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Dobosz-Bourne, D. ORCID: https://orcid.org/0000-0002-9008-1769 (2006) Reverse diffusion of quality: evidence from general motors UK and Poland. Journal for East European Management Studies, 11 (3). pp. 244-266. ISSN 1862-0019 Available at https://centaur.reading.ac.uk/50144/

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Published version at: https://www.nomos-elibrary.de/10.5771/0949-6181-2006-3-244/reverse-diffussion-of-quality-evidence-from-general-motors-uk-and-poland-volume-11-2006-issue-3?page=1?

Publisher: Rainer Hampp Verlag

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Reverse diffusion of quality: Evidence from general motors UK and Poland*

*Dorota Dobosz-Bourne***

This paper explores the concept of a reverse diffusion of knowledge, that is, the transfer flowing from a company's subsidiary to its home plant. The article presents the empirical evidence gathered in General Motors UK and Poland, where the reverse diffusion of a concept of the built-in quality took place. Lastly, the implications of our findings for future research are discussed.

Dieser Artikel erforscht das Konzept einer reversiven Diffusion von Wissen, das heißt, der Transfer von der Tochtergesellschaft zu ihrer Mutterfirma. Der Artikel liefert den empirischen Beweis, aufgrund von Daten von General Motors Großbritannien und Polen, wo die reversive Diffusion eines Konzeptes der integrierten Qualität stattfand. Zuletzt werden die Implikationen unserer Entdeckungen für zukünftige Forschung besprochen.

Keywords: reverse diffusion, transformational and evolutionary knowledge diffusion, built-in quality, car manufacturer, Eastern and Western Europe.

* Manuscript received: 21. 10. 05, acceptet: 10. 06. 06 (1 revision)

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https://doi.org/10.5771/0949-6181-2006-3-244, am 17.04.2024, 16:12:12
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Introduction

The idea of quality has travelled globally for many years because of globalisation (Crosby 1979; Deming 1989). It has become a key factor of increased competition in the global economy, which led to attempts by international companies to transfer quality to different locations and cultures in order to achieve high quality-standards globally. Car manufacture became an important field for international knowledge transfer. A quest to achieve high quality in car manufacturing has travelled along various management tools and production models since 1911 (Tolliday 1998) and after 1990 it began to travel to Eastern Europe, including Poland.

After the fall of the Berlin Wall and the collapse of Moscow's domination in the post-Soviet block, the relationship between Eastern and Western Europe has changed dramatically. Suddenly, it was freed, having previously been restricted economically and politically. The East embraced the change with not only hope but also the image of Western Europe that it both had and aspired to. People from Eastern Europe associated the West with luxury and well-being, as the images they received were vastly different to the reality they lived in. Previously, people in the East were usually the recipients of Western ideas via tales from other people, or their occasional visits to the West. However, they did not have the opportunity to take an active part in their creation or institutionalisation. Hence, their knowledge of some ideas did not include the whole institutionalisation chain. This seemingly small aspect played a crucial role in the later development of post-command economies. Not knowing the reality of the free market and other things in the West, people only knew the images of the final effects and products of capitalism. Additionally, the drive to make up for the lost years of stagnation under Moscow's government resulted in many cases of uncritical willingness to accept some Western concepts as miracle cure's for the problems of post-command economies.

One of the ideas that international companies attempted to transfer to Eastern Europe was the idea of quality, more specifically the concept of quality in car manufacture as something that can be procedurally built into the system – so-called built-in quality. General Motors played a particularly significant role in this process as it was a first car manufacturer from the West to open a plant in Poland.

Since its start in 1996, General Motors' plant was able to 'pass on' the notion of built-in quality, a concept of Japanese origin, to the Polish plant, Opel Polska. After this process was complete, and Opel Polska reached maturity and relative independence, the relationship between the UK (and similarly other European Opel plants) and the Polish GM plant became very interesting. One might say that a pupil transcended its master. The successful institutionalisation of built-in quality in Poland resulted in Opel Polska achieving a first place in a quality rating among all General Motors European plants in 2000. This opened a new

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forum for knowledge transfer in the opposite direction, from the East to the West of Europe. However, this process, which we will call reverse diffusion, proved problematic.

Reverse knowledge transfer

Knowledge transfer is traditionally discussed in terms of 'diffusion' (Levitt/March 1988; Mohr 1969; Rogers 1995), a process which has 'direction'. This concept is mainly used when describing the transfer of innovation (Deutschmann/Borda 1962; Rogers 1995). Diffusion of ideas has become a crucial subject for multinational companies. Their ability to transfer knowledge and practices globally often determines their survival or failure on the market. Hence, many authors emphasise the importance of understanding the factors determining its success.

Hirschman (Czarniawska/Joerges 1995) spoke of technology transfer and development projects as a 'pseudo-imitation' technique. It involved building projects as a replica of a successful venture in an advanced country. It enabled the promotion of projects that would normally be discriminated against as too risky and uncertain to be realised. Bartlett and Ghoshal (1998) emphasised the need to diffuse world-wide innovations as an important reason for corporate internalisation. The ability to exploit new ideas and products globally in a rapid and efficient manner has become crucial for a company's survival. Boyer et al (1998) agued that imitation or direct transplantation of ideas is rarely feasible, thus we should focus on the process of hybridisation, a complex interaction of ideas with national and societal effects.

Diffusion is a special type of communication in which participants create and share information with each other in order to reach mutual understanding (Rogers, 1995). It is a process consisting of four main elements:

1. a *new idea*,
2. is *communicated* through certain *channels*,
3. over *time*.

These are the factors which are likely to influence the difficulty or ease of the diffusion process. Different researchers emphasise different attributes which might influence the knowledge transfer. Rogers (1985), for example, places almost exclusive emphasis on the attributes of innovations. Bartlett and Goshal (1998) and Mohr (1969) consider the social system and communication channels as crucial. Nonaka (1995) and Arrow (Szulanski, 1996) stress the characteristics of the situation, such as time. Others (Szulanski, 1996) try to draw on all of these factors and create eclectic models enabling the measurement of their relative influence.

