

CHAPTER 3 – The relationship between employment, job quality and innovation in the Automotive Industry: a nexus of changing dynamics along the value chain. Evidence from Hungary and Germany.

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1	Introduction. Global Value Chain Approach and Knowledge Mobilisation	89
1.1	Global Value Chains and their restructuring.....	89
1.2	Labour relations going global along the value chain.....	92
1.3	Knowledge as a key resource shaping power relations in the value chains.....	94
2	The automation challenge and how it affects value chain power relations	97
2.1	What is automation and should we be afraid of it?.....	97
2.2	Impacts of automation on employment: American and European experiences.....	97
2.3	Automation, Job Quality, Organisation and the Value Chain perspective	99
3	Interplay between innovation, job quality and employment: Lessons from the company case studies	103
3.1	Preliminary remarks on the case study method.....	103
3.2	Company cases: ‘locus’ along the GVC and the drivers of innovation	103
3.3	Interplay between innovation, quality of job and employment: decisive impact of	115
	the position in the GVC.....	
3.4	Impact of organisational innovations on job quality and employment	117
4	Concluding remarks	119
5	References	120
6	List of Case Study Reports and Industry Profiles	122
7	Annex – Summaries of Case Studies	123

1 Introduction. Global Value Chain Approach and Knowledge Mobilisation

Since the last decades of the 20th century, large corporations have been speeding up the delocalisation of various business functions – both in manufacturing and service sectors – from the developed market economies characterised by higher-wages and tighter environmental controls to the developing world of Asia and the former state-socialist countries of Central and Eastern Europe (CEE) and Russia, including the former Soviet republics. Even as the positive and negative aspects of globalisation are debated in communities of academics and politicians – in reality it is extremely difficult to stop the very complex and advanced process of delocalisation of business functions driven by several mega-trends. The second section of this chapter focuses on some of these trends, namely on (1) the globalisation of labour market (i.e. Great Doubling (Freeman, 2007)), (2) ICT revolution (digitisation, automation/robotisation), and (3) modularisation of large corporations.

As a result of the advanced state of the globalisation process in various business functions, practically almost all departments/divisions of a given corporation can now be delocalised. Already at the beginning of the 21st century, this process produced an impressive result measured in terms of global spending (billion USD).

The intensification of the delocalisation process of various business functions has resulted in an “...increasing fluidity of corporation structures that has resulted from these continuous and rapid change processes has led some commentators to question whether the individual enterprises or corporation or ‘firm’ (located conventionally, in the economic statistics, within a ‘sector’) is the best unit of analysis for understanding these restructuring processes” (Huws and Ramioul, 2006:18). They conclude that an “exclusive focus on the company runs the risk of missing the most important changes which takes place...”

A recent example for this phenomenon is the rise of the so-called contract logistical services. Currently, many large OEMs tend to outsource not only those logistical services that are not directly linked to the production processes (transportation, customs services, etc.) but also those services that are provided within the factory’s premises. It often happens that the works tasks are performed by the former employees of the company, and even the tools necessary to perform the job are rented by the OEM. This has far-reaching consequences not only in terms of working and employment conditions (which are usually significantly poorer in the outsourced firms than in the OEMs) but also with regards to the statistical measurement of the sector as these activities are most typically categorised under the NACE-code 5229, that is ‘other transportation support services’.

It is therefore obvious for us to choose value chain perspective as a general theoretical framework to analyse and interpret case study experiences. In this first introductory section we will briefly present the main pillars of this framework and to overview some consequences of the globalisation of value chains on two dimensions particularly important from the standpoint of the QuInnE project: labour relations and the internal and external knowledge use of the firms.

1.1 Global Value Chains and their restructuring

Relying on the Global Value Chain (GVC) approach we may avoid the risks of misunderstanding important enabling or inhibiting factors shaping the complex phenomena of innovation and its influence on quality of job and employment in the automotive sector. What is a value chain and its globalised version in this context? The notion of value chain describes the full ranges of activities that firms and workers do to bring a product from its conception (design-planning) to its end use and

beyond. This includes activities such as exploiting new materials, design, procurement, production, marketing, distribution and after sales support services.

In a previous large international research project (carried out by a consortium of universities and research institutes from 15 countries and supported by the EU's 6th Framework Programme¹²) aimed to measure the impact of globalisation on work, we used and operationalised the following definition of the GVC: "The value chain is a phrase used to describe each step in the process required to produce a final product and service. The word 'value' in the phrase 'value chain' refers to added value. Each step in the value chain involves receiving inputs, processing them, and then passing them on the next unit in the chain, with value being added in the process. Separate units of the value chain may be within the same company (in-house) or in different ones (outsourced). Similarly they may be on the same site or in another location" (Huws and Ramioul, 2006: 19).

Using the concept of GVC, it is necessary to make a distinction between different versions of it. One should especially distinguish 'producer-driven' (e.g. automotive sector) versus 'buyer-driven' (food industry) GVC. In the first case the entry barrier is rather high because of the need for large-scale high-tech in the production involving heavy investment. In contrast, in the case of the 'buyer-driven' GVC the entry barrier is relatively low.

In the mainstream literature of the GVC, a special focus is paid on the mechanisms and processes of acquiring additional business function(s) in the production and service provision along the value chain in order to benefit from activities with higher value-added. In relation to the various forms of movement in the value chain, Smith and Pickles (2015:322) make distinction on the product, process, functional and chain upgrading: "Product and process upgrading involve firms retaining their position in a chain by enhancing productivity gains through adopting new production processes or new configuration of product mix. Functional upgrading involves a movement 'up' the chain into new, higher value added activity, such as full package and own design/own brand manufacturing (...) chain upgrading involves a movement to new activity, which may also imply higher skills and capital requirements and value added"

In preparing the theoretical framework for our analysis of the company case studies on innovation carried out in the automotive industry, we will especially rely on the GVC approach, focusing on the governance structures and the institutional environment.

Gereffi, Humphrey and Sturgeon (2005) identify three variables that play a decisive role in determining how global value chains are governed and changed:

- (1) Complexity of transactions.
- (2) Ability to codify transactions.
- (3) Capabilities in the supply-base.

The authors distinguish five ideal types of global value chain governance which range from high to low levels of explicit coordination and power asymmetry (see Figure 1). This typology is "based on the combination of three important variables: the complexity of transactions (related to asset specificity, to requirements of complex coordination and opportunistic behaviour control mechanisms), the ability to codify transactions and the capabilities in the supply-base (the latter concept, firm capabilities mainly refers to the importance of generation and retention competences that distinguish firms from their competitors)... this means that governance models are not only 'market' or 'hierarchy' but that

¹² WORKS project: Work Organisation and Restructuring in the Knowledge Society (2005-2009) (www.worksproject.be)

different forms of co-ordination can be observed: ‘hierarchy’, ‘capture’, ‘relational’, ‘modular’ and ‘market’” (Huws and Ramioul, 2006:22).

This typology also helps to explain why some value chain activities could be more easily relocated than others (Sturgeon, 2008). According to this classification there are five ideal types of the governance on the scale from market to hierarchal forms of governance (power and control):

- *simple market linkages* are governed by price – in this case the complexity of transactions is low, but the ability to codify transactions and the capabilities in the supply-base are high;
- *modular linkages*, where complex information regarding the transaction is codified and often digitised before being passed to highly competent suppliers;
- *relational linkages*, where tacit information is exchanged between buyers and highly competent suppliers;
- *captive linkages*, where less competent suppliers are provided with detailed instructions;
- *hierarchical linkages* within the same firm, governed by management hierarchy.

Figure 1: The Global Value Chains Framework

Key Variable	Complexity of transactions	Ability to codify transactions	Capabilities in the supply-base	Degree of explicit coordination and power asymmetry
Market	Low	High	High	
Modular	High	High	High	
Relational	High	Low	High	
Captive	High	High	Low	
Hierarchy	High	Low	Low	

Note: There are eight possible combinations of the three variables. Five of them generate global value chain types. The combination of low complexity of transactions and low ability to codify is unlikely to occur. This excludes two combinations. If the complexity of the transaction is low and the ability to codify is high, then low supplier capability would lead to exclusion from the value chain. While this is an important outcome, it does not generate a governance type *per se*.

Source: Sturgeon 2008, based on Gereffi et al. 2005 and Dicken 2007

It is worth noting that, in contrast to the producer-driven and buyer-driven dichotomy, the governance, power and control approach of the GVC is more complex than an industry-neutral framework. What is more, this framework offers some predictability in the analysis of the cross-border linkages that could be a useful tool to understand the complexity of the corporate restructuring on a global scale.

This theoretical concept fits quite well for an interpretation of ongoing changes in the automotive industry. According to recent findings (Schwarz-Kocher et al., 2017), it is no more only the OEMs’ strategies alone which determine the position and profitability of the companies. We will emphasise in following sections that the position of the companies in the automotive value chain can be strategically influenced, and this depends on their strategic ability and resources to get into higher

value aspects of design, production preparation, and production. Furthermore, we will use Gereffi et al.'s categories to classify our cases and provide a basic orientation on companies' efforts in that respect (c.f. Chap. 3.2).

1.2 Labour relations going global along the value chain

The role of institutional context (e.g. impact of the labour relations system, government policy on minimum wages, global ethical conduct regulation framework (ILO), etc.) has been growing during the last decade in both the global and European industry, especially in the manufacturing/automotive industry under the growing influence of the labour shortage of almost all categories of employees. Therefore, there is an urgent need "... to consider a wider range of agents – other than firm trajectories (other than upgrading) in the process of restructuring within global production. This included a consideration of workers in the establishment of competitive conditions within which firm- and regional-level trajectories played out" (Smith and Pickles, 2015:323).

In relation with the influence of the wider range of stakeholders, it is worth noting the currently increasing internationalisation of labour relations in the automotive industry. An outstanding example of this very recent trend is the initiative of the largest German sectoral trade union, IG Metall. In the framework of its Transnational Partnership Initiative (TPI), the German trade union aims to collaborate with local trade unions' representatives in order to improve wages and working conditions and to root German-style labour relations based on the principle of co-determination and cooperation (Fichter, 2017) in German-owned plants operating outside Germany as well as at their suppliers. TPI offices have been opened in Hungary and in the US. The first office in Hungary was opened in 2014 in Győr-city in the proximity of the plant of Audi. Since then a second office was also opened in Kecskemét-city in 2016, where Mercedes Benz operates.

The core aim of this international network initiative – in cooperating with the Hungarian metal workers trade unions (Vasas) – is to advocate for higher wages and better working and employment conditions. The full time member of the IG Metall Executive Committee, Wolfgang Lemb said, "If we want to maintain and expand our strengths, we have to look beyond the horizon of the company where we are employed ... if we overcome the wedge between employees working at different sites within and outside of Germany and develop our joint strategies that we can prevent employers from succeeding with their strategy of playing off workforces against each other... we need close cross-border cooperation, especially at the company level" (quoted after Rüb, 2016: 3-4) Despite the rather short time of existence of IG Metall offices and activities, some positive outcomes are visible, such as the Hungarian Metal Workers Union, a cooperating partner of the IG Metall, which succeeded to increase the trade union membership by 1.500 new entrants. Its presence is clearly visible through the stronger bargaining position, with more frequent warning strike activities of the Hungarian metal workers union operating in this sector. It is not by chance that "The first strike to happen at the Audi plant in Győr, northern Hungary, in its 23 years of existence was announced by the trade union organisation there in early 2016 and aimed at achieving a significant general wage increase and improvements in working conditions" (Galgóczy, 2017:13).

