IJARBM – International Journal of Applied Research in Business and Management
Vol. 02 / Issue 02, pp. 23-38, December 2021
ISSN: 2700-8983 | an Open Access Journal by Wohllebe & Ross Publishing

This paper is available online at
www.ijarbm.org

Kaizen in Automotive Innovation: How the Hungarian Automotive Clusters Can Profit From the Adoption of Kaizen Principles

A Literature Review of the Central European Automotive Industry

Laszlo Hammerl
hammerl.laszlo@phd.uni-szie.hu
MATE- Kaposvár Campus

Dennis Weber
weber.dennis@phd.uni-szie.hu
MATE- Kaposvár Campus

Anh Don Ton
ton.anh.don@phd.uni-szie.hu
MATE- Kaposvár Campus

https://doi.org/10.51137/ijarbm.2021.2.2.3

Abstract – Due to historical, political, and cultural similarities the Central European (CE) domestic market grew to one of the closest and most integrated economic networks of the world. Sharing the necessary technological competencies and resources, industries like the automotive industry arose to cross-bordering ecosystems. In contrast to the supply chains of other consumer goods, Hungary established a suitable environment to become dominant in the primary industry of manufacturing rather than a sole cost-reducing supplier. However, the analysis of current organizational framework of operating automotive enterprises in CE highlighted, that long existing concepts like Kaizen are still not tailored into the day-to-day business concept. Consequently, competitors from other hemispheres might have an impactful market advantage. Thus, the purpose of this paper focuses on the barriers of implementing said organizational changes and identifying necessary steps towards internal reorganisation in Hungary while keeping the security of known and long-established structures alike. By analysing the experiences of neighbouring countries which are also part of the CE supply chain, critical factors are revealed. The findings of the paper elaborate on the positive long-term effects of Kaizen for this specific industrial sector as well as drafting a recommended innovation roadmap for the Hungarian automotive innovation.

Keywords – Organization, Innovation, Hungary, Central Europe

IJARBM – International Journal of Applied Research in Business and Management
Vol. 02 / Issue 02, pp. 23-38, December 2021
ISSN: 2700-8983 | an Open Access Journal by Wohllebe & Ross Publishing

This paper is available online at
www.ijarbm.org

1 Introduction

The industrial sector of the Central European automotive manufacturing is manifested by a long tradition of few established competitors and high market entry barriers. These formerly middle-sized businesses expanded to international enterprises, offering a diverse range of products and services in the mobility and financial segment. The thorough protection of domestic assets, beginning in the 20th century and lasting to this day, results in an extensive laissez-faire policy regarding governmental regulations (Dmytriiev et al., 2019). Consequently, the successful market launch of new automotive products is not implicitly accompanied by long lasting radical scientific insights. This perception of innovation shaped the strategic decision making, as automotive manufacturers and especially their accompanying suppliers adopted the philosophy of incremental innovation, fearing the lack of demand and interest in certain capital-intensive research projects (Kshirsagar et al., 2014).

Since the liberation of European markets after the Cold war, many (from a political definition) Eastern European countries became potential markets and manufacturing hubs for a range of industrial sectors. Hungary, having a long and deep industrial, cultural, and infrastructural interconnectivity in Central Europe, quickly gained the attention of Central European, mostly German, automotive manufacturers, due to the proximity, the labour force and the FDI promoting local administration. Consequently, many Hungarian cities, most notably Kecskemét, Győr and soon Debrecen established headquarters, going so far as surpassing the production capabilities at their original bases (Audi Hungaria Zrt., n.d.). To promote synergy between local institutions and reduce both complexity, costs, and disruptive factors, the concept of regionally interconnected industrial centres, so-called innovation clusters, were established (Danieles, 2017).

The rising political importance of ecological and ethical sustainability resulted in strict regulations on the automotive industry, most prominently issued by the European Commission. Long-lasting legal setbacks and the rising market share of external manufacturers from overseas compelled the European automotive industry to realize the potential of new technologies. Still entangled with the strategy of low risk, but secure reward, the hesitation of said manufacturers was revealed, who instead of radical change agitated for a slow and controlled change of business (Wengel & Shapira, 2004).

