s to the 1940 for creating a competitive metalsmith cluster in Helsinki. Compared to

other Finnish cultural industries, which rely on inputs of both design and technique, like furniture, glass and many other forms of industrial design, which all made a name for them internationally in the 1950s and 1960s, the jewellery industry never really took off to the extent, especially in regards of exports.

However, not only where the design environment favourable because of possible spillover effects between the different design intensive industries and their actors, who were part of a small world network, but the guardians of metalsmith techniques were also present. Before the Russian revolution in 1917 St Petersburg, building up around Carl Fabergé's studio, was a central node for the craft of jewellery making and design in Europe. What makes the Fabergé legacy even more significant is that from a technical point of view the techniques used by the House of Fabergé represents a pinnacle reached by goldsmiths and jewellers in the history of the trade (Snowman 1980). A lot of these techniques are, however, lost today, as are, more understandably, the extravagant designs, and rather intriguingly the organisational form.

The Finnish jewellery industry, rather surprisingly show very little influx from the Fabergé legacy, design, technique and organisation-wise. Unlike popular perception, the industry has dominantly shown more influence from Swedish (Vainio-Korhonen 1994). This despite the fact that a large part of the Fabergé goldsmiths came to Finland following the Russian revolution in 1917.

3.1 The community of people: The role of the Finnish metalsmiths

The House of Fabergé was created largely thanks to the network of master jewellers and goldsmiths that Fabergé managed to orchestrate. Central nodes in his network were the hundreds of artists who he found in Finland (at that time the Tsar's Grand Duchy, annexed to Russia). In 1840 29% of all goldsmiths in Petersburg were Finns, and in 1869 27% (Engman 1980). By the early 1900 this number diminished somewhat, but the Finns still made up 1/5th of the total (ibid). Of the workmasters at the House of Fabergé as many as 3/4th were of Finnish origins. St Petersburg had no equal locality for Finnish metalsmiths, there were twice as many Finnish metalsmiths in St Petersburg as there were in the whole of Finland in 1840.

The environment in St Petersburg was very multinational. Around half of all the masters were foreigners, the Finns made up around 15% of this group. Consequently, most of the Finns worked as journeymen and apprentices. The Finnish masters rarely refused to employ non-Finns, but still their employees were mostly Finns. In many workshops almost all the workers were Finnish. The level of trust among these foreigners was high; this would certainly have facilitated the transfer of knowledge between the employees in the workshops. (Engman 1980)

3.2 The organizational environment: The role of The House of Fabergé

The House of Fabergé was close to what might be called a large international firm in its structure: the company was divided into workshops, each with its own narrow speciality. By the turn of the 19th century the workshops employed over 500 goldsmiths, enamellists, jewellers and other personnel (Snowman 1980). A head of the workshops, entitled “head workmaster”, oversaw the production.

Fabergé produced a wide range of products and design: the famous Fabergé eggs; silverware; jewellery; European-style trinkets, and Russian-style carvings. The Fabergé metalsmiths had acquired and developed highly specialised techniques, which were not used elsewhere (e.g. enamelling and reticulation), the tacitness of these techniques were (and are) very high, Seppä (2001) recalls:

“There was one guy [Mr. Lajunen] who actually had worked in St. Petersburg and he showed me how to reticulate. And he told me where the reticulation came from -- from Carl Fabergé’s shops where the apprentices would heat the coffee pot that they were soldering the spout to. Heat one spot a little bit too much and it would reticulate. And then they found out that hey this is a nice surface. “We can use this technique”. So, they researched it and made it almost infallible kind of process. “ (Seppä 2001)

The Petersburg branch was organised by a number of separate workshops, which all had the responsibility to oversee each object all through the production chain: from design, through the complicated manufacturing stages; to packaging; to finally its sale in a showroom. Each workmaster was then entitled to stamp his initials next to the landmark “Fabergé” on the object that he had overseen. Each workshop was highly specialised in one form of object. The Moscow branch was run in an entirely different manner, more like a commercial enterprise, resembling more modern forms of production. Here the studios and workshops produced a wide range of products, from animal carvings to large silver items. The objects were anonymous and bore no

personal signature of the workmaster. (Snowman 1980) It is noteworthy that even though the gold, jewellery and enamel products produced by the Moscow branch did not reach the quality standards of the St Petersburg branch, the silver products produced in Moscow were superior. Moscow had historically always been the centre for silver production in Russia, it had become an agglomeration of most of the important and large silversmiths at the turn of the 19th century (Lopato 1991). From a learning region perspective this is interesting, since it underlines the role of the region and knowledge spillovers, but also locational path dependency, in the sense that Moscow had become the centre for silverware, and if you were in the silverware and silversmith trade it was hard to locate anywhere else, even if you were running a business in the scale of Fabergé.