IG Metall thus recognised that in order to safeguard German high labour standard jobs it is necessary to act globally. TPI offices seem to be an efficient way to avoid potential blackmailing by the threat of closing down German workplaces by delocalising them into lower cost countries. One of the most important competitive advantages of such Foreign Direct Investment (FDI) in a location such as Hungary is clearly the low costs and low wages, but it is questionable to what extent delocalisation in Central and Eastern European (CEE) countries represents a real threat for the workplaces in the home country.

Table 1: Total labour cost per hour (Euro). Manufacturing of motor vehicles, trailers and semi-trailers

Country	2000	2004	2008	2012
Belgium	28.38	34.29	32.97	44.90
Czech Republic	4.37	6.52	10.08	11.38
France	24.84	33.24	33.38	38.51
Germany	37.78	41.39	43.14	47.91
Hungary	4.62	7.08	8.86	9.41
Italy	20.45	23.08	25.50	30.11
Poland	-	4.70	7.52	8.09
Romania	-	2.16	3.90	4.82
Slovakia	2.72	3.77	7.77	8.09
Slovenia	-	-	12.73	13.74
Spain	18.63	20.34	23.66	25.39
U.K.	25.81	24.99	23.82	24.17

Source: *Áleaz-Aller et al. 2015, p. 160*

The mainstream view on the drivers behind the wage increase in the CEE countries stresses the impact of the outward immigration and the influence of the FDI. However, the impact of FDI on the wage increase is not automatic but is shaped by such social institutions as the strengthening bargaining power of trade unions conditioned by the tight labour market, the increasing influence of the transnational network initiative (partnership) of the IG Metall trade union, especially in Hungary, and other EU-supported initiatives to support social dialogue in CEE countries (Karnite, 2016); and last but not least the recent Hungarian government initiative (2016) to increase the level of minimum wage.

Table 2: Gross value added per employee and the share of personnel costs in production (2014)

	Gross Value Added per Employee			% of personnel costs in production		
	MF	NACE C29	NACE C30	MF	NACE C29	NACE C30
Belgium	106,3	77,1	117,4	12,2	13,7	23,4
Bulgaria	10,3	10,7	12,8	10,1	11,6	11,1
Czech Republic	31,2	44,3	32,3	11,7	7,7	17,0
Denmark	84,8	64,1	62,4	18,8	22,7	26,1
Germany	73,3	106,9	92,3	21,1	17,8	23,0
Estonia	24,9	24,9	34,1	15,2	19,7	18,9
Ireland	201,3	74,7	66,4	8,3	18,5	24,6
Greece	40,3	23,8	33,9	11,3	24,3	43,8
Spain	60,5	73,3	78,3	14,0	10,9	20,2
France	69,2	65,1	99,8	19,8	18,1	20,9
Croatia	19,0	16,8	10,8	19,6	21,7	29,2
Italy	64,8	59,2	73,2	15,4	13,9	17,5
Cyprus	31,5	24,3	31,9	20,7	27,4	19,3
Latvia	16,4	27,6	14,6	14,5	16,3	27,9
Lithuania	16,4	15,7	15,0	10,6	14,6	14,6
Luxembourg	76,1	:	:	20,5	:	:
Hungary	30,4	45,3	37,3	10,1	6,4	13,8
Malta	:	:	40,8	:	:	10,7
Netherlands	92,4	89,2	90,4	12,2	15,3	14,6
Austria	81,9	105,0	106,8	19,7	13,5	19,5
Poland	25,9	32,2	29,6	10,9	9,3	16,2
Portugal	28,2	35,8	22,9	14,0	10,5	22,9

Romania	13,6	17,0	14,7	12,6	12,1	21,1
Slovenia	38,9	38,7	:	18,6	12,9	:
Slovakia	28,5	39,9	21,1	9,9	5,7	18,0
Finland	73,5	57,0	50,7	16,3	21,0	22,7
Sweden	93,4	80,5	93,6	19,5	18,6	31,0
United Kingdom	77,2	144,8	71,0	16,8	11,7	19,2

Source: Eurostat online database

Note: MF: manufacturing, NACE C29 - Manufacture of motor vehicles, trailers and semi-trailers, NACE C30 - Manufacture of other transport equipment.

No doubt, the difference in the total labour costs is a key factor of delocalisation of business functions (e.g. manufacturing activities) in the CEE region. According to recent findings, in the automotive sector, it is less a 'follow the customer'-strategy but the pressure on prices due to lower wages in many CEE countries (compared e.g. to Western European Countries or Germany) what drives re-/delocalisation (Schwarz-Kocher et al., 2017:7). The available statistical data on total hourly wages in manufacturing motor vehicles, trailers and semi-trailers clearly indicates the attractiveness of the CEE region countries for further delocalisation in the automotive industry.¹³ (See Table 1!) But the creation of new manufacturing capacities in the CEE countries represents a real threat for other peripheral, low cost countries in Europe. The following assessment illustrates well the consequences of the recent changes in the European automotive sector in the CEE region: "... Spain's main competitors for small vehicle assembly operator have tended to be CEE countries. As a result, automotive plants in Spain might be expected to be among those hardest hit by the opening of new plants in CEE countries." (Aleaz-Aller et al., 2015:155)

Based on the data above (Table 2), however, it seems that the low cost competition strategy has its own limits when it comes to attract further, more value-added activities along the value chain. Low wages go hand in hand with low value added leading to asymmetric power relations between various types of suppliers (i.e. 1st, 2nd and 3rd tier) and OEM. These countries representing low-value added product or services in the GVC are more vulnerable for such changes as further delocalisation or automation/robotisation. Competition strategy based on low costs may thus lead to lock-in of the countries' development paths. In order to be able to unlock these paths and to create new high-road of development, it is necessary to move up in the value chain (Makó and Illéssy, 2016). This leads us to focus on the crucial role of knowledge and knowledge mobilisation in the labour process within the GVC.

1.3 Knowledge as a key resource shaping power relations in the value chains

In addition to the governance, power and control oriented approach of the GVC in our analysis we intend to stress the importance of the knowledge mobilisation and learning process in the innovations surveyed by the company case studies. The prerequisite for moving up in the value chain – generating higher value added – is to develop and combine different types of knowledge. To understand the opportunities and limits of this learning process it is worth making distinctions between various types of knowledge and their forms of development. This short overview on forms of knowledge and learning is also helpful in interpreting our case study findings.

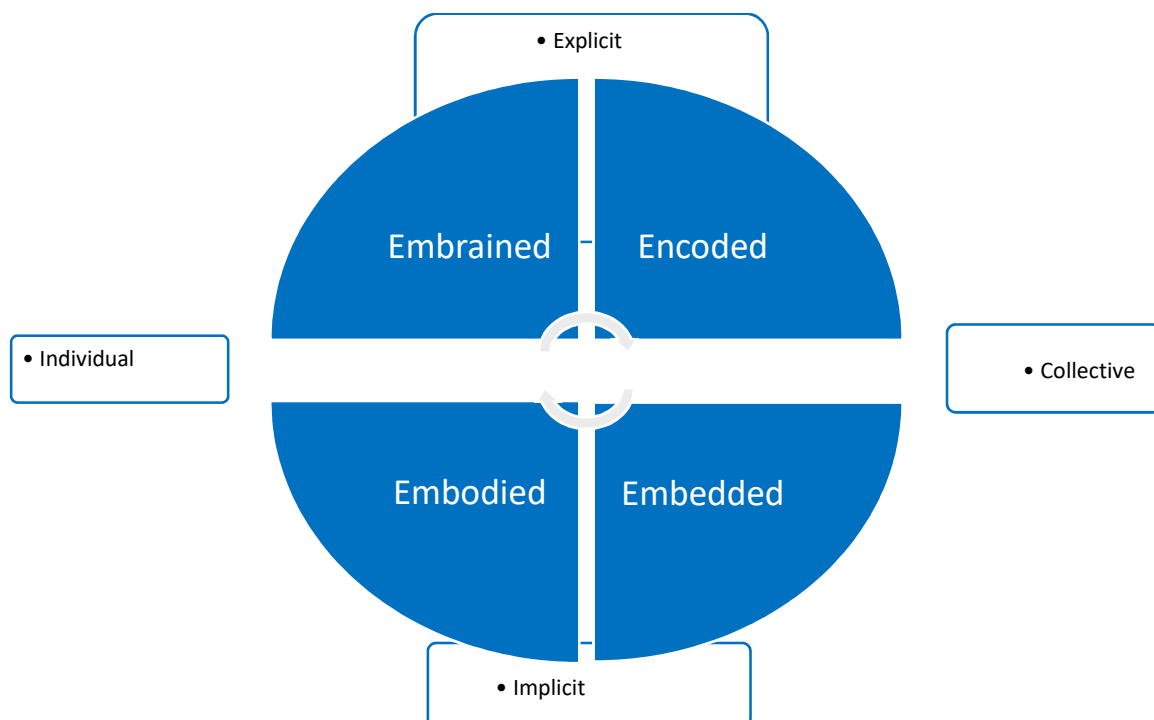
Knowledge in organisations is typically categorised as being either explicit (relatively easy to acquire, transfer and maintain its value) or tacit (difficult to code and document without losing from its value

¹³ In the future, digitisation-automation (robotisation) represents the other important future driver in the location (position) in the automotive value chain, the second section focuses on this issues.

which is the so-called “epistemological dimension” of the knowledge). It is also important whether knowledge is possessed by an individual employee or by larger group of employees. Lam (1998) called the first axe of knowledge classification (explicit vs. implicit) the epistemological dimension of knowledge, while the second axe of the matrix (individual vs. collective) was labelled as the ontological dimension. This combination of explicit-tacit and individual-collective dimensions of knowledge (first mentioned by Collins, 1993; cited by Lam, 1998) results in the below presented four types of knowledge.

- Embrained knowledge* (individual-explicit) is formal, abstract, theoretical, standardised, easily acquirable and transferable, it can be used and applied in various heterogeneous situation and can be incorporated through formal education and training (learning-by-studying).
- Embodied knowledge* (tacit-individual) is based on practical experiences of the individuals, it can be used in specific context, emergent, fluid and individual-bounded. Embodied knowledge can only be acquired in practice, through personal experiences (learning-by-doing).
- Encoded knowledge* (collective-explicit) is codified in signs and symbols and stored in blueprints and recipes of written rules and procedures. It has a collective and public character and transferable almost independently from the knowing subject for a wider audience.
- Embedded knowledge* (collective-tacit) resides in organisational practices, routines and shared norms. It is heavily context-dependent, deeply rooted in specific work practices and socio-organisational structures. It can be transferred through relation-specific informal channels where communication, coordination and organisational identity play crucial role. It is often referred to social skill or social knowledge.

Figure 2: Types of knowledge in the organisation: epistemological and ontological perspectives



Source: Lam, 1998: 491

Obviously, all learning starts with the embodied knowledge that is with knowledge acquired individually and tacitly. It is of prominent importance for all firms to initiate a learning process during with knowledge first becomes explicit (transferable) and then spread over the firm by sharing and collectivizing it. This process is very similar to what Nonaka and Takeuchi called Socialisation,

Externalisation, Combination and Internalisation in their famous model of SECI-spiral (Nonaka and Takeuchi, 1995).

Most of the innovations analysed in the case studies reflect this ambition of the companies investigated to mobilise, develop and share the knowledge – especially the tacit one – of their employees. The core aim of this innovation is to transform a group of co-workers into a so-called ‘community of practice’ in which the employees do not only share their individual knowledge and experiences but are also related to each other by shared motivation and interest based common use of knowledge. Those who are not members of the community do not have access to the ‘community of practice’. The final social product of this briefly presented process mobilisation and transfer is the social capital reflected in the shared norms and values of all members of the community, which may facilitate access to the tacit dimension of knowledge.