The necessary organizational framework of slow, but steady organizational restructuring from within, might be crucial for a prospective enterprise-wide approach to innovation. Said concept is associated with the Japanese concept of Kaizen which gained a lot of popularity in the 1990's. European companies acknowledged the positive effects of the concept early on, nevertheless, the learnings were only partially applied. This paper discusses whether the organizational model of Kaizen could help introduce successful product innovations on the consumer market, while maintaining or even expanding market shares and avoiding the risks of radical innovation.

2 Methodology

The literature review starts with evaluating the development and effects of the Kaizen concept, essentially defining its principles, starting from the origins up to the status quo. The databases ResearchGate and ScienceDirect were screened for the keyword “KAIZEN automotive”, solely focusing on characteristics of said concept.

To ensure the successful implementation the emerging necessity of individual adjustment to the local and regional framework is a key requirement. Hence, the characteristics of the Central European automotive ecosystems in neighbouring countries of Hungary are discussed, focusing extensively on the role and output of small and medium enterprises and their relevance for long-term innovation. Evaluated research data concentrated on aspects of “Central European Automotive KAIZEN” as well as individual focus on “Hungarian automotive organization”.

The internal research culture of automotive manufacturers causes the measurability of their insights to be hidden in their first stage. Due to the quite recent establishment of automotive production, supplying and research in the Carpathian basin, the geographic neighbours of the Hungarian automotive industry, namely the Austrian and the Romanian enterprises, were analysed, focusing on “Austrian Automotive Kaizen” and “Romanian Automotive Kaizen”, respectively. Other neighbouring countries with automotive history like the Czech Republic, Slovakia and Poland were also taken into consideration, however, did not yield enough research insights or focused on different approaches regarding automotive development.

Lastly the concept of innovation was integrated, as organizational changes directly influence the innovativeness of the whole enterprise. Keywords included “Hungarian automotive innovation”, “Central European Automotive innovation” and similar. Seldomly, public information was used to underline basic statements, as the high up-to-dateness of certain developments is not reflected in publicly esteemed research yet.

3 Literature Analysis

3.1 Concept of Kaizen

The concept of Kaizen originated from the Japanese manufacturing concept of improving the current operational sequences steadily. Instead of uncoordinated and sudden drastic changes, small, but significant changes should be enabled continuously. This change of handling organizational change is acknowledged to be a good foundation for succeeding and keeping a competitive benefit in unforeseeable and insecure economic developments. For strategic success, communication and enterprise-wide understanding and support of the proposed strategy is essential. Moreover, the implementation of monitoring and measuring systems is mandatory, to sup-

port the establishing of new changes while simultaneously ensuring the adaptation for future projects (Bessant & Francis, 1999).

To guarantee a successful business cycle following the principles of kaizen, all involved personnel of a company are coordinated to stop their current tasks as soon as they encounter any misbehaviour or unwanted process. Instead of a solution proposed and enforced by upper management, the employee and his team are getting together to suggest an improvement or resolution countering the current negative event. The founding fathers of kaizen anticipated the model to be implemented in the daily life and everyday thinking of the stakeholders, not just as a workplace principal. The improvement of customer needs and requirements is seen as the final aspiration (Helmold, 2020).

The key qualitative attribute to support such incremental changes is the build-up of necessary tools and human resources. Instead of simple acquisitions of assets like purchasing innovative or successful enterprises, kaizen emphasizes the internal establishment of an individual company-ecosystem of continuous improvement (CI). This integration of new and adequate changes requires a multidimensional and multi-layered communication network, including aims and sub-goals for all stakeholders. The decisive parameter for the success of kaizen is the effectiveness of pre-event communication to share all future aims in the enterprise. These aims are tied to learning processes, achieved individually through specific training measures to the staff, which is organized and CI groups with identified and measurable targets (Doolen et al., 2008).

To further promote the support of idea management systems, potential ideas are split into different categories. All these measures need to be adopted to an enterprise-wide routine to result in long-lasting effects.