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Edwards and Ferner (2004) distinguished between forward (FD) and reverse (RD) diffusion. They offered this separation as a way to analyse the process in which knowledge is transferred, not only from the country of its origin to the foreign subsidiary, but also in the reverse direction. According to Mikl-Horke (2004) bi-directional diffusion also implies the intermingling of old and new, of outside influences and inside perspectives (ibid. 115). Edwards and Ferner identified two kinds of reverse diffusion: evolutionary and transformative. Evolutionary RD occurs when an optimal mix of practices is achieved within existing modus operandi. It does not affect the assumptions concerning the way in which the organisation operates, but seeks to improve its operations through the process of learning from this organisation's subsidiary plants. Transformative RD is directed towards a much more significant impact and seeks to move the organisation towards a new modus operandi.

Reverse diffusion, despite being introduced by Edwards and Ferner in 2004, is nearly absent from literature and so far was not followed by any research to address this phenomenon. This paper presents a case study exploring the reverse diffusion of the idea of built-in quality in General Motors Europe, and discusses the implications of these findings for future research.

Global transfer of quality in car manufacture

Quality represents an idea that became the main factor of increased competition between global companies. This resulted in the attempts of international firms to convey high-quality standards in all their foreign divisions and their attempts to transfer quality to different countries (Crosby 1979; Deming 1989; Ishikawa 1986).

Quality, according to Schremerhorn (1999), is the degree of excellence defined as the ability to meet customer needs 100% of the time. Other definitions of quality include compliance with specifications (Crosby 1979), pride of workmanship (Deming 1989), minimising the gap between supplier standards and recipients' expectations (Zeithaml et al. 1990), or even 'delighting' the customer by surpassing his/her expectations regarding the final product and customer service (Moran/Riesenberger 1994).

The search for quality improvements led to various operating philosophies evolving over the years. During the past two decades, simple inspection activities have been replaced or supplemented by quality control, quality assurance and now by Total Quality Management (TQM) (Dale et al. 1997).

There is an apparent lack of a generally accepted definition of TQM. According to Crosby (1979), it is 'zero defects' or 'right the first time'. Deming (1989) called it 'plan to check action' and Juran (1993) speaks of 'fitness for use'. The British Quality Association (BQA) has provided three alternatives to these definitions. They focus on 'soft' qualitative characteristics, 'hard' productive

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characteristics and the third definition consists of a mixture of both 'soft' and 'hard' characteristics (Thiagarajan/Zairi 1997; Wilkinson 1992).

According to the first definition of 'soft' qualitative characteristics, TQM is seen as being consistent with open management style, delegated responsibility and increased autonomy of staff (Wilkinson 1992). This side of TQM is concerned with creating customer awareness within an organisation. The factors of soft quality are intangible and difficult to measure as they are primarily related to leadership and employee involvement (Thiagarajan/Zairi 1997).

'Hard' quality represents the production/operations management perspective. It places emphasis on the production aspects, such as systematic measurement and control of work, setting standards of performance and the use of statistical procedures to assess quality (Wilkinson 1992).

As mentioned before, one definition of TQM is a mixture of 'soft' and 'hard' aspects of quality. It combines the need for a scientific approach with the view that all employees are part of one team. Oakland (1995) sees this way of managing quality as the key to improving the effectiveness, flexibility and competitiveness of the business as a whole. According to this approach, TQM is conceptualised in a form of three interdependent factors: management commitment, statistical process control, and teamworking. Another critical aspect in this view of TQM is the concept of the quality chain, indicating the interdependence of customer-supplier links throughout the organisation. Hence, TQM focuses primarily on the requirements of the customer, internal or external to the organisation (Oakland 1995). The aim is to make quality the responsibility of all employees, rather than a specialist department, and in this way, quality becomes something 'built into' the process rather than inspected (Wilkinson et al. 1992). Good quality of the final product becomes an inevitable result of such system and culture. The benefits of such an approach are potentially huge. According to Oakland (1995), one third of an organisation's efforts is spent on repair and dealing with checks. By moving the focus from the production process to the customer (internal and external), TQM creates customer awareness within the organisation. It is a way of involving everybody in the process of improving their work, by which high quality and meeting customer requirements become inevitable and leads to quality being built into the process (Wilkinson et al. 1992).

Companies that have successfully implemented TQM and made quality the responsibility of all employees are recognised in the U.S. by being awarded the Malcolm Baldridge Award. The framework used in this prestigious award defines a total quality system as consisting of seven categories: 1) leadership, 2) information and analysis, 3) planning, 4) human resources, 5) quality assurance, 6) results, and 7) customer satisfaction (Schmidt et al. 1992).These criteria largely reflect quality management techniques developed by Juran (1993), Crosby (1979) and Deming (1989) (Shetty 1993).