The Moscow silversmith cluster also affected the Finnish knowledge of silversmithing. Most of the Finnish metalsmiths worked in St Petersburg, and thus the Finns knowledge on silversmithing was limited in comparison to the other metalsmith trades. This would later be evident by the fact that the Finnish silversmith art as taught in school in Finland, could be considered backwards and less innovative than the other metalsmith trades. This is echoed by the comments of one of pioneers of Finnish silversmithing, Heikki Seppä, who revolutionised the field with his silversmithing techniques, when describing the formal education in Finland in the 1940s:

“The goldsmith was working on jewellery. And the silversmiths were making coffee pots and trays and forging spoons and forks -- just run of the mill stuff. And when I look at some of the pictures from the school times, it just makes me so sick because I did not realize that silver can do a lot more than that... Finland is still not contributing to the silversmithing art... silversmiths are still working on two-hundred-year-old designs that don't say anything.” (Seppä 2001)

The high degree of specialisation as used in St Petersburg favoured a system built on subsidiary suppliers. This was the form of organisation, favoured by The House of Fabergé. Very few of the Finnish masters had shops of their own in St Petersburg, they concentrated on production for firms, like the House Fabergé, which took care of the sales. These Finnish workshops usually worked either under exclusive contracts or as free subsidiary suppliers. (Snowman 1980) This system of organisation would later seal the fate of many of the Finnish masters upon their return to Finland, and serves as part of the explanation on the non-transfer of knowledge from the Fabergé cluster to the Finnish jewellery industry. Of the few who made the successful transfer from St Petersburg to Helsinki was Alexander Tillander, who was one of the very few

Finnish masters who was running both a workshop and a shop in St Petersburg. The case of Tillander will be discussed later in this paper.

3.3 The institutional environment: The role of embeddedness in St Petersburg

The small worldliness of the St Petersburgian jewellery production network is quite evident. Fabergé himself was half-Swedish on his mothers side, and surrounded himself with Finno-swedish workmasters and metalsmiths (Tillander 1990). The metalsmiths formed a foreign elite in St Petersburg, a tightly knit society of specialists, connected both by a common trade as well as family links. (Jangfeldt 2000) The Finns in St Petersburg had their own newspaper, charitable organisations, temperance associations and shared a cultural life (Engman 1980).

The transfer of knowledge was facilitated both by organizational proximity (The House of Fabergé), and relational proximity (shared metalsmith expertise; the tight knit community of the foreign elite), thus displaying strong resemblance to the more recent literature on communities of practice (Brown and Duguid 1996). People who have similar practices also share an identity, which, to some degree, separate them from other groups (Brown and Duguid 2000) It might not have been so much the information they shared that makes them different, but rather the attitudes and the shared background (Brown and Duguid 2000).

When the studio of Carl Fabergé closed its doors in 1917 after the revolution, there were quite a few Fabergé-trained metalsmiths who returned or fled to Finland. Some of them became teachers at the goldsmith school in Helsinki, others started their own goldsmith workshops in the city, while others took up employment at existing workshops. But very soon after the metalsmiths returned the non-embeddedness (both socio-geographic and organisational) and the effect this would have on the flow of knowledge became evident. The Finns returned and found themselves foreigners in their own country. Some were second and third generation Finns from St Petersburg who hardly spoke a word of Finnish, others were first generation Finns who spoke Finnish fluently or with a slight accent. They were met by suspicion and were called “country traitors” and “ruskies”. (Hollming 2003) The embeddedness of the craftsmen aristocracy of St Petersburg was gone. So were the common norms and conventions. In many cases the level of trust did not bolster between the returning masters and the young Finnish aspiring metalsmiths who wanted to learn

the trade. Some kept their background secret altogether, and never told of their background. The woman who had designed the celebrated Winter Egg, Alma Pihl, took up work as a second grade art teacher, and never told any of her students of her past. And thus never transferred her knowledge to the Finnish jewellery industry. Her brother, who had been a leading craftsman at Fabergé, also took up a teaching position at an art school, but was convinced by a local professor to take up work at Tillander's firm in Helsinki. Tillander, who had also returned from St Petersburg (see separate chapter) knew the man's reputation and made him head-designer for the firm. But in that case the knowledge stayed within a small family-run business (in this case Tillander).