There is a commonly shared view in the recently growing literature of digitisation and robotisation (Chui et al., 2016, Brynjolfsson and McAfee, 2014) that the use of ICT can dramatically boost the opportunities of knowledge management in formalising and coding knowledge. This approach can be proved to be an effective strategy in a stable and slowly changing economic and social environment. However, in the past decades a radically new environment was created for corporations by mega trends, including globalising product, service and labour markets, together with organisational and managerial innovations such as modularisation, eliminating the bureaucratic ‘silos’ in the organisation through project work. In such an environment, the sources of long-term success for organisations are their high learning and adaptation capabilities using and mobilising the tacit (practical) knowledge. This is even more important if there will be a shift in products (e.g. towards electro-mobility) or towards an approach to sell “mobility as a service” instead of cars as a product.

Overall, we can see that there are changing conceptual orientations visible along the automotive value chain. E.g. the sharing of knowledge is no more limited to a single company, but the scope of the ‘community of practice’ is at least partly extended into the value chain: it is obviously useful for OEMs and 1st tier suppliers to increasingly integrate the knowledge and competencies of suppliers for solving complex problems in design, pilot runs, and regular production as well as over the whole product life cycle. In this sense, there is an increasing amount of research (e.g. Blöcker et al, 2009) on the shift from an OEM-centered approach in innovation towards an innovation network concept thus integrating different forms of knowledge of different companies – in an at least partly contradictory manner (cooperating vs. being integrated in a fixed logistic and financial frame).

The innovations studied by the method of the company case studies in the automotive industry – without exceptions – illustrate a need for various forms of knowledge mobilisation and learning, and their impact on the quality of job and employment in the perspective of value chain perspective.

The next section of this chapter is focusing on the mega-trends driving the changes in the automotive sector. The third section presents the dynamic relations between quality of job, innovation and employment using the empirical evidences from the company case studies carried out in automotive plants in Hungary and Germany. The concluding section summarizes the major findings on the interplay between of innovation-learning and quality of job and employment in the perspective of GVC.

2 The automation challenge and how it affects value chain power relations

Undoubtedly, one of the main challenges the automotive sector has to currently confront is a series of disruptive technological innovation that may fundamentally change the automotive industry. Additive manufacturing, the “Internet of Things”, Industry 4.0, Big Data, Smart factories are some of the most commonly used buzzwords of this socio-technical transition, and techno-economic paradigm shift. Although there is no consent in the scientific community either on the number of employees, or on the exact jobs affected by these technological changes, it seems that almost everyone agrees on one thing: we are currently witnessing revolutionary changes in manufacturing processes. Instead of giving a detailed overview, in this chapter we intend to assess the potential impacts of this mega-trend on both job quality and employment.

2.1 What is automation and should we be afraid of it?

One of the most encompassing phenomena of the present decade is the process of automatisisation and digitisation. By the former we mean the replacement of labour input by machine input for same type of tasks, while digitisation refers to the phenomenon of the use of sensors and rendering devices to translate parts of production (and distribution) into the digital domain. Both phenomena fundamentally transform the way how we produce products and services to such an extent that an entire new branch of the literature has emerged to map its future consequences on the employment. There is an abundant body of literature examining the well-known “automation anxiety” caused by concern over the decline in the employment rates in certain sectors or even the disappearance of entire professions. For example, according to Frey and Osborne (2015), the work of almost half of the employees will be replaced by computers in 1-2 decades. Bowles (2014) estimates that 45-60% of the European workplaces will be automatisised. Brezski and Burk arrive at similar conclusions concerning the German economy, in which 57% of the workplaces are threatened by the risk of automatisisation. It is also worth noting that in this literature the unit of analysis is dynamically changing: professions, occupations and jobs often appear as interchangeable concepts.

2.2 Impacts of automation on employment: American and European experiences

A more balanced analysis of the potential impact of automatisisation can be found at Autor’s article (Autor, 2014) aimed to map the impact of automatisisation on employment. Instead of focusing on professions or occupations, he uses a task-based analysis of different jobs. The starting point is the so-called Polanyi’s paradox, according to which “We know more than we can tell”. This refers to the fact that a large part of our knowledge is tacit and therefore hard to codify. In contrast, explicit knowledge is easy to codify and transfer.

Based on the tacit and explicit knowledge elements of different work tasks, Autor differentiates three main types of jobs: manual-intensive, routine-intensive and abstract-intensive. These jobs are exposed to the threat of automatisisation to different degree. His analysis of the US employment trends since 1979 clearly show a process of ‘hollowing out’ in the middle of the employment structure. This means that in the past nearly four decades most loss has been registered in the middle-skilled white collar and middle- and low-skilled blue collar jobs. A similar trend is observable in Europe as well. According to Autor, this is at least partly due to the automation and digitalisation.

However, the effects of automation are far more widespread and complex than it is usually suggested. Autor calls attention to the fact that while computerisation may substitute human labour in some cases, it can complement it in almost every economic activity: ‘The fact that a task cannot be

computerised does not imply that computerisation has no effect on that task. On the contrary: tasks that cannot be substituted by computerisation are generally complemented by it. This point is as fundamental as it is overlooked.’ (Autor, 2014:136). In these cases the automation does not lead to technological unemployment, instead it increases labour productivity.

In a recent Eurofound publication (Eurofound, 2016), Fernández-Macías and co-authors analysed the potential impacts of automation on the European employment structure. Analysing the literature on technological development-driven employment changes, the authors distinguish two main approaches: the skill-biased technological change (SBTC) and the routine-biased technological change (RBTC). Overall, the first strand of literature interprets the main employment patterns of the past few decades in an upgrading narrative, while the second uses the polarisation argument and interprets data according to this narrative. (Eurofound, 2016:11)

In order to give a more nuanced picture of post-crisis employment trends in Europe, the authors combine the occupation-based approach with the sector-level analysis, that is, their unit of analysis is occupations in a given sector. They regrouped these occupations into quintiles on the basis of the average wages and analysed the employment changes before, during and after the global economic crisis. We will highlight only three facts that are relevant for this chapter.

First, albeit recent employment trends are less supportive to the upgrading argument than those before the crisis, a clear downgrading process has been taking place in only two countries: “Over the four-year period 2011–2015, Hungary and Italy both experienced an obvious downgrading pattern of employment shift. In each of these countries, employment growth was strongest in the lowest-paid jobs and weaker in higher-paid jobs (...) At aggregate EU level over 2011–2015, there was upgrading with some polarisation – relatively faster growth in the bottom than in the middle.” (Eurofound, 2016:13)

Second, at sectoral level, while the biggest employment growth was registered in the service sector, the automotive industry is one of the manufacturing sectors that recent employment gains come from, together with food production. With respect to the automotive sector, Schwarz-Kocher et al. (2017:18) recently stated that, since the 2008/2009 crisis, nearly the entire growth of production in European automotive industry is realised in CEE countries (with respect to production value). What is even more important, this employment growth has taken place in the higher-paid jobs.

It is quite obvious to interpret these changes along with the aforementioned shift in automotive industry: at least for a part of the production sites in CEE countries, there seems to be an upgrading of production from commodity parts towards higher value and more complex products which is presumably based on their increasing experience in production. This is driven by company strategies coping with the challenges in this market in order to be highly productive on the one hand, and an innovative and a high-quality producer at the same time. What we might have is a coexistence of contradictory trends in different companies and production units. We will come back to that aspect in the analysis of the case studies. (cf. Chap. 3.2)

Third, the general employment patterns in Europe have been always a combination of upgrading and polarisation but with a changing emphasis between the two: “The pre-crisis employment expansion in the EU was mainly upgrading but with some polarisation. The crisis itself has been clearly polarising but with some upgrading (the top quintile continued to grow). The most recent pattern (2013 Q2–2015 Q2) is one of balanced growth with only a very mild upgrading skew. There is, as yet, no indication of actual downgrading in the aggregate EU data, though recent employment shifts are clearly less upgrading than those observed in the pre-crisis period.” (Eurofound, 2016:12)

Looking at recent data available for the automotive sector – i.e. a comparison of employment quality in CEE countries and Germany (Schwarz-Kocher et al., 2017:14ff., based on Krzywdzinski et al., 2016) –, there is a great difference in employment stability e.g. in fluctuation rates (in CEE three times as high as in Germany), in contract work (Germany 5%, CEE 11% of employees), and fixed-term work contracts (Germany 6%, CEE 11% of the employees). This is indicating that – at least in automotive industry – the polarisation mentioned has to do with company strategies in the framework of employment regulation in the different countries: not only multinational companies or foreign direct investments obviously react on opportunities to apply labour regulations in order to optimize their position in the automotive value chain.

2.3 Automation, Job Quality, Organisation and the Value Chain perspective

Makó et al. (2017) analyse the changes and trends of work task characteristics of European employees. Their aim is to investigate the relation between entrepreneurship and creativity. The authors argue that countries in which more employees are working in knowledge-intensive jobs with high level of autonomy offer a more valuable reserve pool of future opportunity entrepreneurs¹⁴. In other words, in countries where the share of creative workers is higher, we will find more new entrepreneurs with higher probability of future success. Using the model of Lorenz and Lundvall (2011) and the database of the Eurofound's European Working Conditions Survey (EWCS-2005, 2010), the authors distinguished three types of workers on the basis of their work tasks' characteristics.

The sample consisted of salaried employees working in organisations with at least 10 employees in non-agricultural sectors such as industry and services, excluding public administration and social security; education; health and social work; household activities; as well as agriculture and fishing. They measured creativity according to six variables reflecting knowledge-intensity and autonomy of different jobs at work task-level: (1) whether the work requires the mobilisation of problem solving capabilities; (2) using individuals' own ideas; (3) whether it involves learning new things; (4) executing complex task, and whether the employees have autonomy; (5) in choosing the working methods; and/or (6) in choosing the order of tasks.

Three groups of employees were distinguished: (1) creative workers are characterised by highly knowledge-intensive jobs and high degree of autonomy, (2) constrained problem-solvers are employed in similarly highly knowledge-intensive jobs but they enjoy significantly less autonomy, while in the case of (3) Taylorised workers the level of knowledge-intensity and autonomy of jobs are relatively low.

Table 3: Characteristics of the three employee clusters

	Creative workers	Constrained problem-solvers	Taylorised workers
Knowledge-intensity	high	high	low
Autonomy	high	low	low

Source: Makó et al. 2017

This analysis is also useful to assess the effects of automatisisation. In this regard, the share of different types of employees can be seen as a proxy-indicator for assessing the number of employees who can be hit by the automation either by complementing or by substituting these jobs. In theory, we assume

¹⁴ In the literature, 'opportunity entrepreneurs' are often distinguished from 'necessity entrepreneurs'. In the case of the former the '... main motif is the desire for independence and desire to work for themselves', in the other case, the so-called 'necessity' entrepreneurs are pushed into entrepreneurship because they have no other employment options.' (Mascherini and Bisello, 2015:13)

that highly knowledge-intensive and autonomous jobs are unlikely or difficult to be replaced or complemented by machines. To a lesser extent, the same is considered true for constraint problem-solvers, whose tasks usually require high cognitive capacity but with lower level of autonomy. Jobs with low level of autonomy and low knowledge-intensity (i.e. Taylorised workers) are exposed the most for automation. It is worth adding however, that – as Autor rightly noted – the assessment of the real effects cannot be separated from some external factors such as the elasticity of both labour demand and supply.