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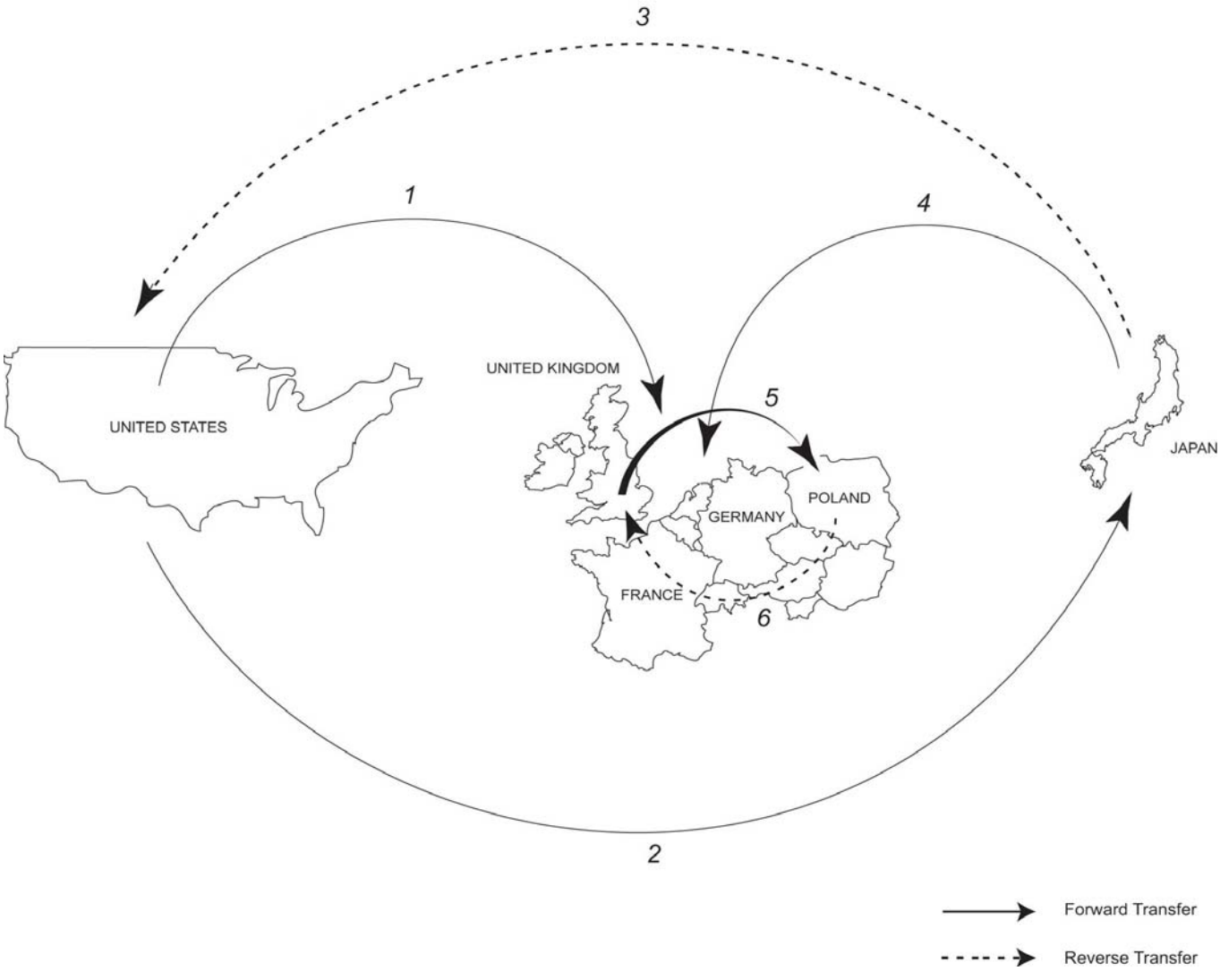
Quality Management award is also present in Europe in a form of The European Foundation for Quality Management (EFQM) Excellence Model which has its origins in TQM (Sandbrook 2001). The model provides a framework for managing quality and continuous improvement in an organisation. It is composed of five 'enablers' (leadership, people, policy and strategy, partnership and resources, processes) and four 'results' (people, customer, society and key performance) (Ruiz-Carrillo/Fernandez-Oritz 2005). The model has also the added advantage of providing a set of measures for 'hard' and 'soft' quality.

The concept of the built-in quality in car manufacture is a good example of an idea that has been subjected to both forward and reverse transfer across cultural and linguistic borders (see Figure 1). The first attempt to transfer this idea took place between America and Western Europe in 1911 (Tolliday 1998). Despite the failure of this process, further attempts at forward quality transfer occurred when Ford and General Motors established their subsidiaries in Japan in the 1930s.

Figure 1.Global transfer of quality in car manufacture



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Japan's search for new managerial ideas and practices begun after the World War II. The country struggled economically and the Japanese car manufacture suffered due to the poor quality of its suppliers and a domination of American car producers on the market. The search for ways of improving this *status quo* led to the modification and later adoption of ideas of Deming and Juran about the use of statistical process control and teamwork (Tuckman 1994). Their work led to the notion that fault prevention (not detection) was the key to achieving good quality results; continuous improvement was the ultimate goal. This notion of quality was well received in Japan and further developed into the concept of quality as something that can be procedurally built into the system, and adapted to local conditions. Despite a fairly limited response to these ideas in the USA, their impact on Japan was profound (Cusumano 1989) and resulted in the introduction of the concept of built-in quality by Eiji Toyoda in 1960 (Tolliday 1998).

The success of the Japanese car manufacturers in the 1970s stimulated the export of Japanese cars and led to a first attempt at reverse knowledge transfer when the Japanese car producers introduced their plants to North America (Abo 1998; Adler et al. 1998; Tuckman 1994). Furthermore, the Japanese tried to transfer their concepts of built-in quality, and its technology, to Western Europe along with companies such as Toyota, Nissan, Honda and General Motors (Inkpen 1998; Saka 2004).

In 1990s the concept of the built-in quality travelled further, this time from Western to Eastern Europe. The collapse of Moscow's political and economical regime in Eastern Europe in 1989 marked the economic transformation of the Eastern bloc into a free market economy. This transformation was accompanied by the steady growth of foreign investment and the flow of Western economic ideas to the emerging market of Eastern Europe.

This process was particularly interesting and dramatic in Poland. Polish car manufacture prior to 1989 was relatively underdeveloped in quality standards as opposed to, say, the textile industry, which had a strong industrial tradition and its quality standards were relatively high (Kozminski 1993). The car manufacturing sector in the command economy was stimulated by the surplus of demand over supply with no competition. The quality of vehicles was a secondary issue as the production was directed to meet overwhelming customer demand. The Polish workforce was highly educated but it lacked in discipline and the understanding of principles of quality management (Kozminski 1993). Therefore, despite the ability of the workforce to handle modern technology and equipment, quality in Polish car manufacture remained poor and has never reached Western European standards.