These categories include:

- accepted and officially recognized improvements, which cannot be put in effect immediately
- ideas, which are considered and carried out immediately
- ideas, that need the support of specific experts
- ideas, which surpass the smaller structure of CI groups and need a reorganization and integration of multiple groups

To increase the efforts of every individual to contribute to an effective kaizen approach, tribute systems, including awards or other appreciations need to be established. The recognition of a suggestion is proposed to a committee, which then ranks the proposal into the mentioned categories and evaluates the possible positive economic benefit the company receives through the change. Besides monetary profit, the change of current processes also results in simpler and faster work processes for all members of the organization.

A case study of a Japanese conglomerate in automotive manufacturing, which adapted the principles of kaizen Burnes (2004) identified that the methodical approach of Kaizen is split up into a multitude of so-called action spaces. The operative business is kept in check by daily reviews, which in-

clude the local representative to question and intervene the current business flow and identify potential improvements. Simultaneously the individual teams are subdivided into task forces (so-called “quality circles”), scheduled with direct and specific quality-orientated assignments. Exemplary assignments are kept in one-point-lessons and would be inspired by “zero-orientation”, interweaving concepts of zero waste, zero accidents, zero deficient products into permanent policies. Defining the right questions is crucial for the successful decision making inside the team, therefore issues are resolved differently to the more common practice. Instead of identifying the responsibility or interpersonal debates, all focus is put on the resolving of nuisance. With the support of predefined principles, a simple action framework is put into place (Helmold, 2020).

This step-by-step approach ensures that change is implemented constantly and slowly, rather than radically, effectively avoiding the potential administrative chaos or uncertainty among the workforces.

Further development in the management concept of kaizen emphasizes the crucial necessity of clear targets. The sudden and emergent realization of companies to implement radical change results in over 60% of change management efforts to fail. The lack of clarity, whether changes should or even can be planned or should rather follow a “learning by doing” mentality is predetermined to lead to a failure of impactful internal change. Especially radical changes, which shall be implemented in short time frames, prove to be a lot more destructive than maintaining the current strategy.

The concept of kaizen proposes a well-balanced approach, where emergent and radical changes complement the slow and planned strategy. To be open to rethinking concepts, open-ended experimental projects are put on the agenda. Leaders and specialists often find themselves difficult with a change in their decision-making behaviour. Innovating the conceptualization and handling of occurring events by leaving the traditional path increases the willingness for change as a bottom-up strategy. The dismantlement of strict boundaries allows the modification of structures inside the organization and consequently the enterprise culture.

Nevertheless, the strategic concept of change shall not be undermined. As emergent change is often local and not applied to the complete enterprise, mechanics must be introduced to ensure an organization-wide approach. This revolves around quick and coordinated mechanisms that involve the majority of employees and counting on their (previously gained) support. This last step takes significant intuition, as social, legal, and cultural shifts vary from department to department. Through the synergy between untamed and controlled actions of change the proposed concept of kaizen can adapt to all prospective entrepreneurial and market challenges (Burnes, 2004).

The described approach is highly dependent on the interactivity and commitment of the staff, further supported by regular motivation events and rewards for voluntary sign-up. All these measures open huge long-term profits for the company, as all members are trained on the same level of

knowledge, while facilitating individual input and concepts to boost the overall effectiveness. The build-up of lasting core competencies further helps building up unique selling points (Aoki, 2008). Accomplishing the mindset and securing the support and readiness during the whole internal supply chain, improves the stability and resistance against external disruption while integrating modern human resource concepts like work-life-balance approaches and similar. Consequently, internal social securities can be established as every single upskilled employee concentrates and generates irreplaceable knowledge, which is fundamentally necessary for the innovation capability of the said enterprise. Additionally, manufacturing expense factors can be fundamentally decreased, as both labour productivity and the risk of error margins can be diminished (Chapman et al., 1997).