Table 4: The share of different employee clusters in European country groups (EWCS-2010)

Country groups ¹⁵	Creative	Constr. Problem-Solvers	Taylorised
Nordic	71	15	12
Continental	49	25	26
Anglo-Saxon	49	24	27
Mediterranean	46	29	35
Central and Eastern Europe	41	29	30
EU-27 average	48	24	28

Source: Makó et al. (2017)

If we compare the distribution of each employee group in 2005 and in 2010 at European aggregate level, we do not see significant differences. During this period, the share of creative workers decreased by 2 percentage point (50% vs 48%), the share of Taylorised workers increased at the same rate (26% vs 28%), while the share of constrained problem-solvers remained the same (24%). However, this apparent stability overshadows important differences. First and foremost, there are significant variations across the main country groups within the EU-27.

As it can be seen from the table above, the share of the creative workers is the highest in the Nordic countries, followed by the Continental and the Anglo-Saxon country groups, while Mediterranean and CEE countries are lagging behind. In contrast, the share of Taylorised workers is the highest in Mediterranean and CEE countries, while their percentage in the workforce is far less in the Nordic country. Anglo-Saxon and Continental countries can be found between them.¹⁶

These country group differences are important not only from the point of view of ‘automation anxiety’ but also from what has been said in the previous section about the differences in the value-added per employee. As we can see from these data, creative and high value-added jobs are not distributed evenly geographically in Europe. This is not at all surprising. Sturgeon and Florida have introduced the distinctions between cost-cutting and market-seeking investment motives of the large automotive companies. The investment motive is determining the limits of these newly established plants for any

¹⁵ The country groups include the following Member States:

1. Nordic countries Sweden, Finland, Denmark,
2. Anglo-Saxon countries: the United Kingdom and Ireland.
3. Continental countries: Germany, Netherlands, Austria, Luxembourg, France and Belgium.
4. Mediterranean countries: Spain, Portugal, Italy, Greece.
5. Central and Eastern European (CEE) countries: Estonia, Latvia, Lithuania, Poland, Czech Republic, Slovakia, Hungary, Slovenia, Romania, Bulgaria.

¹⁶ In fact, according to the preliminary calculation of the authors, the differences between the Continental and Anglo-Saxon countries on the one hand, and Mediterranean and CEE countries on the other hand, are much more striking in both 2005 and 2015 but these data has not been yet published. This bias may be due to the short-term effects of the global economic crisis which temporarily reduced the real differences.

kind of value chain upgrading: “Based on the key distinction between cost-cutting and market seeking investment locations, the study developed a hypothesis that many plant attributes too could be predicted by type of location, including plant size, degree of integration, level of automation, share of parts sourced from the local supply-base, etc.” (Sturgeon and Florida, 2000:12)

After conducting interviews with some 45 managers worldwide and gathering quantitative data from more than 2000 plants, the authors set up the following typology of production location: 1) Large existing markets (e.g. United States, northern Europe, Japan) – when the plant is established in the same country where the headquarter of the firm is located; 2) Large existing markets – when the plant is established in a well-developed country other than that of the firm’s headquarter base; 3) Peripheries of the large existing markets (e.g. Mexico, Canada, Spain, Portugal, and East Europe); and 4) Big emerging markets (e.g. China, India, Vietnam, Brazil). Albeit this typology was created almost two decades ago and thus needs some refinement, it still proves to be relevant from a value chain upgrading perspective.

Table 5: Attributes of different types of automotive investment

	Type 4	Type 2	Type 3	Type 1
Strategic intent	Market seeking	Market and capability seeking	Cost cutting	Market and capability seeking
Capacity	Low	High	High	High
Wages	Low	High	Low	High
Application of lean principles	High	Low ¹	High	Low ¹
Vehicle development	No	In some cases	No	Yes
Level of integration	Low	High	Medium	High
Level of local supply	Low	Medium-to-high	Medium	High
Level of exports	Low	Low	High	Low ¹

Note: 1 = Except of Japan

Source: Sturgeon and Florida, 2000:13

Undoubtedly, in the competition to attract automotive sector’s FDI, the main advantage of such peripheral regions like Eastern Europe is still the combination of geographical proximity and low labour and production costs. The most important changes since this research was carried out can be found at the application of lean principles, the level of integration, and the level of local supply. This is mainly due to the rise of modular production networks best described by Sturgeon (2002). Inspired by the value chain restructuring in the US electronics industry, Sturgeon argued as a response of highly demand, OEMs tended to seek for ‘full-service outsourcing solutions. In this process more and more manufacturing activities were outsourced to ‘turn-key suppliers’, while the lead firms could focus on their core activities, like design, R&D, and marketing, and was less hit by an eventual industrial downturn (at least they didn’t have to face with excess manufacturing capacity). The increased volume of outsourcing was also beneficial for the 1st Tier suppliers: “I call such firms ‘turn-key’ suppliers because their deep capabilities and independent stance *vis-à-vis* their customers allow them to provide a full-range of service without a great deal of assistance from, or dependence on lead firms. Increased outsourcing has also, in many instances, vastly increased the scale of suppliers’ operations.” (Sturgeon, 2002:455)

This restructuring process has reached the automotive industry to a considerable extent and resulted in sophisticated and excessively integrated global value chains. An important precondition of such a radical transformation was what Richard Freeman (2007) called ‘the Great Doubling’. He argued that

since the end of the 1980s, the labour pool globally available has increased from 1.46 billion to 2.93 billion workers, with the entry of the former Soviet bloc countries, China and India to the world economy. The evolution of the global labour market has an immediate effect in the segment of low-skill / low-paid jobs and influenced negatively the competitive advantage of such countries like Peru, El Salvador, Mexico and South Africa. But Freeman emphasises a second, longer-term effect: the emergence of highly skilled labour population apt to fulfil jobs in technologically advanced activities.

As Freeman rightly observed: *“In 1970 approximately 30% of university enrolments worldwide were in the US, in 2000 approximately 14% of university enrolments worldwide were in the US. Similarly, at the PhD level, the US share of doctorates produced around the world has fallen from about 50% in the early 1970s to a projected level of 15% in 2010.”* (Freeman, 2007:6) The difference is even more striking today, especially in the technology-related fields. In 2016, the number of STEM (Science, Technology, Engineering and Mathematics) graduates was 4.666 million and 2.575 million in China and in India, respectively, while the US was lagging far behind with 568 thousands graduates (World Economic Forum, 2016:21). Of course, the quality of the education is not (yet) at the same level but it is also improving year by year.

Transferring this general observation to the automotive industry, we have to take into account that along with the growing standardisation (and if applicable: automatisation) of the production processes, it is a question of work organisation whether qualification and skill aspects will matter. According to Schwarz-Kocher et al. (2017:14), the impact of skills differences is decreasing, the more standardised production processes are. But they tend to gain importance when coping with production ‘crashes’ (i.e. when unforeseen or not standardised events occur), or in production maintenance, and especially in a ‘pilot run’ situation (i.e. when a new product is first produced on the dedicated production line). In these aspects, skills still matter – even the rapid availability of skills (e.g. from machine tool producers) is an important asset. Production knowledge and an increasing experience in coping with these aspects may provide a basis for companies in different parts of Europe to improve their position in the automotive value chain. (cf. for the applicable strategies Chap. 3.2)

There is another aspect to be taken into account when looking into the reasons for and patterns of delocalisation: This is logistics, transport costs, and the spatial distance from supplier to OEM. For many standardised or (comparably) simple parts, transport costs and availability are not crucial. But approx. 40% of the parts of a presently produced automobile are so called “bad shipping parts” (Schwarz-Kocher et al., 2017:17) with a higher complexity which needs to be produced close to the final production line or the OEM. The planned availability of these parts is crucial for the OEMs –especially in Just-in-Time- or Just-in-Sequence-Production–, and therefore, it is likely that they will be produced nearby the OEM in order to guarantee the continuity of production. This is a limiting factor for delocalisation that has impact on the development of supplier plants close to production sites of OEMs, e.g. new production sites in CEE countries. (cf. e.g. Chap. 3.2.1 on *HU-SUBSIDIARY* and *HU-GLOBAL PARTS SUPPLIER*)

Delocalisation patterns may turn out to be different for functions like design and product development, i.e. functions dependent on highly skilled and specialised staff. Accordingly, these changes call attention to the changing patterns of delocalising the development of higher-value added parts, products and services due e.g. to a lack of skilled workforce or higher labour costs in the core countries of OEM manufacturers. This changing pattern is well illustrated by the establishment of R&D research centres by Audi in Győr city and Knorr-Bremse in Kecskemét city, etc. Labelling this changing pattern of delocalisation of business function we may speak about ‘first’ and ‘second generation’ delocalisation process in the CEE region.

3 Interplay between innovation, job quality and employment: Lessons from the company case studies

3.1 Preliminary remarks on the case study method

Critics of qualitative research that include case studies often emphasise that the small number of cases investigated do not allow the gathering and analysis of statistically valid data and developing generalised findings. Another critical opinion is that case studies question the objectivity of researchers and they are not suitable for explanation of relations between the phenomena investigated. Without questioning the briefly outlined critics on the methodological weakness of case study method, we intend to stress the value-added character of the case study method used in the social science research in general and especially in the study of firm level innovation process and the impact on employment and working conditions.

The experiences analysed in this section are partly based on a literature review coupled with first hand company case study experiences. The case study method aims to “... understand how people interpret their experiences, how they construct their world and meanings they attribute to their experiences’ (Tomory, 2014:60). In our analysis, instead of a single-case study method we used the so-called multi-case or multi-sites case study strategy, relying on the experiences of four company case studies covering five innovations carried out in the Hungarian and German automotive industries.¹⁷

3.2 Company cases: ‘locus’ along the GVC and the drivers of innovation

Before presenting the context and the drivers of innovations investigated in the company case studies, we first intend to locate these companies along the GVC typology presented in section 1.1, i.e. by the types of governance, complexity and ability to codify transactions, supply capabilities and coordination/control in the value chain. The following table illustrates the features of company case studies carried out in the automotive sector in Hungary and Germany.

¹⁷ In practice five company case studies were carried out within the QuInnE project (two German and three Hungarian), but due to the service nature of the second German company case was omitted from the systematic case analysis: The second German case study (Kümmerling, 2017) is focusing on the rather new development of car-sharing services. In this emerging sector, even employment data are not available and due to the short-time operational period of the mobile or free-floating service, it is rather difficult to identify the impacts on employment and job quality. So, the case is added at the end of the paper to shed some light into yet un-investigated changes in the automotive sector, and to illustrate that there is –as one tendency among others– a shift towards mobility services (like car sharing) which might lead to new and different pressures for employment and working conditions. (cf. cf. ‘Excursus’, Chap. 3.2.4)

Table 6: Company case studies: Types of governance, forms of transactions, capabilities and coordination

Types of governance	Characteristics of the company case studies
Market	HU-T-PLASZTIK (3rd tier supplier) (Hungary) Low complexity of transactions, High-ability to codify transactions, High capacity of supply base, High degree of explicit coordination and power asymmetry.
Modular	HU-SUBSIDIARY (OEM) (Hungary) High complexity of transactions, High ability to codify transactions, High capacity in the supply base, High degree of explicit coordination and power asymmetry GER-SUPPLIER (1st tier supplier and development partner for OEM) (Germany) High complexity of transactions, High ability to codify transactions, High capacity in the supply base, High degree of explicit coordination and power asymmetry HU-GLOBAL PARTS SUPPLIER (2nd tier supplier and development partner for OEM) (Hungary) High complexity of transactions, High ability to codify transactions, High capacity in the supply base, High degree of explicit coordination and power asymmetry
Relational	-
Captive	-
Hierarchy	-

Source: Own compilation based on case study reports (see list of reports in section 6 of this report)

Besides using the concept of the GVC to understand the incentives of innovation, we identified the following company strategies as drivers of innovation:

- a. Seeking cost efficiency
- b. Seeking knowledge efficiency
- c. Cost and knowledge efficiency mix.