A transition from the command to a free market economy was embraced by Poles with hope and enthusiasm. However, the drive to make up for the lost years of stagnation under Moscow's government resulted in many cases of

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uncritical willingness to accept some Western concepts as a miracle cure for the problems of the post-command economies. The arrival of companies such as General Motors not only brought the opportunities to acquire Western expertise of car manufacture and business management but, perhaps more importantly, it also provided Polish people with a platform to enter the Western arena of vehicle production. Poles displayed great openness to these new ideas and practices. They wanted to adopt them with a sense of urgency and leave an era of the command economy behind them. For some people, proving themselves as an equal partner to Western European countries, became a matter of national ambition (Davies 2001:300). It took just four years to fully institutionalise built-in quality along with other management and manufacturing practices in the Polish GM plant (Dobosz/Jankowicz 2002; Malone/Kirk 2000). In 2000, Opel Polska achieved first place in the General Motors Europe quality ranking, proving itself a mature car manufacturing plant.

In 1994, Tuckman suggested the development of Eastern Europe into a possible future source of management expertise in car manufacture. He compared the potential emergence of Eastern Europe with that of Japan several decades ago.

"In this regard, aspects of Eastern Europe are not just seen as mirroring of the state sector of the west – where the development of a market philosophy is but a rehearsal for the larger production – but that the product is almost the prehistory of that of Japan. The reputation of East European cars is often compared with that of Japan a few decades ago – the early imports of Toyotas with the current reputation of the Skoda or Lada. Potentially, we are seeing the opening of a new phase in industrial development and the international division of labour – a periodization that could perhaps be Fordism, Toyotaism or Skodaism" (Tuckman 1994:746).

Now, ten years later, the presence of Eastern Europe in the global car manufacturing arena became a fact, and multinationals such as General Motors are eager to take advantage of this. The potential benefits stemming from the reverse knowledge transfer from Poland to other Western European GM plants were already appreciated by the company in 2000, when the first attempts at this process took place between Poland and Germany. However, the matter did not become urgent until 2001 when the American General Motors headquarters closed the Vauxhall Luton plant in the UK. Subsequently, two German Opel plants begun to fear they may share this same fate in the future in the light of newly emerging competition from behind their eastern border (Nowak 2005). Financial and quality problems experienced by companies in Western European plants led to an inquiry by General Motors Europe headquarters in Zurich into company operations in the UK and Germany. As it happened, one of the Zurich's directors was an ex-Opel Polska director, who set up the Polish plant and witnessed the development of the local staff there. Being familiar with the level of expertise of the Polish staff he decided to establish the reverse diffusion

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of knowledge between Poland and the UK as a response to the findings of this inquiry.

Research design and data collection

According to Szulanski (1996), knowledge transfer should be viewed as a distinct experience depending on the characteristics of everyone involved where the identity of the recipient can determine the outcome of the process. Hence, it is important to address the sociological concepts pertaining to different cultures as well as the psychological concepts pertaining to individuals involved in the knowledge transfer between two cultures. The analysis of the cultural factors behind the knowledge transfer and the individual construction and meaning of the concept of quality will enable the identification of the factors behind the success or failure of this process, as defined by the organisational actors themselves.

This research aims to understand the meaning of the concept of quality in two different cultures and trace the process of reverse knowledge transfer of this idea. The research paradigm adopted in this paper is that of constructivism (Berger/Luckmann 1976; Kelly 1955). From this perspective, we can only interpret reality and not directly apprehend it in any absolute sense. No construction of reality is irrevocable as the alternative construction can always be offered (Bannister 1981). The purpose of constructivist enquiry is to gain sufficient understanding in order to predict future outcomes (Jankowicz 2000).

The study focuses on qualified descriptions and empirically generated theory about the phenomena under scrutiny. The organisation is treated as a social site, a community, and therefore traditional methods of studying communities, such as ethnography, phenomenology or hermeneutics are especially useful. People in organisations as well as the researcher are seen as active sense makers, and while theory may provide important sensitising conceptions, the key concepts and understandings are created by the participants of the research (Alvesson/Deetz 2000).

The research was carried out at three General Motors plants involved in knowledge diffusion between the UK and Poland, that is, the Vauxhall Luton and Vauxhall Ellesmere Port, and Opel Polska plant in Gliwice, Poland. The study consisted of the ethnographic interviews (Alvesson/Deetz 2000) with 33 key informants (Tremblay 1982) chosen on the basis of their direct involvement in forward and reverse quality transfer between the UK and Poland. On the British side, there was a group of 16 managers, consisting of people involved in the managerial activities at the Vauxhall plant as well as the creation of the Polish plant, Opel Polska. On the Polish side, there were 15 Polish managers trained by the English ones, which included three Poles who were later employed by the Vauxhall UK as expatriate managers. The sample also included

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two German engineers in managerial positions in Opel Polska. All managers had corresponding roles in each of the two places. Sample size was determined by the information supplied by respondents according to ethnographic methodology, meaning the sample is enlarged until it results in a clear, unanimous picture of the phenomenon under scrutiny.

The interviews took place in all three locations selected for the study and were conducted over the period of 2000 - 2002. They were accompanied by the guided visits to every shop at the Vauxhall Luton and Opel Polska. The author was also present at the Vauxhall Luton in December 2000 during the dramatic events that followed the announcement about the plant's closure. However, the interviews and conversations carried out during this period were not recorded as requested by the respondents. All remaining interviews (approximately 60 min. each) were tape-recorded and fully transcribed. Following the ethnographic mode of data analysis (Hammersley/Atkinson 1995), the transcribed interviews were content analysed and resulted in a written account of the process by which the idea of built-in quality travelled between England and Poland, as interpreted by the author. In order to maintain the confidentiality of all interviews the names of the respondents are coded. Their quotations used in this account give the organisational position of an interviewee and location(s) where he/she was employed.