The general concepts of kaizen are commonly known and established among manufacturing industries, however there is no strictly defined code of practice, how to implement all mechanics into an already established enterprise with multiple headquarters worldwide. As a result, the mentioned processes are mostly only partially and company-exclusively developed. Often the concept boundaries of total quality management (TQM) and kaizen are not distinguished very precisely either (Brunet & New, 2003). Additionally, both TQM and kaizen do not offer direct, short time effects on financial metrics like return on assets or earnings on shareholder value. This vagueness can quickly result in a misjudgement of the effectiveness of kaizen and similar, as short-term financial gains are receiving larger focuses than long-term internal growth. The rise of conflicting interest peaks into a daily paralyzing disorientation between external demands for higher performance and internal attempts of incremental change. Missing immediate benchmarks in the department of sales and margins often lead to the definitive discard of further kaizen led projects (Chapman et al., 1997).

3.2 European Automotive Suppliers and Their Way of Implementing Kaizen

Originating from the Japanese automotive manufacturing environment, Kaizen was quickly identified as a recognizable competitive edge over traditionally operating German manufacturers (de Meyer, 1998). Additionally, automotive suppliers gained a dominant role in the matter of development of innovative technical components and the cross functionality among them. The legal, social, and economic demand for new products, especially in hybrid and pure electric propulsion, demanded high level expertise. These areas of investment were untapped by the German automotive industry for a long time, which promoted the development of established technologies like Diesel propulsion.

The market of European automotive suppliers is shared by a huge variety of small and medium sized enterprises (SMEs), that all specialize on very distinctive and concrete mobility solutions, rather than on a wide range of products. The dependence on the demand of their few, but profitable Ger-

IJARBM – International Journal of Applied Research in Business and Management
Vol. 02 / Issue 02, pp. 23-38, December 2021
ISSN: 2700-8983 | an Open Access Journal by Wohllebe & Ross Publishing

This paper is available online at
www.ijarbm.org

man customers (namely Daimler, BMW, and Volkswagen) impacted the corporate culture of these SMEs permanently and results in a dependence asymmetry (Ma et al., 2021). Short-term profitability became the dominant and decisive strategy. Nevertheless, these SMEs are facing the same radical changes of market behaviour as their customers. The danger of mismanagement or bankruptcy has an even more destructive potential on their business, as they are not capable of enduring long terms of profit loss- both due to the general cost-value ratio of SMEs and the high peer pressure exercised by the market dominance of their customers.

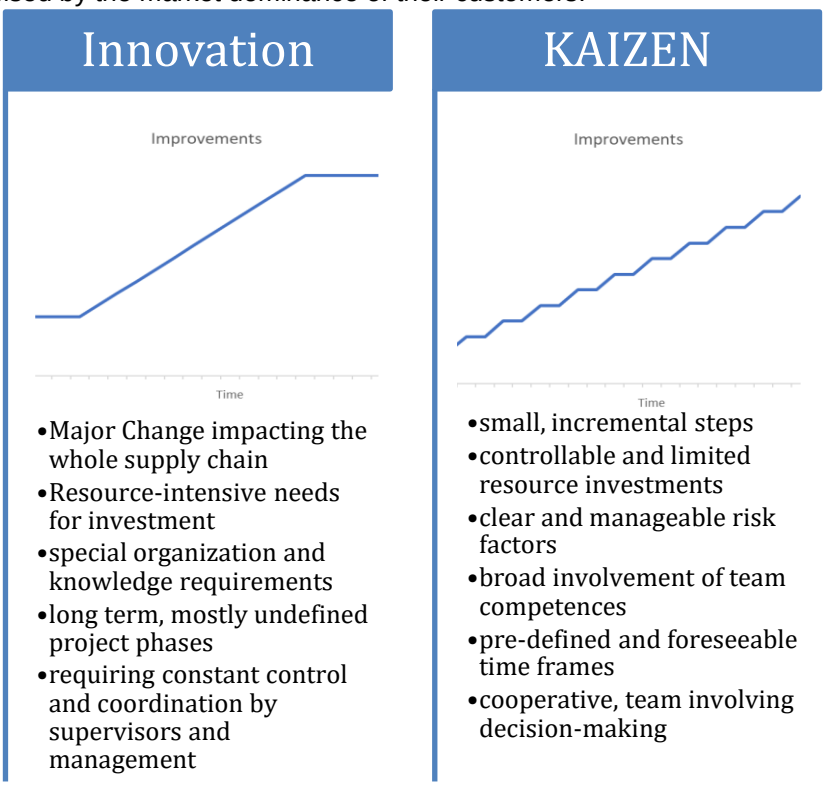

Figure 1: Difference between classic innovation and KAIZEN, own table, content graphics based on the research of Helmold, 2020