Ad a: In the case of the ‘cost-efficiency’ strategy, the key motive of innovation is to find tools of competitiveness through ‘cost cutting’ or in other word to be ‘cost leader’ among competitors in the automotive sector. At the macro level, this strategy generally represents the so-called ‘low-road’ strategy of economic development based on abundance of the low wage and low skilled workforce (Makó–Illéssy, 2016). Underdeveloped institutional environment (e.g. non-existent or weak trade unions, highly deregulated or flexible labour market and lack of other regulatory tools, like international ethical code of conduct of the firm, etc.). This strategy has only short-term advantages accompanied by the risk aversion investment policy.

Ad b: Contrary to this approach, the ‘knowledge efficiency’ strategy puts the focus on the mobilisation of knowledge and sharing it within the members of the organisation. A good illustrative example for this strategy is when a firm combines technological (e.g. ICT) and organisational (e.g. Employee Driven Innovation, IDE) innovations in order to develop and share knowledge or implement various methods to improve collective learning in the organisation. In this future oriented strategy, organisational learning is the core source of the sustainable competitiveness of the firm through developing capability to continuously produce higher value added products and services. Developed institutional regulations (e.g. presence of strong trade union, presence of the international regulation of code of conduct etc.) or high wages are functioning as a ‘positive constraints’ for the seeking ‘knowledge efficiency’.

Ad c: The combination of these strategies is based on a compromise between the short-term and long-term pressure of competitiveness. The pressure for cost-efficiency is permanent and universal, but the development of partnerships in development with the OEM, or reaching the status of the ‘turn-key supplier’ through ‘knowledge efficiency’ in combination with ‘efficiency seeking’ are the tools of the sustainable-competitiveness in the automotive sector.

The following table summarises the classification of these strategies or drivers of innovation of the firms surveyed by the organisational case study method:

Table 7 Company case studies in the automotive industry by drivers of innovation

Drivers of innovation	Types of Innovation
Cost efficiency	<i>‘IT-based management’</i> (HU-T-PLASZTIK, 3 rd tier supplier, Hungary)
Knowledge efficiency	<i>‘Integrated Project Team’</i> (GER- SUPPLIER, 1 st Tier supplier, Germany) <i>‘Ideenbörse’</i> (HU-SUBSIDIARY, OEM, Hungary)
Cost & knowledge efficiency mix	<i>‘Kaizen-principles’</i> (GER-SUPPLIER, 1 st Tier supplier, Germany) <i>‘Quality Circle’</i> (HU-GLOBAL PARTS SUPPLIER, 2nd Tier supplier, Hungary)

3.2.1 The company cases

The following table summarizes the main features of the company cases carried out in the Hungarian and the German automotive industry.

Table 8: Main characteristics of the company case studies

Pseudonym	type of company	number of employees	No. of persons interviewed
HU-SUBSIDIARY	OEM, Hungarian subsidiary of a German global car manufacturer	Hungarian establishment: over 2 500	5 (company) + 2 (other expert)
GER-SUPPLIER	1 st Tier German car supplier – family owned	Company: 500-2500 worldwide, establishment: 50-500	3 (company) + 5 (other expert)
HU-GLOBAL PARTS SUPPLIER	2 st Tier supplier, car supplier, Hungarian subsidiary of a global manufacturing company (H)	Global company: over 2 500 worldwide, Hungarian establishment: 500-2 500	6 (company) + 1 (other expert)
HU-T-PLASZTIK	3 rd tier supplier, car manufacturing supplier Hungarian family owned	Company: over 250 employees	8 (company)

Source: Own compilation based on case study reports (see list of reports in section 6 of this chapter)

HU-SUBSIDIARY, a Hungarian subsidiary of a German global (OEM) manufacturer was founded in the early 1990s with engine manufacturing. The car manufacturing production started some five years later with a premium-market segment sport-car product. Around 2000 an engine R&D centre was inaugurated. As an extension of the operation, a tool-factory was built a few years later. In 2007 HU-

SUBSIDIARY created the first common department with the City University, and currently they jointly operate four departments. During the present decade, a new vehicle factory and Project and Training Centre were established first, while the mass production of a new – medium/upper market segment – vehicle started a few years later. The new logistic centre opened in 2015 and this was the year when the Hungarian plant finally covered the entire range of car manufacturing. Currently, the company employs several thousand employees representing more than 10% of the total workforce employed in the Hungarian automotive sector (Borbély et al. 2017).

GER-SUPPLIER is an old company (>100 years) and it is still family owned. In 2014, the majority of the ownership share was transferred into a family foundation structure for a company holding as a radical change in the form of governance. It is a typical German ‘Mittelständler’ (family owned middle-sized company), but since 2010, no family members are involved on the business as a manager. Since 1950, the company is active in automotive sector, with several production sites in Europe since the 1990s. The Headquarters, largest production site and the engineering unit are still located in the West of Germany, Presently, there are more than 1 000 employees worldwide in **GER-SUPPLIER’s** automotive division. The entire company is presently reaching a turnover of almost 300 Million € per year. The automotive division is the largest division of the company (Latniak 2017).

HU-GLOBAL PARTS SUPPLIER is a Hungarian subsidiary of an ‘Interior Manufacturing and Assembly’ (IMA) business line in a global corporation, employing thousands of employees in more than 100 business sites in 35 countries. The predecessor of the Hungarian subsidiary was founded in 1993 by a foreign investor and this company was purchased by IMA around 10 years ago. Five years later a second factory was built, which was later complemented by a logistic centre. The turnover in the Hungarian plant increased by 85% between 2011 and 2016, and the size of the workforce nearly reached 2 000 employees. Due to the fast development of the Hungarian production sites the output was doubled in 2012. The volume of the manufacturing increased to 3.2 million and represents 3 % of the global market output. The core activity of HU-GLOBAL PARTS SUPPLIER is to produce internal parts of cars. As 2nd Tier supplier its main customer are the 1st Tier suppliers of the internationally well-known companies like Audi, Volkswagen, Hyundai, Kia, Toyota, Suzuki, BMW, Daimler Benz, General Motors and Ford. In the middle of 2000s, the share of medium-category car segment dominated, by the 2016 the company improved its position in the GVC and the share of premium-category cars exceeded 50% of the production (Losonci et al. 2017).

HU-T-PLASZTIK is a relatively new player in the automotive sector in comparison with the other OEM manufacturer and parts suppliers. It was created as a family business following the collapse of the state-socialist political-economic system. HU-T-PLASZTIK today is a 3rd tier auto-part supplier company in the industrially less developed North Great Plain region of Hungary. Beside the dominance of the agriculture, the region is well-known on the high ratio of gypsy minority in labour market. The company employs more than 300 people. It produces rubber-based products for various sectors (i.e. white good, agricultural machines and automotive industry). The share of production for the automotive sector in the turnover is around 20%. *HU-T-PLASZTIK* is a fast growing family company, its turnover has more than tripled in the last decade and the company surpassed the medium-sized category of the firms. The family owned firm’s governance structure has radically changed since the 2008 financial crisis. The family has delegated the management responsibility to the non-family members. HU-T-PLASZTIK developed various product portfolios (e.g. products for white goods, agriculture and automotive industry) to diminish the dependency on the seasonal fluctuation of the production. Due to the continuous growth, it was necessary to professionalize the production management system and diminish the influence of the family members in the governing structure of the company (Szentesi et al., 2017).

3.2.2 'Integrated project team' and 'Ideenbörse': tools of knowledge development and sharing

The German GER-SUPPLIER is not only 1st tier supplier but is trying to become an important and reliable development partner for German, Japanese and US OEMs in the premium car segment. The company innovation strategy has a dual nature. Firstly, it tries to win premium-market segment orders from OEMs and it intends to become a development partner by using a type of 'knowledge efficiency' strategy of innovation. This strategy is well illustrated by the creation of the '*Integrated project team*'. Secondly, due to the 'matured technology' and the dominance of unskilled workers in the workforce, GER-SUPPLIER implemented a Japanese managerial innovation (i.e. *Kaizen*) combining the motives for 'knowledge' and 'cost efficiency'. Both innovation strategies served to save and improve position in the GVC in the automotive sector (Latniak 2017).

The core driver of the 'knowledge efficiency' strategy of GER-SUPPLIER is the following: the company does not aim to become a 'cost leader', because the previous cost-cutting efforts had only short-lived results. The rationale behind the simultaneous use of 'cost' and 'knowledge' efficiency seeking is well summarised by the plant manager:

According to the plant manager at GER-SUPPLIER, there are limited innovations in the technical process (due to the matured technology). The challenge is to apply technology in a high-flexible way according to the demands of customers with 100 % delivery performance and '0' defects, etc. Shifting towards less automation and towards the use of employees' ideas to optimise production based on smart use of manual work.

The *Integrated project team* represents a company effort towards 'knowledge efficiency'. This initiative (dated back 2015) is designed to replace the slow, traditional 'stage-gate' approach by the *Integrated project team* in the process of product development:

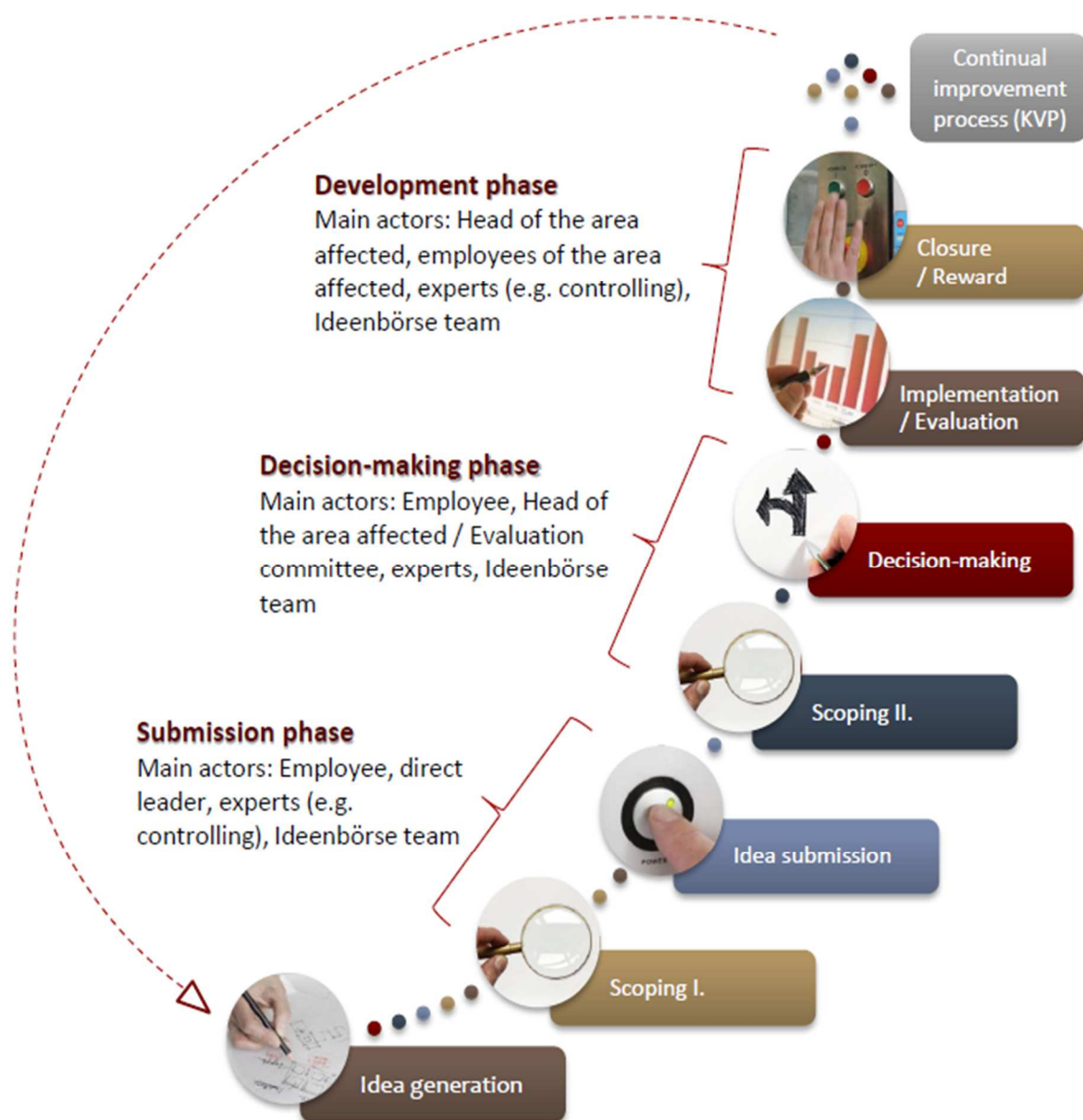
As the plant manager explains, before entering the next stage, there needs to be a positive decision by management (project clearance unblocking resources for the next step in development). Stage gate procedures tend to be fairly bureaucratic and extend functional walls, while people involved would need to closely work together and intensively communicate on development related issues instead.