Built-in quality travels to Poland

The process of setting up a new green field site in General Motors is supported by the intensive forward diffusion of knowledge between the new plant and one or more mature GM plants. This transfer is aided by several institutions. One of them is the institution of a home plant, which represents a mature, brown field GM plant that will serve as a model for a green field site. The home plant is used as a location for an on-site training of a new staff as well as a source of experts who are often lent to a new plant as expatriate managers. The institution of an expatriate manager, called International Service Person (ISP) in GM's jargon, plays a crucial role in forward and reverse knowledge transfer.

Opel Polska received a German plant in Eisenach as its official home plant. However, the initial on-site training also took place at Vauxhall Luton. Correspondingly, a group of ISPs allocated to set up Opel Polska consisted of English as well as German managers. As a result, the development of the built-in quality in Opel Polska was influenced by the notions of quality embedded in the GM plants in these two countries (see Figure 2).

The British managers brought in and developed the 'soft' part of quality in Opel Polska. This part of knowledge diffusion had its roots in the Japanese concepts of quality and people management, which are at the core of the notion of built-in quality. Henceforth, the ideas and practices brought by the British to Poland

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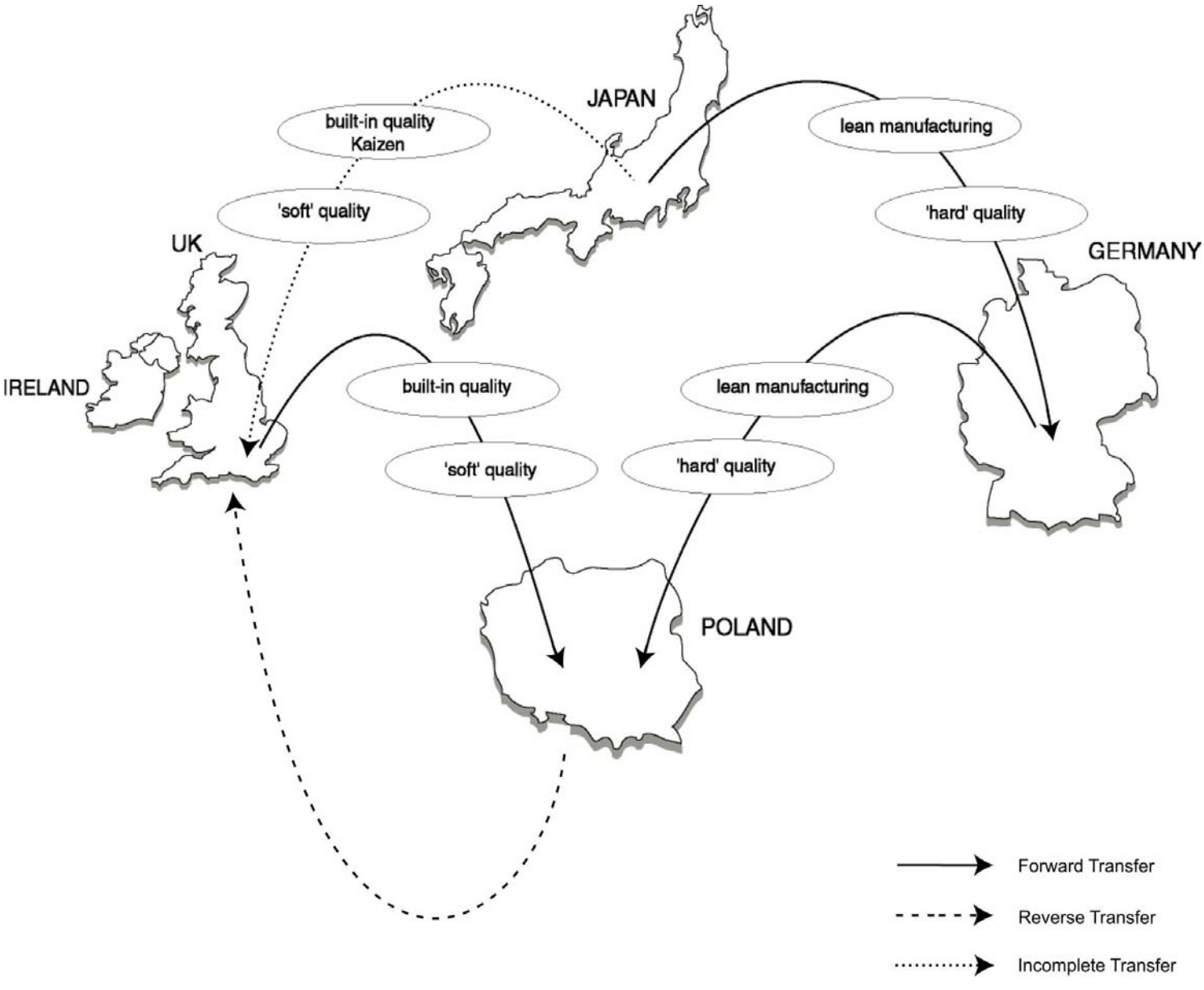
represented the idea that all organisational members should be responsible for the quality of their work, and that defects should be prevented rather than repeatedly repaired. They were also responsible for establishing a built-in quality culture in the plant, something they failed to achieve in the UK GM plants (Saka 2004).

Figure 2. Diffusion of the built-in quality in General Motors Europe



Corresponding to the notion of the built-in and 'soft' quality, there was an influence upon Opel Polska that led to the development of the 'hard' side of the quality system in the plant. This process was strongly influenced by the German managers who served as a link between Opel Polska and the German plants. The operations that took place between these locations were concerned with the

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'hard', measurable aspects of car production. Henceforth, the German team was responsible for establishing in Opel Polska the processes of lean manufacturing and standardisation amongst others.

The Japanese and German ideas of quality management had an impact on different areas of the quality system in Opel Polska. The Japanese ideas influenced and stimulated the development of quality of the whole system, whereas the Germans determined the quality of the final product. Despite affecting different aspects of the quality assurance system in Poland, these two effects worked as a complimentary forces leading to the unique blend of approaches developed in Opel Polska (Dobosz/Jankowicz 2002).