From the view of innovation management SMEs involved in the automotive sector exclusively concentrate on product innovations. These result in new, technically innovative product solutions that offer a high chance of financially successful retail. Main drivers are temporary technological monopolies through pioneering profits. As Helmold (2020) points out (Figure 1) the classic concept of innovation is seen as a combination of amplified changes, resulting in high financial costs and potential risks of permanent, long lasting negative effects.

So-called process innovations, which question the status quo of processes and decision-making inside the company are seldomly assessed, as they are falsely deemed not pivotal enough to make an impact (Simms et al., 2021). Consequently, SMEs evaluate strategic reorientations as high risks. This false conclusion can result in a fatal development, where every new product design determines whether the company will be sustainable or fail in the long run. The implementation of organizational approaches like Kaizen are urgently advisable, as they reduce the pressure to perform from single product projects to the organization, which involves more knowledge, risk assessment and a higher chance for both incremental and radical innovation inside the strict boundaries of automotive economics. Meanwhile social dangers, provoked through recessions, like short-time work or labour leasing are reduced as employees are not seen as mere cost factors but as highly valuable assets generating unique innovation inside the company (Veres et al., 2018).

Kaizen, as one of the leading process innovations already applied by the original equipment manufacturers (OEM), promotes a solution-based manner, whereby the innovative thinking is applied via a holistic approach all along the supply chain (Bashkite et al., 2014).

3.3 The Role of Innovation in Central European Automotive SMEs

To analyse the potential of Kaizen upon the recently established knowhow-rich industry of automotive manufacturing in Hungary, it is essential to look at neighbouring European partners, already familiar within this business field. Hereinafter two case studies of SMEs involved in the automotive sector are presented.

3.3.1 The Austrian Automotive SMEs

The Austrian automotive commitment quantified with ca. 17 billion € of business volume in 2018, is mainly relying on supplying the German OEMs, closely located in Southern Germany. The infrastructural proximity and formerly lower net income in Austria facilitated the restructuring of many existing Austrian businesses to diversify their product portfolio in the sectors of synthetics, textiles, and rubber. This concept resulted in Austria developing into a so-called extended workbench, meaning that all strategic decisions are made by the external OEMs outside of the national borders. Binding around 75.000 unionized workers, this sector is the second most important industrial cornerstone of the Austrian economy (Statista, 2019/2020).

Due to strict social regulations, a sudden and disruptive change of production could inquire for a complete reorientation. Furthermore, this might result in an immediate halt of current manufacturing projects, as most local businesses are relying on the current technological level of combustion engines. While a total conversion of the manufacturing commodities regarding social and ecological terms is requested from parts of society and some political

institutions alike, a strictly ecologically compatible and sustainable strategy contradicts the present profit-orientated system. The high importance of the automotive sector for the Austrian gross domestic product causes the automotive industry to face the potential conflicts emerging from the different economic, employment and ecological policies and interests. Additionally, the high dependency from the German OEMs severely limits the negotiating power of said suppliers. The marginal amount of end customers forces the SMEs to comply with the strict dictated requisitions. This power asymmetry hinders the possibility of free development into other business fields and the large amount of supplier competition can quickly result in a loss of new orders (Ludwig & Simon, 2019).

Lastly, the high commitment of incremental technological innovation reduces the willingness and the openness to adapt completely new products. Lock-in effects arise through the sheer number of efforts already put in a specific technological field. As a result, many managements refuse to acknowledge the pursuit of complete restructuring of mobility, especially of social and environmental origin, in fear of being “stuck in the middle”, possibly ending in a jack of all trades, but outcompeted by smaller but more developed rivals (Pichler et al., 2021).

The case study of Högelsberger et al. (2020) concluded the following pains and the possible gain of Austrian automotive SMEs regarding radical innovation (Table 1).