Instead of dividing the product development tasks between a dozen of different functional units located in separated offices and departments (from technical process, production tools, tools purchasing to design engineering, program managing, etc.), these tasks were delegated only to two teams: 'Akquisition 1' and 'Akquisition 2'. The members of these teams work together at the same premise of the company and have to report only to the program manager and not to their functional unit head.

The *Integrated project team* – initiated originally by the sales department – is an appropriate tool of knowledge development/sharing and results in a 'community of practice' (source of trust relations between team members). The joint effort of the experts belonging to more than dozen organisational units guarantees to develop high quality offer within the short calling time of the OEMs' tenders. These tenders are usually characterised by not only with the extremely short notice time for GER-SUPPLIER (3-4 weeks) but by bureaucratic guidelines containing complex and extended technical, commercial and financial calculation details. The volume of these documents often exceeds 1500 printed pages. If we intend to identify the type of the knowledge transfer, we may say that the '*Integrated project team*' is an enabler to transform the individual 'embrained' knowledge of experts working in separated 'functional walls' at the company into a 'collective embedded' knowledge.

HU-SUBSIDIARY, the subsidiary of the German global carmaker was founded as a ‘brown-field’ investment (Foreign Direct Investment) in a city having matured industrial culture and was the centre of engine and truck production during the state-socialism. ‘Ideenbörse’ has been used in the German parent company for about 30-35 year and was implemented in the Hungarian subsidiary in 2004. There was no urgent cost efficiency-seeking motive to implement this suggestion system. Instead, the main driver was the favourable experiences gained by the OEM mother company with this form of employee driven innovation (EDI) system. After a decade of the operation the management intended to implement ‘Ideenbörse’ (2004) as a best practice in the Hungarian production site, too. The intention is to create an institution for organisational learning through strengthening the cooperation between various occupational groups (e.g. direct and non-direct production workers) and increasing the feeling of commitment (identification) with the company. The following figure is a stylised illustration of the idea generation process (Borbély et al. 2017).

Figure 2: The process of idea generation at HU-SUBSIDIARY



Source: authors' own editing

A special unit was created within the management to organise the activity of the ‘Ideenbörse’ and to motivate, support and evaluate the various phases of the idea generation process. Their members, called ‘idea coordinators’ (‘spokesperson’, ‘extended hand’), help in the submission of new ideas and suggestions, acting as a ‘care managers’ (Hasu and Lehtonen, 2014).

The philosophy of the ‘Ideenbörse’ team is the continuous improvement and idea generation without limitation on their scope:

“We never say if something has been changed that it is optimal. There are always new aspects and other techniques as time passes. At this point the initiator can have a say in the process. So can others. Conditions change. Let’s modify it. The underlying purpose of all this is to make it better and better.” (IB Team Member, white collar, HU-SUBSIDIARY)

Several radical changes took place following the implementation of the ‘Ideenbörse’. The first one was when the paper-based idea generation system was replaced by the IT interface (2013). Its advantages – compared to the earlier paper-based system – were summarised by an engineer involved:

“We used to have a paper-based system where they could write down their ideas by hand. As far as I could see it was not used much. I do not know why. Maybe it is due to lack of confidence that they are too insignificant to implement a great idea. They throw the idea into the container and nothing would happen (...). This paper-based thing is not proper any more in 2017.” (Engineer, white collar, HU-SUBSIDIARY)

During its introduction, an extremely ambitious training program was organised for both managers and employees. As an idea coordinator remembered:

“That year (2013) we met nearly 9000 people. We organised the instruction of the IB system; how the new system is run and what the most important rules are. The result is that it is known by everyone how to submit an idea and if the Ideenbörse was not known, it became familiar.” (IB Team Member, white collar, HU-SUBSIDIARY)

Another significant step was taken into the direction of increased ‘inclusivity’ in 2015, when an IT interface was implemented and opened offering an unlimited access to all workers, overcoming the occupational and space-related borders. The additional positive impact was the ‘instant feedback’ in comparison with the slow feedback that characterised the paper-based system. (Partly due to this measure, the number of idea submitters grew by 11.1 percent to 5155 by the end of 2015 and the amount of savings realised after implementing the idea of employees increased dramatically by 55 percent.)

In addition to the above mentioned short-term financial (extrinsic incentive) benefits of the involvement in the ‘Ideenbörse’, it is necessary to stress the long-term effect of increased creativity (intrinsic incentive). The system can be regarded as an instrument for individual self-fulfilment according to one engineer:

“It is not by all means the money that motivates. At the beginning I also had some ideas with which I started to deal to earn money. But when it comes to my ‘greater idea’ money has never occurred to me. It can rather be regarded as self-fulfilment: «Let me show you what I am able to». So ‘Ideenbörse’ is not only good for money but also for creativity and self-fulfilment.” (Engineer, white collar, HU-SUBSIDIARY)

Until recently, the advantages of the universal and unlimited online access in the idea generation process were not systematically assessed by the management of HU-SUBSIDIARY. However, according to the experiences of the idea coordinators interviewed, the universal e-access has favourable effects

not only on the intensity of participation in the ‘Ideenbörse’ but on the social environment of the production site. As an idea-team member noticed:

“We are trying to reach everybody so that it should not be a nuisance, rather a comfortable opportunity. If they access the web interface from a mobile phone or from home, we can be contacted.” (IB team member, white collar, HU-SUBSIDIARY)

“Those who have not done it so far for some reasons (e.g. because they had a bad relationship with their managers, team coordinator or shift leader), now these colleagues can again have a sense of belonging, practically by bypassing these people they can convey their ideas directly through us to the management. These people may have felt to be outside the system and this process cannot give anything to them. By making it possible for them to submit their ideas from home, they are successfully involved in again.” (IB team member, white collar, HU-SUBSIDIARY).

However, the unlimited or inclusive e-access to the ‘Ideenbörse’ could not remove barriers of participation in the real (off-line) working practice. For example, assembly line workers may overview maximum 4-5 working stations, against this, the non-direct production workers have easy access to computers and could develop a more holistic view on the various units of production and generate new idea. In other words, the source of unequal conditions of participation in the idea generation system could not be removed by the ‘virtual inclusion’ strategy, there is still a need for the possibility of ‘organisational slack’ for production workers to generate new ideas and suggestions.

3.2.3 Combining ‘cost’ and ‘knowledge’ efficiency: Kaizen philosophy and Quality Circles to transform individual tacit knowledge into collective practice

Following the 2008 crisis, GER-SUPPLIER implemented a Japanese production management system, the *Kaizen principles*¹⁸ in 2010 (Masaaki, 1997), complementing the knowledge-efficiency innovation strategy of the ‘Integrated project team’. Due to the matured technology with limited innovation possibilities in the technical process, the company adopted the approach to ‘make it simple’ or ‘smarter’. GER-SUPPLIER learned from previous failures of narrow cost-cutting programs and made a substantial shift toward less automation and increased use of employee’s practical knowledge. The introduction of the well-known *Kaizen principles* - with the help of a Japanese consultant – represented a radical turn in combining the drives for cost efficiency with employee knowledge (Latniak 2017).

To build a common understanding of managers and rank-and-file employees on the methods and functioning of the Japanese management technique, numerous workshops were launched in all

¹⁸ Kaizen”, in Japanese means “continuous improvement for the future”, the 10 Basic Kaizen Principles are the following:

1. Throw out all your old fixed ideas on how to do things.
2. No blame — treat others as you want to be treated.
3. Think positive—don’t say can’t.
4. Don’t wait for perfection. 50% improvement now is fine.
5. Correct mistakes as soon as they are found.
6. Don’t substitute money for thinking—creativity before capital.
7. Keep asking why until you get to the root cause.
8. Better the wisdom of 5 people than the expertise of 1.
9. Base decisions on data not opinions.
10. Improvement is not made from a conference room.

company units. Workshops were organised every two weeks to monitor the progress of each project. Furthermore, a roadmap was designed for the implementation of the *Kaizen principles*. Among the tools of implementation the following were stressed during the interviews:

- (1) “Karawane” – a factory tour of plant managers to discuss and solve production problems every morning;
- (2) “Reflexplan” – a systematic planning method for controlling, planning and - if necessary - changing the production in each unit;
- (3) “SynchroMap” – a tool for creation of an optimised layout for specific production processes); and
- (4) “Just do it-room” – a meeting place for managers and other participants to supervise the advancement of on-going Kaizen projects. All projects and every new step are documented there. Every employee is free to join in if a problem occurs that can’t be solved within the organisational unit.

As a consequence of the introduction of the principles, visibility and transparency in production processes and interruptions is high:

As the plant manager at GER-SUPPLIER states, supervisors’ workplace are in the middle of the workshops (not in separate offices – in Japanese it is called ‘gemba’, which is a location in the shop floor where actual work is performed). If a problem occurs, the workers try to solve it by themselves, first, but if that fails, the signal lighting at that workplace is set to red and the process stops. This is when the supervisor comes in and have to support the employees in solving the present difficulties.

If this doesn’t work out, the next step is to join a meeting in the “just do it”-room.

With respect to the working conditions, the outcomes of the *Kaizen principles* - introduced in the production and in the assembly lines – were the increased adaptability, flexibility and higher quality of work. This production management method is focusing on the mobilisation of practical/tacit knowledge of workers and offering organisational/managerial tools how to share, formalize and use them for the competitiveness of GER-SUPPLIER. In spite of more intensive work, works council members had positive opinions about it:

As the works council member at GER-SUPPLIER explains in the interview, the crucial point is that in the Kaizen process, workers experienced that their knowledge and their experiences is respected: Management and engineers listen to them and then they can see that their ideas are implemented and their work is improved. But the overall work intensification increased in recent years and will further increase in the future.