The notions of quality in Opel Polska and the Vauxhall Ellesmere Port

Quality is a concept defined by General Motors as something that can be procedurally built-in to the production process. The system is designed in a manner that prevents defects from occurring and shifts the responsibility for faults from the individual onto the system. The emphasis is placed upon customers, both internal and external, and on the prevention of potential defects.

There are three main components of quality as understood by GM:

1. the quality of the system;
2. the quality of the final product as defined by the customer; and
3. the quality of workmanship.

The quality of the final product is almost equivalent to customer expectations. It is the product as seen in the eyes of the customer. Her/ his decision as to whether or not to buy a GM product means for Opel people having a job or not. Thus, customer satisfaction lies at the core of any [General Motors] definition of 'good quality'.

The quality of the system consists of the mechanisms that enable employees to deliver a product of high quality. The idea of creating a system that 'automatically' leads to good quality is called *built-in quality*, and is a definition of quality that GM teaches its employees. The system of quality assurance, which gives 'built-in' quality to the product is supported by a number of techniques such as:

1. problem-solving techniques (e.g. the Practical Problem Solving Technique);
2. strategies supporting defect prevention (e.g. automation, Andon);
3. techniques enhancing employee motivation (e.g. performance related remuneration, teamwork, empowerment through Kaizen);
4. standardisation supported by visual management.

The last area of quality is quality of workmanship, often described as the most important part of quality. The quality of people and their workmanship is

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considered by the GM people to be the absolute base factor that determines the overall quality of results achieved in the plant.

These three elements – quality of the final product, system and workmanship - function interdependently and create a whole system of built-in quality, which is understood to be an overall approach, engaging every member of the organisation into creating high-quality products and satisfied customers, both internally and externally.

Opel Polska is a good example of a car plant where these three elements were successfully introduced and implemented. However, in order to shed some more light on this issue we will listen to the opinion of the Polish ISP.

"Gliwice is not a good example for describing the approach to quality. There were 2,000 people chosen from 20,000 applicants. And they were brainwashed right from the beginning. In this plant, if someone does not believe it, they will go crazy. The approach implemented in Gliwice is like in Chinese communism, and there is no discussion. Do not accept, do not shift defects. There are no situations where someone hid something. People were introduced to it right from the beginning and I believe in it too. If I didn't believe in it I would go crazy in the environment where this is the rule. (…) This also corresponds with the corporate visions of GM such as say what you believe, do what you say. If there is a problem you have to say it openly, it happened, too bad. This exists in Poland but in other plants no one cares about it too much. In here [Ellesmere Port] supervisors accepted that but there was only one manager who acted according to it." (*Polish ISP,Opel Polska, Vauxhall Ellesmere Port)*

The Polish plant is a typical green-field site where the concepts of quality were implemented right from the beginning. This also applies to the quality of workmanship, itself enhanced by the high number of applicants, which allowed General Motors to choose candidates matching their desired profile (i.e. young, willing to learn and accept new ideas).

The implementation of built-in quality in Ellesmere Port was rather different. The plant was set up in 1964 and, prior to the concepts of lean manufacturing and built-in quality being introduced, the plant operated successfully for a number of years. There are still many people employed at the plant who started there in 1964. Therefore, changing the work attitudes, a dilemma for most brown-field sites, is a major challenge General Motors has to face.

"If people have done something for 30 years in the same way and may have been successful economically, they've made a lot of volume, and all of a sudden, you come along and say, 'I'm sorry, but this is not going to allow you to survive in the future'. They look at you and say, 'You are crazy. We've always done it like this. It's been OK'. (…) And that's the most difficult challenge anybody has to have, to take a brown field workforce, a brown field culture, and try to change it. That is very difficult and very frustrating. I spent two and a half years trying

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to do it and let me tell you, all the hard work of this green field was nothing compared to the frustration of trying to change an old, traditional group of people."(*English Manager 1, Nissan UK, Opel Polska, GM Europe Zurich)*

The most important difference between the Vauxhall Ellesmere Port and Opel Polska lies perhaps in this element of quality – the workmanship. The willingness to learn and accept new ideas in the UK plant is very low. Furthermore, the nature of people's motivation is different. The picture of the employees in these two countries that emerged in this study indicated that Polish employees are more motivated by their work-related achievements and the fact that they work for General Motors. Contrastingly, English employees are more concerned with the quality of their life, and the relative importance of work itself is much lower in England, due to higher job security compared with Poland.

Reverse diffusion of quality

The development of the second element of quality as defined by General Motors – the quality of the system – was the main reason behind the reverse knowledge diffusion from Poland to England. As mentioned before, the process started in 2001 as a result of poor financial and quality results in the Vauxhall Ellesmere Port. Initially, the process was to take place through a project team sent from Poland to the UK. However, after the time-scale of the project was extended several times, the company decided to bring in the Polish staff in a role of ISPs for a longer period. The first Polish ISP was sent to Ellesmere Port along with a group of Polish staff as a support. Soon after, a similar team of another Polish ISP and support staff was sent to a German plant. However, the latter group was not included in this study.

The Vauxhall Ellesmere Port is more developed technically and better equipped compared to the plant in Poland, as it has been expanded and refitted for the production of a new Vectra in the UK. There is also a difference in the level of implementation of lean manufacturing in these two plants.

"For example, the wheel. The employee does not have to take it from the shelf. There is a special machine, which passes the wheel on and the worker has to slide it on and attach the screw. And all of this is automated. Additionally, the wheel is sequenced so s/he does not have to worry whether s/he is putting on the right or wrong wheel. This production line [in Ellesmere Port] is more automated so it's easier for people. There are also more people on the line; the stations are more dispersed. Their work is more detailed so it's easier for them. (...) In Poland they try to save money on everything, on equipment, on people. We employ less than 2,000; they have 3,500".(*Polish Manager 1, Opel Polska, Vauxhall Ellesmere Port)*

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The elements of the quality of the system that were missing in the UK plant were:

1. problem-solving techniques;
2. standardisation and visual management;
3. organisation and planning of work and production.