Table 1: Obstacles of successful Kaizen in the Austrian automotive SME environment

Limiting factor: lack of perspective for new technologies in the management
- social employment protection
- high confidence in ecological modernization of combustion technology

- supposedly high potential for optimization
  - disbelief in extensive mobility turnaround
  - strategic transformation should only take place incrementally and inside the current technology branch

- fear of workforce dismissal due to loss of manufacturing complexity   - protections of qualifications and know-how
- social insecurity: current customer segments might not approve the new product
- New technologies seen as complementary product rather than as a substitute

3.3.2 The Romanian Automotive SMEs

Romania offers a long tradition of automotive manufacturing since the 2nd half of the 20th century. After the collapse of the Eastern Bloc many western European manufacturers showed deep interest in the production plants and the adjacent know-how and manpower. Similar to other EU countries, the Romanian government restructured its long-term energetic strategies in fa-

vour of promoting both the production as well as the consumption towards revolutionary electric vehicles (Varga, 2013).

Popescu (2015) analysed how cross-border EU cooperation in the automotive sector can succeed with the Kaizen and compete on an international level against economic and structural challenges. With the concept of Kaizen, obstacles like cultural gaps could be overcome and with the quick access to foreign know-how the new fusion could have a competitive edge over the local competitors. Further strategic and organizational models could be accessed and implemented; concepts originating from Japanese automotive manufacturing, like lean thinking and the adoption of the 5S model could be built upon the Kaizen fundament.

Latest methods and concepts, originating from the principles of Kaizen highlight the potential in Romanian companies' event today, as straightforward and easily implementable changes in the daily business procedure increased the material efficiency, reduced waste, drastically reduced the space and time budget necessary while still increasing the productive efficiency by a considerable rate (Ioana et al., 2020). New projects were conceptualized and finished in short time frames with significant boosts of performance, resulting in lower costs and higher quality. While corporate culture and philosophy endanger the development through the newly established Kaizen principles, a high level of commitment and communication proved essential to cope with rising challenges.

4 Kaizen as a Possible Solution for Hungarian Automotive SMEs

The experiences gathered by the businesses of neighbouring countries of Hungary proved that the concept of Kaizen is a crucial technique to progress through technological innovation while still maintaining the know-how and human resources acquired, bound, and developed throughout the decades. While the Hungarian automotive industry already surpassed the mentioned sectors in other countries in a time frame of less than a decade (HIPA, 2019), it also evident, that the Hungarian promotion of trade and industry administers the ever-growing foreign direct investments to become a long-lasting and organically growing industry in Central Europe. Through combined efforts in infrastructure, education, research, going so far as to incorporate nation-wide, partially self-sufficient innovation clusters, the innovation potential is deemed higher than in neighbouring economies (Szabo & Fabok, 2020).

Through the large number of new share- and stakeholders the proposals, how to successfully integrate Kaizen for radical technological innovations while still maintaining the incremental organizational structure inside the enterprise, towards democratization during the strategic decision-making is evaluated as a lesser threat. Instead of extended workbenches, Hungary managed to follow an individual approach and not become a partner for out-

sourcing through lost-cost labour alone, but rather an own, self-functioning part of the automotive supply chain, reaching so far, to develop and produce independently, and not just supply the German OEMs. Simultaneously the scale of manufacturing, research, and development outreach to all neighbouring countries, becoming an integral part of the European automotive industry.

Högelsberger et al. (2020) propose that a supply chain wide reorientation from inside out is only possible through a radical change in internal decision making. This approach embraces the direct interaction of all participants inside the company to allow change daily. The attribute of being a supplier might foster this development, if the SME is native in a specific technology, circumventing the danger of being replaced by its few customers. Becoming participants in a recently established industry, however, break up the traditional view on change and could further improve the innovation capability of Hungarian automotive SMEs. Moreover, modern supply chains rely on real time deliveries (Just-in-Time or Just-in Sequence concepts), to minimize inventory costs. Sudden disruptions, like the shortage of materials and labour, inside the manufacturing clusters have long lasting effects on the production plans of OEMs, forcing them to allow a certain co-determination from the SMEs (Ibn-Mohammed et al., 2021).