Other of the returning craftsmen were almost immediately drafted and sent to war in the 1930s and 1940s. Some of them returned but the war had left their scars and the motivation for passing on the knowledge and secrets of the trade were not always the highest. Seppä recalls how he learned a specific technique, which had been perfected by the House of Fabergé:

“I would sneak out to this old fellow who had been working for Carl Fabergé. And he was very, very sort of a dour guy. He did not want to talk to anybody. He just did his work and got his pay. But I snuck over his shoulder and watched how he worked. And I was just admiring how he would juxtapose everything, everything together and soldered it. And it was perfect every time. Great admiration for craftsmanship. But he would not teach me how to reticulate [a silversmith technique].” (Seppä 2001)

The example serves as a reminder that organisational embeddedness and a community of practice, is not very useful without the right socio-cultural and geographic embeddedness. There are also examples of how the Fabergé legacy was lost due to the lack of organisational embeddedness: some of the craftsmen and designers still felt bound to “the code of Fabergé”, which forbade them to pass on the secrets of the House of Fabergé, even years after the house had stopped existing (Godenhielm-Tillander 1991).

3.4 The narrow knowledge of the specialist versus the broad knowledge of the apprentice

Before a formal school was established, the only way to be trained as a metalsmith was to get accepted as an apprentice at the workshop of some goldsmith master. The period of training was rather long, about 5 years, and about two third of the

apprentices passed the test for becoming a journeyman. (Vainio-Korhonen 1994) The journeyman period was rather extensive, as it took in average 10 years before they could present themselves for the master craftsman's certificate. The time as journeyman included an obligatory journeyman's ramble, which was a kind of study trip made though the home country or abroad. This trip was very important not only for the young journeyman but for the whole industry in order for new tendencies and new techniques to spread. (Kruskopf 1989)

The system with journeymen and masters was terminated towards the end of the 19th century, when freedom of trade was eventually initiated. Due to this the relationship between the journeymen and the masters slowly transformed into that of employer and employees, thus many of the masters perceived a future threat of competition from the apprentices, and turned increasingly unwilling to take them in. (Fagerström 1983)

Also at the house of Fabergé the business was divided into several small workshops, each with its own specialty. Consequently, each metalsmith turned increasingly specialized. The Seppä remembers the situation in Finland still in the 1940's as:

“Even though you chose to become, let's say like I did, a silversmith, you still had to keep your hand in engraving, in goldsmithing, in gemology, and even enamelling. So those skills were not getting away from you. You still have to be with them, although less time than those who majored in them. So that general knowledge was seldom found in the profession.” (Seppä 2001)

When the metalsmiths returned to Finland, there was an overflow of highly specialised masters, but no market for such costly jewellery. Rather, the industry inquired about artisans with general knowledge and a broader base of skills.

“So the tradesmen -- although the field was very narrow, but they were masters. When you had an engraver who had nothing but engraving, he was doing very well, I mean, much better than our students. But, our students also knew what was involved. So, I mean, the overall value of a trained student was really sought by the industry.” (Seppä 2001)

Hence a need for a Goldsmith school increased even more, and finally after 20 years of planning it was established in Helsinki in 1938 by the Finnish Goldsmith Association. Some time later the city of Helsinki bought the school as it run into some

financial problems, and again later it was bought by the city of Lahti. (Seppä 2001) The Goldsmith school is today a part of the Polytechnic of Lahti, and is one out of four institutions where you can study for a Bachelors degree (three years). (Finnish Goldsmith Association 2004)

3.5 The firm of Tillander; an example of successful knowledge transfer within a closed community

One of the few goldsmiths who successfully made the transfer from St Petersburg to Helsinki was the Tillander firm. Ironically, Tillander was not employed at the House of Fabergé, but had run a successful jewellery workshop and shop premises on the same street as Fabergé on Bolshaya Morskaya, the so-called golden street of St Petersburg. Some of the apprentices¹ that worked for Tillander later successfully established themselves in Helsinki, and together with Tillander became the most prominent names in the Finnish jewellery industry. (Tillander 1990)

Tillander also ran a wholesale business, and created an extensive network to a number of foreign retail shops² in the city. The firm took over the stock of the renowned Paris jeweller Boucheron, which had closed its own premises in the city. This marked the start of collaboration between the two firms, which in part explains the successful transfer of Tillander's firm from St Petersburg to Helsinki after the revolution. Tillander had formed a network to a large number of Finnish subsidiary suppliers that were employed as Tillander's workshop could not keep up with rising demand. With the revolution the business came to an abrupt halt. Soon after the revolution 1917 Tillander died, the business was taken over by his son.