The process of reverse diffusion was targeted at these elements in particular. The Polish staff was introduced as a team supporting problem-solving and defect tracking in production of the Vectra. The Polish ISP took on the position of a Material and Control Production Manager. His role was to stabilise the functioning of the Material department. This would involve the introduction of production planning and control, and standardisation of the operations.

Due to different official positions, and what follows different levels of authority, given to the Polish experts their way of introducing new ideas in the UK plant varied. The Polish ISP had a relatively strong position in the company, which gave him authoritative power to implement some of his decisions. Several people initially rejected his strategy of implementing new working practices such as planning of production, thorough organisation and documentation of individual work, and visual management.

"I sacked 4 out of 5 managers. There is only one left. If he doesn't perform, he will be replaced too. And then I will start with the middle level. Even though I am here for just 12 months, it's enough time to remove this acrimonious structure. (…) There are no mechanisms, which would discipline them. Pure communism. If they come to work or not, they will receive the same bonus at the end of the year. If they produce 5 or 500 cars the pay is the same."(*Polish ISP, Opel Polska, Vauxhall Ellesmere Port)*

The strategy adopted by the members of the Lean Manufacturing Support Team was dramatically different to this demonstrated by the Polish ISP. The rest of the Polish experts adopted the role of advisers. The decision of whether or not to adopt their advice was left entirely to the British staff.

"I tried to approach them in a friendly way, not to impose anything. It is always the case that if you try to force someone to do something they will object it. My position here is also too low for me to dictate anything."(*Polish Manager 1,Opel Polska, Vauxhall Ellesmere Port)*

This group of Polish employees developed a more cooperative style. They tried to assist problem analysis and suggest techniques they were familiar with. They believed that if the technique proved useful, the adoption of it by local staff would follow. They also organised training introducing the UK staff to various instruments assisting communication and problem solving.

The Lean Manufacturing Support Team succeeded in the introduction of several ideas. They managed to implement a technique called PPS (Practical Problem

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Solving). The production line adopted the method of reporting problems introduced by the team that improved the tracing of problems and defects, and what follows the identification of a root-cause and fault prevention.

The Polish ISP managed to revive production planning in the plant. So far, the production department used to agree the volume and the model to be produced on a daily basis. This, however, was against the central planning procedure adopted by General Motors, where production is centrally planned in Germany for each GM European plant. This is closely connected to the system of material purchasing and control, which has to match and sequence the material required for the production according to the central plan. This element is considered by the Polish staff to be the most significant change that has been implemented. Additionally, the planning and documenting of individual work as well as visual management were introduced.

Although both groups of Polish managers and their approaches to introducing change were successful, the impact of the Polish ISP was more significant, and resulted in a more fundamental change. Whereas the first group of managers helped to streamline certain procedures, the Polish ISP introduced a new approach to some operations such as production planning.

The ideas and practices related to standardised work and lean production were the most difficult to introduce, as they require a disciplined approach to ones' work and high levels of motivation. These elements seemed to be missing in the UK plant, which have significantly hindered the implementation of the ideas related to quality. However, according to the Polish ISP the failure in the adoption of built-in quality does not need to have dramatic consequences for the plant as a result of organisational politics.

"The plant in England will always get the model to produce and will be there forever because it is in the UK. And the plant in Gliwice will always be at the other side of the world and sometimes it will get the model but sometimes it won't. And there will be always people going there to learn."(*Polish ISP, Opel Polska, Vauxhall Ellesmere Port)*

The process of reverse quality diffusion to the UK is ongoing. It is also taking place between the Polish and German plants. Whether Opel Polska will ever become a home plant for any of its partners, time will show. The arena of car manufacture in Europe is fascinating and fast changing, but our journey into it has to end here.

Discussion and conclusions

The analysis of the existing systems of quality assurance in the Polish and UK Vauxhall plants indicates some significant differences. The successful implementation of the system of the built-in quality in Poland, the element missing in the UK plant, creates scope for the reverse diffusion of knowledge

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between Poland and England. The team of Polish experts in the UK plant have introduced the elements related to the quality of a system and 'hard' quality elements, such as problem-solving techniques, enabling tracing the root-causes of problems and defect prevention, standardisation, and detailed planning of work at the individual as well as departmental level. The reverse quality diffusion was planned as an evolutionary RD in Edwards and Ferner's terms (Edwards/Ferner 2004). Henceforth, it was aimed at improving the operations and quality of the system in the UK plant by introducing some new practices and ideas. However, the analysis of an overall system of quality assurance in Vauxhall Ellesmere Port indicates that it contradicts the philosophy of built-in quality. The ideas of quality embedded in the UK plant place the emphasis on the final audit of a product and fault repair, which in itself is the contradiction of built-in quality. Moreover, the study indicated that low levels of motivation and the work attitudes of British employees might further hinder the development of quality workmanship in the plant. Therefore, the factors contributing to the lack of presence of the built-in quality are more complex than a lack of procedures or lean manufacturing principles. They involve the organisational values embedded in the culture, which were developed in the plant over the decades of its existence.

These findings indicate that the evolutionary reverse diffusion, which is aimed at introducing new practices without changing the existing modus operandi, is not sufficient to address the problems existing in the UK plant. It could be argued, that the implementation of transformative reverse diffusion would be more appropriate, for transformative transfer is directed towards a more significant impact and seeks to change the assumptions concerning the way in which organisation operates. This process is strongly dependent on learning from the subsidiary plant, in this case Opel Polska.