The business practice of HU-GLOBAL PARTS SUPPLIER is oriented by such guidelines as ‘high customer satisfaction’, ‘profit enhancement’, and ‘employee development’. These values relate in part to the product themselves (e.g. product, quality and internal logistics development) and also to the development and motivation of human resources (e.g. leadership training, communication, Quality Circles (QC)). Among the human resource development projects, the QC activity demonstrated well the interplay between innovation, quality of job and innovation.

QC can be interpreted as a strategy of HU-GLOBAL PARTS SUPPLIER to develop an Employee-Driven Innovation (EDI) since 2013.¹⁹ The aim of the 4-6 members working of the QC is to identify problems

¹⁹ At the global corporation level this organisational-managerial innovation was implemented during the early 2000s.

related with everyday practice and find solutions to improve both product and process quality and increase efficiency of the operation. While QC is not a novelty in the shop-floor practices of the automotive industry, this combined approach includes several components that distinguish this version from other small group QC activities (Losonci et al., 2017).

The main features of this QC strategy include:

1: *Selection* of the project ideas and identification of the most relevant one over a period of half a year:

“Of course, when quality people or team leader or anyone sees that there are quality problems somewhere, and there are these developers, they will decide that well, they propose that for the Quality Circle. So in this half year, topics are collected until the summer approximately.” (mentor, white collar, HU-GLOBAL PARTS SUPPLIER)

2: *Starting* project – contrary to the traditional management or engineers initiated changes – employees design and execute the necessary, improvement related changes. To overcome the innovation inhibiting ‘silo-effects’ of the separated organisational units, QC team includes production line workers, engineers and supporting staff (e.g. HR member) but no higher-level executives. When the team is set up, its members choose a team leader from among themselves – this role may change during the project. QC has a fixed timeframe and focused on addressing the root of the problem. The project goal is to work out and implement a solution supported by facts (e.g. quantitative data). For example in the previous year (2016) the aim of the QC activity – production workers cooperating with the HR department – was to identify the source of high turnover and develop counter-measures. The groups report project progress on a weekly basis, at management meetings.

In general, the members of the QC activity are recruited on a voluntary basis, however the ‘caring role’ of management is not negligible:

“What I see is that ... it would be false to say that they are not motivated by us, because we also motivate and encourage people to take part in this ...of course, there are also other forms where they can provide feedback, but this is a problem-solving method they can feel their own all the same. This is, they invent a little something that will make their daily work easier. This is what we use for motivation, but of course they also do it for money ...” (plant manager, white collar, HU-GLOBAL PARTS SUPPLIER)

Evaluating the QC circles activities requires comparing their outcomes in the perspectives of management and rank-and-file employees, and in the perspective of QC both members and non-members. The most important advantage for management is the mobilisation of the practical knowledge of employees to solve various problems selected by management and the stronger loyalty of employees as well. However, the maintenance of the system requires significant resources in the forms of the managerial assistance (i.e. mentoring system) and further training on the methodology of the QC, etc. In the case of the participants, they may learn English (due to the globally organised network of QC) and improve their general competencies.

With respect to the working conditions, at the end of a project, members of the QC have a holistic overview on the local operation of HU-GLOBAL PARTS SUPPLIER, since these groups are involved to solve many cross-sectional problems. Thus, the project participants have better promotion chances. On the other side, the QC membership results in higher workload in the form of the increased overtime. From perspective of the non-QC members, their workload is also higher because of the often-absent QC members from the regular-daily work. This inequality may create an increasing tension between QC and non-QC members.

3.2.4 Seeking cost-efficiency: implementing an IT based management system

The company case study (HU-T-PLASZTIK) aimed to assess the implementation of the IT based management system (2011) and its impact on quality of job and employment (Szentesi et al., 2017). HU-T-PLASZTIK is applying an IT based management system called 'Abas-ERP²⁰ System'. It represents an ambitious codification of the skills/knowledge owned by shop-floor managers and rank-and-file employees. In accordance with typology of Lam (1998), this kind of knowledge should be classified as 'embodied' and the IT based management system using the technique of 'Abas-ERP' to transfer the 'embodied' individual knowledge into an 'encoded' collective one. The second-generation owner-manager characterised the former traditional knowledge management of the firm in the following way:

"Description and record keeping etc. were completely lacking. To fulfil any order of the customer required my personal visit at the customer warehouse to identify the missing products and then to manufacture them. In a fast growing company, this 'person based recording system' did not work it was necessary to implement a formalised, IT aided record keeping system."

"Before implementing the new IT system, one of the most important challenges for the production management was reliable recording of the steady movements of stocks." (IT expert, white collar, HU-T-PLASZTIK)

Looking back to the former production management system, the description of the various processes, documentation of the customers' and suppliers needs, adaptation of documents for accounting and financial departments, and the collection of the necessary information for the managerial decision increasingly required more and more time from both managers and rank-and-file employees. This was the main motive behind the introduction of the integrated the *IT based management system*.

The implementation of the new the *IT based management system* started with a comprehensive training covering, first, managers and IT expert (i.e. the so-called key users), and then all other employees. Production workers (e.g. machine operators) were rather unhappy with the new system because the *IT based management system* has enabled management to a systematic mapping and controlling of both quantity and quality of their performance in real-time. One of the unexpected results of the new system was the intensification of the conflicts on the higher performance requirements at the shop-floor. According to the plant manager, *"An intensive fighting emerged around 1 per cent increase in the performance standard."* (plant manager, HU-T-PLASZTIK).

The new *IT based management system* had strong impact not only at the production site but on the whole organisational architecture (e.g. units responsible for quality, logistics, sales, HRM), and it contributed to a substantial increase of turnover – which almost doubled since the implementation of this IT based information system. In relation with the organisational restructuring, it is necessary to mention that this system led to two major changes: First, it facilitated the further centralisation of the decision making, and second, power was transferred to the non-family professional managers.²¹ The implementation of this *IT based management system* aimed to upgrade from the 3rd tier supplier position in the GVC to a slight increase in the direction higher-value added products. The investment

²⁰ ERP = Enterprise Resource Planning.

²¹ For example, a CEO of the well-known Electrolux operating in the white goods sector was hired and confined the most important top manager post at the family company.

in a new tool design and manufacturing site support the development into direction in the form of the functional upgrading.

3.2.5 Excursus: German Car-sharing company²²

Car-Sharing is a relatively young but rapidly expanding business about which has not been robustly researched. There is little information about the situation in the businesses; in particular, little is known about the number of employees, their working and employment conditions and their qualifications and skills.

Car-sharing in Germany has emerged since the end of the 1980s: The car-sharing companies established during that period were mostly set up as clubs or associations. Profit was not initially the objective; rather, the aim was to reduce damage to the environment and save costs by sharing one car among a few households or members. The fact that many people operating car-sharing businesses have their roots in left-wing environmentalism has had effects on working and employment conditions, with self-exploitation having long been taken for granted.

In the second phase of the business' development, which started around 2005/2006, new providers, in many cases, spinoffs of the major carmakers such as Daimler and BMW emerged. The years following, the carmakers' entry into the car-sharing market are described as the traditional operators' industrialisation phase. It is likely that this professionalisation was a response to the carmakers' entry.

The case

The objective of the case study, which was conducted in a large stationary German car-sharing company, was to discover what effects the pressures for change mentioned have on working and employment conditions within the company. To what extent is the company aware of the pressure for change and to what extent is it reacting innovatively to the challenges? And what effects do these dynamics have on working and employment conditions – what are jobs in this innovative growth sector actually like?

The company is a holding (parent) company that works with one of its subsidiaries to provide local operators with all central services required by a car-sharing business. The company has a presence in more than 20 German towns and cities. The local car-sharing businesses are operated by independent companies (client companies). The owners of the holding company are for the most part customers and employees. Services, including call centre and IT services and app development, are provided by both the parent company and the subsidiary service provider company.

Around 180 people are employed in the group as a whole. In the parent company itself, there are currently 33 employees and a further 30 in the subsidiary service company, of whom 23 work in the call centre and seven in data processing. Some 60% of the employees in the partnership companies have a vocational training qualification, while 40% are university graduates. These shares have remained stable in recent years. Nevertheless, there have been changes in both the workforces. The size of the local car-sharing operators fluctuates sharply and it is impossible to obtain average figures. The number of employees in the parent company has risen continuously albeit slowly in recent years. Growth has been particularly strong in the IT department. The IT department is responsible for the development and further evolution of software solutions for car-sharing companies and company car fleets, on which it has been working for several years with external service providers.

²² This text is an excerpt of Kümmerling (2017).

The case-study company has had a works council for three years; it covers both the parent company and the subsidiary service company. Currently, it consists of three representatives, none of whom has been released from their duties. The local companies are not represented in the Works Council.

The company does not have a standard innovation management system. Generally speaking, decisions are made at management level and it is from there that the impulses for innovation usually originate. The general decision that the company should become active on social media was taken by the parent company.

Examples for recent innovations are

- Switch from large stations to smaller stations integrated into the streetscape – as a step closer towards the customer and become more visible
- Internet, mobile apps and social media activities - social media are regarded as very important means of communication with customers, which the company uses enthusiastically
- Rewording the customer service script - as a marketing innovation

Together with the increasing migration of the information supply to the Internet, the introduction of the mobile app in 2012 has had effects especially on call centre job quality. The mobile app has been so successful that customers now use it more frequently than the telephone. This has in fact considerably widened the range of tasks of the cc-operators, with responsibilities for dispute management and customer advice.

At the time this investigation was carried out, the company was under pressure to innovate from various angles: (1) from customers, (2) from employees and (3) from new competing providers in the market.

- Improving customer focus was the main motivation for the introduction of the mobile app, which customers can use to make bookings on the go via their smartphones. As a consequence, there are fewer telephone bookings than previously and so, the call centre's sphere of activity has changed. Newly acquired customers are relying increasingly on the Internet in order to obtain information on the company's procedures and then telephone the call centre to ask for any information that may be missing.
- The employees are no longer satisfied with the informal way in which working and employment conditions are determined and have been exerting pressure with the aim of professionalising the company. The establishment of a Works Council can also be seen as a move in this direction.
- As a direct response to the new competitors' higher visibility on the streets, the company's local car-sharing businesses are now parking their vehicles in several smaller stations that are significantly more prominent than before, when the stations were mainly located in rear courtyards. The experiments with smart cards and on-board computers can also be seen as a reaction to the free floaters, which are significantly more innovative in the implementation of new technologies than the traditional operators.

3.3 Interplay between innovation, quality of job and employment: decisive impact of the position in the GVC

The position occupied in the GVC in the supplier hierarchy and the related drivers of innovation to improve cost and/or knowledge efficiency are important factors shaping the dynamic relation between innovation, quality of job and employment. It is the objective of different strategy implementations to change the GVC position of the companies.

Here we focus on the **'knowledge efficiency seeking' strategy**, represented by the *'Integrated project team'* at GER-SUPPLIER and the *'Ideenbörse'* at HU-SUBSIDIARY. In this case study the following interplay between innovation, quality of job and employment were mapped:

At GER-SUPPLIER, a slight increase in the stability of employment was registered, and the innovation surveyed has had no direct negative effect on employment. The *'Integrated project team'* contributed to break down existing 'functional walls' between organisational units, and it has contributed to improve internal communication and coordination between various professions and units. In addition, a common perspective was created on the development and production of parts before their production started (Latniak, 2017).