Upon return to Finland Tillander soon took over the jewellery firm that had represented Tillander in Finland for many years. (Tillander 1990) This is a significant observation, since it explains how Tillander could transfer his firm from one embedded geographic location (St Petersburg) to another (Helsinki). The Finnish metalsmiths who had worked under and with Fabergé, on the other hand, were shackled to the system of working as highly specialised suppliers, with their own workshops but without their own shops (Engman 1980). The organisational form that he had been running in St Petersburg was more compatible with the Finnish market, than that of the highly specialised workmasters of Fabergé. As Tillander had a good

¹ E.g. Westerback, and Fagerros, both jewellery firms which still exist today

² E.g. the French firms Vaillant; and Clément & Guilbert; and the Swedish firm Bolin).

knowledge of the prices that jewellery could fetch on the international market, he used this knowledge and his previous international contacts to sell large quantities of jewellery that he bought from people emigrating to Finland after the revolution (Tillander 1980). As the Finnish market had a rather limited demand for excess jewellery, his international sales contacts proved crucial.

A smoother socio-cultural transfer, than that experienced by many of the other Finnish masters supported the organisational transfer of Tillander to Helsinki. Tillander had made an effort to remain socio-culturally embedded both in St Petersburg and Helsinki. Not only did he along with most of the other Finnish masters, involve himself in community (of foreigners) in St Petersburg, but he placed a foot in the Finnish society as well and kept his ties up-to date. He was thus part of two elites, that of the foreign elite in the city he considered his home (St Petersburg), and that of the Finno-swedish elite in Finland. Even though based in St Petersburg his children spoke Swedish, Finnish, German, and Russian. Upon return to Finland his children were thus not foreigners to their own country to the same extent as many of the other returning metalsmiths, who hardly spoke the Finnish language anymore. Tillander shared, and was familiar with the untraded interdependencies of both geographic locations: the language, norms and conventions.

4 Discussion and Conclusions

Previous research has shown that firms with a common geographical background and history can share knowledge resources, which can provide them with a collective competitive advantage (Pinch et al. 2003).

From a geographical point of view, following the “learning region” approach (Lundvall and Johnson 1994) it can be argued that it is unlikely that this locality, seen as a container of the most tacit dimensions of the metalsmith trade, could have emerged or, indeed, relocated anywhere else. However, in this case, the necessity of the region is more rooted in the production of knowledge, rather than the transfer of knowledge. However, transfer-wise it can be argued that the essence of the metalsmith trade both design and technique-wise was not contained to the Fabergé organization. The complex relational proximity was embedded both in the specific culture (of being foreign in St Petersburg, thus feeling kinship with other foreigners) and family (the artisans helped family even though they did not necessarily work for the House of Fabergé). The transfer was thus facilitated by a number of untraded

interdependencies, which are hard to reproduce anywhere else; common codes of communication, shared conventions and social norms; and personal knowledge of each other based on past history of both formal collaboration, informal interaction, and familiar kinships. It was not uncommon that the established metalsmiths helped their kin who arrived in the city, although these could be seen as competitors in the jewellery industry (Hollming 2003). The uniqueness of the regions ability to spur on innovation was further enhanced by the spillover effects from other cultural (arts and crafts) industries present in the city.

In many ways the St Petersburg case bears many similarities to an industrial district as defined by Becattini (1990). By this definition the district is a socio-economic and territorial entity characterised by an active community of people, institutions and firms specialised in operating in a naturally and historically bounded area (Becattini 1990). However, the St Petersburg district differs from the traditional Italian jewellery district as described by e.g. Lazzeretti (2003) and Santagata (2004), by not being an agglomeration of small firms, by rather an agglomeration of small firms emergent around one large nodal company. A lot of the small independent workshops were working exclusively for Fabergé. However, it might be argued that St Petersburg could have developed more into what we see in places like Vicenza, Valenza Po, and Arezzo had the revolution not intervened. It is possible that workers employed by Fabergé would have left and set up small shops of their own in the area. This is, however, speculation, and as can be seen in the case of the jewellery sector in Finland, the Fabergian knowledge was seemingly rather immobile.