There is a clear difference in organisational implications of evolutionary and transformative reverse diffusion. Evolutionary transfer, dealing with mastering the existing organisation and its operations by slight improvements, does not require the time and resources that would be necessary for the transformative transfer. The transformative change, in order to be effective, would need to involve the support and commitment of organisational decision-makers as well as appropriate resources. Furthermore, the role of experiential learning, especially crucial when transferring tacit knowledge (Nonaka 1995; Szulanski 1996) such as some elements of 'soft' quality, needs not to be underestimated. As illustrated in this study, the attempt to introduce experiential learning by the Polish staff in Ellesmere Port as well as organisational and structural changes carried out by the Polish ISP, were sufficient to bring out some improvement in the quality of the system. However, for the full diffusion of built-in quality to be complete, the quality of workmanship would need to be transformed as well. The establishment of an institution of a home plant indicates that learning from

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experience has a strong presence and organisational support in General Motors when forward diffusion takes place. It could be argued, that this institution and this type of on-site training are equally important in case of the reverse process. The employment of these techniques could lead to increased professionalism and expertise of staff as well as a continuous improvement of company's operations – an important element of the built-in quality philosophy.

According to Boyer et al (1998), reverse diffusion may be as equally as important as the forward process. Toyota and other Japanese car manufacturers, by transferring knowledge in the reverse direction, abandoned their payment system that was potentially counter-productive (ibid. 377). Our study showed that General Motors UK could benefit from transformative reverse diffusion and introduce the system of the built-in quality in the Vauxhall Ellesmere Port improving the plant's quality and financial results. Additionally, Poland's membership in the European Union opened more avenues for the knowledge flow to the West of Europe. However, as Poland entered global car manufacture only few years ago, its position was not yet as well established as that of Japan's. Therefore, we can expect the willingness to learn from the Polish Opel Polska plant in General Motors Europe to be rather low (Nowak 2005). As argued by Muthusamy and White (2005) the new skills and knowledge learned in the process of knowledge transfer depend on so-called ability-based trust, that is, a trust in a partner's ability. This aspect coupled, with goodwill, are necessary factors in making the exchange of knowledge meaningful and productive (ibid. 434). The nature of reverse diffusion can prove to be challenging regarding this dimension. While the willingness to absorb new managerial ideas and practices was an understandable characteristic of the Polish staff, who had an ambition to 'catch up' with the West (Kozminski 1993), the same attitude could be problematic to achieve in societies with a history of economic success such as the United Kingdom. According to Styhre (1998), the acceptance of management ideas is higher in groups, which run the risk of being excluded or marginalised. This statement is well illustrated by the dramatic economic growth of Japan after World War II and Poland post 1990. However, the consequences of such a transformation can sometimes only be appreciated by others when the process proves successful.

"Before, we [Volvo in Sweden] believed we were the centre of the world, but we have discovered that there are things that are better in other places."(*Mr. Blue in Styhre 1998: 202).*

Reverse diffusion of knowledge offers a unique opportunity to keep up with the developments and innovations taking place in the organisation's subsidiaries. It also enables the revival of systems such as audit-based quality assurance by that of built-in quality, as demonstrated in this study. After the emergence of the post-command economies on the free market, the reverse diffusion gains a particular importance in the European context. The potential to aid the

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development of new core capabilities and gain competitive advantage by employing reverse knowledge transfer has been proved by Japan's car industry, and should not be underestimated. Similarly, the potential for furthering knowledge by the CEE societies must not be overlooked (Mikl-Horke 2004). However, in order for the reverse diffusion to be successful, it needs to receive the same attention the forward transfer does.

The difference in the nature of evolutionary and transformative reverse diffusion (summarised in Table 1) draws our attention to the importance of apt evaluation of a company's situation and needs prior to the transfer. The role of change agents taking part in this process should also be considered, as it will influence the implementation and adoption of new managerial practices by local staff. The importance of ability-based trust and willingness to learn as key factors in determining the outcome of the reverse diffusion indicates that the development of the appropriate relationship between both parties should start from the beginning of their cooperation. By creating a climate of mutual respect and learning, an environment can be built where the evolving nature of the relationship between parties during a shift from forward to reverse diffusion will become a natural consequence of organisational development, rather than reversal of power relations.

The research presented in this paper raised many questions. It demonstrated the importance of the reverse diffusion of ideas in the development of core capabilities and gaining competitive advantage by organisations. The process of RD has also great relevance to a discussion on globalisation and can contribute to the views of Amin (1997) and Holden (2002). Moreover, its importance for other industries, whether product or service, should be recognised in the context of globalisation.

This paper also pointed at some significant differences between evolutionary and transformative reverse diffusion and their organisational implications. However, there needs to be more research conducted into reverse knowledge transfer for us to better understand the factors determining its outcome, and support our discussion with more empirical results. The abundance of data to be explored, as well as the fascinating nature of this subject, leaves the author hopeful that some exciting accounts of this process will soon follow.

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Table 1. Factors affecting reverse diffusion

	Evolutionary RD	Transformative RD
Factors calling for RD	Keeping up with innovations and specialised knowledge developed in subsidiaries, Development of core capabilities and gaining competitive advantage, Slightly worse performance results comparing to the subsidiary (need to improve), Professionalisation of staff, Expertise development, Ongoing or short-term commitment	Transformation of existing modus operandi, Organisational culture change, Organisational revival of the brown-filed sites in decline, Significantly worse performance results comparing to the subsidiary (need to catch up), General restructuring of corporate strategies and structures (Edwards and Ferner 2004), Long-term commitment
Drivers	Standardisation of operations across borders, Good communication channels and strong network between the companies involved, Focus on continuous improvement, Structures and procedures supporting RD	High degree of strategic autonomy vis-à-vis HQ (Birkinshaw et al. 1998), Openness to new ideas and willingness to learn (domestic), HQ's support and allocation of appropriate resources, Emphasis on experiential learning, Movement of personnel across borders
Depressors	Fear of losing competitive position (subsidiary), Low ability-based trust, Economically dominant position of a domestic country	Fear of losing power, position of privilege and/or status (domestic), Low ability-based trust, Economically dominant position of a domestic country
Results	Continuous improvement of company's operations and performance, Professionalisation of staff, Up-to-date expertise and innovations, Increased competitive advantage and core capabilities	Increased (or new) competitive advantage and core capabilities, Standardisation of products and operations across borders, Institutionalisation of 'best' practices in a local environment, Organisational revival (brown-filed sites in decline)

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