At HU-SUBSIDIARY, the introduction of the *'Ideenbörse'* increased the autonomy of persons involved in the process of idea-generation, while basic work tasks remained routine. Although the IT interface increased the options to participate, inequality in working conditions, including organisational slack as necessary resource to generate new ideas, access to the IT infrastructure, and the saving of free time, inhibit the intensity of involvement of production workers compared to the non-direct production workers. Those participating in the *'Ideenbörse'* may benefit a variety of rewards. In addition, the participation in this suggestion system increases creativity of work (Bórbely et al., 2017)

The **cost and knowledge efficiency-seeking mix** obviously represents a generally used strategy of innovation by the 1st and 2nd tier suppliers. The implementation of the well-known Japanese management method, *'Kaizen'* at GER-SUPPLIER has several beneficial effects on the quality of job. It contributed to avoid polarisation of jobs, both unskilled and semi-skilled jobs are enlarged through involvement in *'Kaizen'* and employees now even have an active role in the restructuring process of the work organisation. In relation with the other core elements of the quality of job, the Works Council succeeded to negotiate a premium wage in the production unit concerned.

Quality Circle implemented by HU-GLOBAL PARTS SUPPLIER – the Hungarian subsidiary of a global automotive corporation which is located on the 2nd tier position in the GVC – produced overwhelmingly positive impact on the quality of job and employment. Involvement in the *Quality Circle* entailed a fixed-amount allowance for the employees, and it had a positive effect on the future wage increase. Furthermore, the participation offered an excellent opportunity for learning and personal development (e.g. members of QC groups master several techniques with the assistance of the coordinator). Due to the corporate wide (global) QC movement, the involvement in *Quality Circle* of *HU-GLOBAL PARTS SUPPLIER* has substantially contributed to increase team-cohesion and commitment of the participants. Membership does not guarantee an automatic 'lift' in the promotion system, but it has had a positive effect on the employment security. This form of participation has negative impact on the work-life balance due to the excessive amount of overtime. In addition, colleagues who are not involved in the *Quality Circle* complained on higher workload due to the absence of the QC members in the everyday work (Losonci et al., 2017).

The **Cost efficiency seeking strategy** is adopted by the introduction of the *'IT based management'* at the Hungarian family owned HU-T-PLASZTIK. Due to the fast growth and the transfer of company control to professional managers, the firm has launched radical changes in production management: The implemented *IT-based management system* (2011) is directed to transform the former personal (tacit) knowledge-based system into a standardised system independent from individuals. Due to short learning period of the reorganisation of the production information system, it is difficult to map its impact (Szentesi et al., 2017).

The *IT-based management system* has no visible impact on the wage level, but conflicts related to the wage-standard norms have increased since the implementation of the *'Abas-ERP'* system. Concerning working time and employment security, no changes were reported. Similar to other Hungarian firms

operating in the automotive sector, this company has to cope with the impact of a tightened labour market. In spite of the training friendly policy of HU-T-PLASZTIK, employees are eager to attend only On-the-Job training (OJT) during the working time organised in forced breaks during production. The new, *IT-based management system* has had no influence on the work-life balance. It seems to us that this cost-cutting and top-down *IT-based management system* provides advantages for the management to extensively monitor, supervise and control the information flows in real-time. However, the managerial ambition to move up in the GVC requires further changes into the direction of knowledge efficiency as well.

3.4 Impact of organisational innovations on job quality and employment

It is quite likely that in spite of the temptation of ‘economic nationalism’ in some countries the radical changes in the global labour market, and the impact of the global financial and economic crisis, may result in only a temporary slowdown and stronger competition and not in a reversal of the trend of delocalisation of business services. Governments in the emerging markets are designing new development and modernisation strategies aimed at moving up on the GVC and shifting from the ‘low-skill’ to the ‘high-skill’ equilibrium growth model in the CEE countries.

As mentioned, automotive industry is a core manufacturing sector, and its present and future status is of decisive importance both in employment generation and forming quality of working life. The development roads of this sector are shaped by various mega-trends, like automatisisation, digitalisation, globalisation of the labour market, and recent internationalisation drive of the trade union operating in this sector.

To understand drivers of innovation and their implications for the quality of job and employment, the analysis has to focus on the location of the firm in the GVC and its potential dynamics. The locus and the movement – stabilizing, upgrading, downgrading – within the GVC are widely influenced by strategies of innovation as e.g. cost efficiency, knowledge efficiency seeking and their combination.

The focus of the five organisational innovations we analysed by using a company case study method lay on knowledge mobilisation and transfer and on learning with an emphasis on production knowledge. Comparing the changes between the core components and their relations may help us to understand short and long-term dynamic interplay between innovation, quality of job and employment. For this purpose, we apply Schienstock’s (2004) innovation matrix as an analytical tool to identify key impacts of organisational innovation. In this classification, one dimension indicates the ‘core’ components of an organisation, and the other refers to the changes in the ‘relations’ of these core components. Using these two dimensions, the matrix shown in Table 9 illustrates the possible types of organisational innovation from both a static and a dynamic perspective.

Table 9: Typology of organisational innovation*

Relations between the core components of the organisation	Core components of the organisation	
	Not changing	Changing
Not changing	<i>Incremental innovation</i> (e.g., e.g. Quality Circle, Ideenbörse, Kaizen principles, IT-based management)	<i>Modular innovation</i> -
Changing	<i>Architectural innovation</i> (e.g. Integrated project team)	<i>Radical innovation</i> -

Source: Schienstock (2004: 18)

In this perspective, the incremental type of organisational innovation does not produce changes in the core elements and in their relations within an organisation. In other words, the incremental innovation may not change the interest- and power relations in the working practice.

For example, Quality Circle, Ideenbörse, Kaizen principles or IT based management system do not substantially change the status quo of the (social) relations at the workplace level in the entire company. However, the Kaizen principle, Quality Circles and the Ideenbörse are tools for the practical (tacit skill) knowledge mobilisation of employees. They may have an important effects on the quality of job and employment.

In case of QC, Kaizen methods and Ideenbörse, the creative character of work increased during these activities, but the basic tasks in production remained routine, not allowing for more autonomy or learning opportunities. So, in a way we can say that people perform these activities as an ‘add-on’ at work. Although it may improve creativity of employees, as one participant noticed: “... *Ideenbörse is not only good for money but also for creativity and self-fulfillment*” (engineer, white collar, HU-SUBSIDIARY).

Similar improvement in the quality of job was found in the case of Kaizen or the QC practices too: it is ‘shifting towards less automation and towards the use of employees’ idea to optimize production based on smart use of manual work’. In addition, the mobilisation of the individual practical knowledge and the transfer into collective knowledge has contributed to a holistic view and an extended network of participants which might facilitate their promotion chances. Only the implementation of the *IT-based management*, which aimed at supporting the centralised decision making system is leading to a different direction. Through formalisation of the production information system. The key drivers of this change was the ‘product’ and ‘process’ upgrading within the value chain, and this has led to a significant decrease in the autonomy of rank-and-file employee.

The architectural version of organisational innovation, such as the *Integrated project team*, has changed the relation between the core elements of an organisation but it did not modify the core components. This type of organisational innovation represents a ‘functional upgrading’ within the GVC. Organisational innovations mapped at the Hungarian and German automotive firms fall into the category of incremental and architectural innovations. However, only the *Integrated project team* is focused on cutting through the organisational ‘silos’ between functional units. The longer term perspective may result in a shift in the existing balance of interest and power relations, thereby affecting transforming of both the quality of work and employment conditions. In translating these major forms of innovation into the language of organisational learning, the incremental forms of innovations require a single-loop or first-level mode of learning, and radical innovation represents a double-loop or second level (holistic) form of organisational learning.

Comparing the knowledge mobilisation and commercialisation practices of the four firms investigated, the following firm’ capabilities could be identified (Schienstock and Hamalainen, 2001:16):

- HU-T-PLASZTIK can be characterised as a ‘Reactive firm’. The implementation of an *IT based manufacturing system* indicates significant potential in knowledge application and commercialisation capabilities.
- The organisational innovations implemented at *GER-SUPPLIER*, *HU-SUBSIDIARY* and *HU-GLOBAL PARTS SUPPLIER* illustrates an impressive knowledge creation, development and sharing capabilities. These firms have the quality of the so-called ‘proactive firms’.
- Finally, *GER-SUPPLIER*’s implemented *Integrated project team* could be interpreted as an attempt to develop capabilities to anticipate future knowledge development. Comparing the cases this firm

is fairly advanced in creating and generating human and organisational (managerial) resources to succeed as an 'entrepreneurial firm' in the future.

4 Concluding remarks

Overall, we find that although the automotive industry is one of the most globalised economic sectors characterised by enormous competition, continuous cost-cutting efforts and extensive use of technology at all levels of the GVC, the majority of the innovations investigated in the case studies contributed to improving job quality at these workplaces to different degrees. The management's interest in mobilising and sharing the knowledge of rank-and-file employees has often led to a more inclusive and participative work organisation model in which employees may join in to improve their everyday working practices. In these cases, organisational innovation can be seen as a lever of job quality, although often at the expense of increased workload. It is even more surprising as the 'automation anxiety' is on the rise in the sector. The case of GER-SUPPLIER was especially interesting because they were seeking to gain additional competitive advantage by using the ideas of their employees and by optimizing production based on 'smart use of manual work' instead of investing large amounts of money into less flexible machinery. It seems that the increasing needs for flexibility, together with knowledge intensive character of the work may represent significant limits for automation. The cases of the Ideenbörse and the quality circles showed similar experiences. They indicate that the control of and the knowledge about production processes is still a strategically important resource to be generated. Presently, it is limited because of increasingly smaller production batches, shorter delivery times, and a sharp price based competition which continuously force automotive companies to increasingly manage contradictory objectives, and look for good solutions and compromises by applying available production knowledge.

On the other end of the scale, we found in the case of the 3rd Tier Hungarian supplier HU-T-PLASZTIK, the implementation of a new IT-based management system significantly decreased the autonomy of the employees. This is partly because standardised and widely automated work itself requires less knowledge-intensive activities regularly, and partly because the firm is a relatively new player in this sector and has a less sophisticated work organisation model. The new management system can be seen as a first step in this regard, and it seems to be a necessary precondition of further business development in the future (if the growth will go on as before). This way, it may contribute to a further growth in employment.

Finally, in relation with the impacts of digitisation it is worth stressing the recent trend of the IT companies such as Tesla and Google emerging in the car manufacturing sector as well as the move of automotive manufacturers to offer new services using IT (BMAS, 2017). This was well illustrated by the GER-CARSHARING case study, which indicates that the lines blurring between manufacturing and services and the movement of firms into new markets are driven not only by the digitisation but by the consumer preferences and the societal values too.

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6 List of Case Study Reports and Industry Profiles

Case studies	
GER-CARSHARING	Kümmerling, A. (2017): German Car-sharing company. Traditional car-sharing companies between ‘green niche’ and professionalisation. Case study report for WP6 of the QulnnE project. Unpublished Manuscript.
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HU-T-PLASZTIK	Szentesi, I., Illéssy, M. And Makó, Cs. (2017). <i>IT-based management innovation: formalisation of production information system. The case of a family-owned auto-parts supplier.</i> Case study report for WP6 of the QulnnE project. Unpublished Manuscript.
HU-SUBSIDIARY	Borbély, A., Makó, Cs. and Illéssy, M. (2017). <i>Hungarian subsidiary of a global automotive company: Ideenbörse as an example for ‘Doing-Using-Interacting’ (DUI) Innovation.</i> Case study report for WP6 of the QulnnE project. Unpublished Manuscript.
HU-GLOBAL PARTS SUPPLIER	Losonci, D., F. Tóth, A, Makó, Cs. and Illéssy, M. (2017): Quality Circle as an example for ‘Employee-Driven-Innovation’ (EDI). A Hungarian subsidiary of a global automotive supplier group. Case study report for WP6 of the QulnnE project. Unpublished Manuscript.
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