The division of knowledge made by Lam can easily serve as a theoretical reference for explaining the knowledge transfer and learning within the jewellery industry at arrival of the Faberge metalsmiths and in modern times. As the types of knowledge present different characteristics, they are likely to be acquired and transferred through different mechanisms. The encoded knowledge is mostly the kind of information provided nowadays in the schools of professional training, where the students are confronted with what Ryle (1949) would call "know-what". It might be represented by the knowledge leveraged into information systems and CAD software. If everything goes well, the student is able to turn this into embrained knowledge depending on his conceptual and cognitive skills.

The embodied knowledge is the kind of knowledge that is most personal and inherent within the jeweller, determining his initial attributes for professional advancement. This knowledge will not emerge from the professional education, but is rather likely to develop as the jeweller starts practicing his profession. This knowledge seemed to be present in a large extent in the Faberge metalsmiths as they were representing the top tier in their profession. The embedded knowledge is likely to develop jointly between the jewellers in a workshop. Thus, where several jewellers are working together the main challenge would be to transform the embodied knowledge into embedded knowledge that individuals could share. In the artisan industry where tacit knowledge constitutes a large part of the professional skills, interaction between individuals is fundamental for the transfer of skills. Here encoding the total pool of knowledge is not a reasonable aspiration. Also the examples given by Heikki Seppä of learning through observing (or spying on) other, more skilled metalsmiths working illustrate this way of acquiring knowledge.

According to Lam (2000) the structure of the organization may depend on the kind of knowledge most valuable for the activities. An organization relying on knowledge of more explicit form is likely to have a more formal power and control structure, and formalized tasks and routines. Conversely, an organization where the tacit part of knowledge is more important is more likely to rely on informal structures, autonomy and commitment on part of the employees that enhance the mobility of the knowledge. In the jeweller industry this can be identified in the return of old fashion Faberge type workshops where independent handicraftsmen are joined together, sharing for example tools, technical equipment and marketing. This is according to Weckström (1998) the future for the Finnish jewellery industry, as they are flexible and able to adapt quickly to changes in customer needs. The jewellers should take example from Faberge in marketing their own brand name instead of just manufacturing their products as standardized goods.

The traditional forms of innovation are now faced with more high-tech influences from other sectors and industries. The CAD-software has been in use for a good ten years, and is used by most designers. But the technological innovations are not limited to the design process, for example the art of engraving is almost lost due to the influx of technology and laser-engraving. The fact that hand-engraving is still thought at the Lahti school is considered an advantage for the Finnish jewellery industry (Seppä 2001). The industry now faces further competition from machines in

areas thought too tacit for technological replication. A partnership comprising an Italian creator of jewellery, an Italian technological research centre, a Swiss supplier of precious metals, a German laser designer, a subsidiary of one of Europe's leading microelectronics companies has resulted in the use of laser beams for cutting and piercing precious metals, welding them without the addition of extraneous materials, and applying granulation and decorative engraving techniques. The cuts are more precise and reduce raw material losses. The very high cutting speed makes it possible to produce haute-couture jewellery at industrial prices: a nightmare scenario for many a craftsman.

The craftsmen have been forced to refine and reinvent their own techniques. The perfection of the so-called anticlasking method in the silversmith industry is a fine example of continuous artisanal innovation: a method developed by Heikki Seppä, and perfected by his students, a method that is impossible to replicate by methods of mass production, which makes it possible to form silver in numerous ways, which have not been possible by traditional techniques (Haapanen 2003). The craftsmen have for a long time been stifled by the thought that the tacitness in one hundred year-old techniques is not reproducible by machines, and that innovative design will keep them one step ahead of mass production. Ironically the technological transformation can be seen as a slow wake-up call for the Finnish jewellery industry. Here we see a divided industry between those embracing new technology to bolster competitiveness, against those turning to forgotten history and forgotten forms of tacit knowledge in order to bolster artisan innovation. The keepers of the tacit knowledge are now forced to innovate once more, turn to forgotten techniques and reinvent materials in face of competition from codification of knowledge.

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