These mentioned unique selling propositions allow an adequate foundation for the implementation of Kaizen and complementing theories of lean management. Through combined efforts of innovation by the three main actors of innovation (Malerba & Mani, 2009) the Hungarian automotive suppliers can achieve higher value creation while consequently becoming leading in the research of innovation.

5 Summary and Conclusion

The concept of Kaizen as an influential decision-making model in organization has been introduced and adapted by Japanese automotive manufacturers for decades now. Still, European competitors struggle to adequately incorporate incremental change management into their operating businesses. Still, radical innovation, mostly caused due to radical or disruptive technological invention, is seen as a huge threat to the current key resources like financial, know-how and human resource assets, that would potentially cease the company's operations permanently. The fear of failed investments, sunken costs and consequently the need for public Europe-wide stagnation effects hamper the adoption of radical advancements.

This paper identified that Kaizen could help stabilize the organizational framework, by allowing fast paced and emergent change and decision-making, while still being monitored and directed by the management. Through democratization in the strategic decision making, the know-how and support of all members of the organization structure are guaranteed, allowing multidisciplinary and aimed radical idea generation from the bottom of the company rather than the traditional top-down way of innovation. Addi-

tional small, but impactful changes, radical shifts in social, political, and economic changes can be absorbed and adopted faster and with reduced losses compared to traditional adaptation. These efforts result in a lower resource consumption, higher production efficiency and thereby in long-lasting internal cost-cutting.

Like their Western and Eastern neighbours Hungary invested heavily, both capital- and legislation-wise in the automotive sector, potentially facing devastating regression if not building up the necessary resilience and self-assurance to question the status-quo. However, in contrast to their European partners, Hungary managed to build up a partially self-sustaining industry, not solely relying on just supplying parts and services, but rather manufacturing frameworks, systems, and even final goods, sold, and shipped world-wide. Through this diversification the Hungarian automotive industry offers a unique potential of capturing radical innovation with the help of institutions, governmental support and the local society and thereby further complementing their product portfolio, rather than merely being an extended workbench.

Nonetheless, certain external aspects of the Central European automotive industry were not picked out as central themes and are considered as limitation of this paper. In particular the danger of further external financial pressure might take a heavy toll on the newly established industry in the Carpathian basin. Certain automotive brands already experiment with further cost-cutting projects, looking to move their bases of operation to Eastern locations like Turkey or Ukraine. Additionally, new competitors arise, as Chinese investments in automotive projects move to neighbouring regions like the Balkans, pursuing different strategic and technological approaches. Lastly, from an internal point of view, the high economic effects of afore mentioned automotive clusters overshadow the social and political costs and developments, which Hungary has gone through in the last decade. Thus, the overall innovation costs and yields need to be evaluated differently.

6 Authors

Laszlo Hammerl is a Ph.D. student at the Magyar Agrár és Élettudományi Egyetem (MATE), formerly known as the Szent István University – Kaposvár Campus. His doctoral research focuses on the aspect of innovation in the German automotive industry and thereby evaluate, how hydrogen propulsion can become a meaningful alternative for customers in Central Europe.

Dennis Weber is a Ph.D. student at MATE and the scope of his research includes the applied artificial intelligence in the heavy industry in Germany.

Anh Don Ton is a Ph.D. student at MATE and has recently studied the interdependencies of cross-functional teams in terms of competition and cooperation (coopetition) in economic enterprises.

7 References

Aoki, K. (2008). Transferring Japanese kaizen activities to overseas plants in China. *International Journal of Operations and Production Management*, *28*(6), 518–539. https://doi.org/10.1108/01443570810875340

Audi Hungaria Zrt (n.d.). Motorenproduktion. Retrieved July 28, 2021, from https://audi.hu/de/profil/motorenproduktion/

Bashkite, V., Karaulova, T., & Starodubtseva, O. (2014). Framework for Innovation-oriented Product End-of-life Strategies Development. *Procedia Engineering*, *69*, 526–535. https://doi.org/10.1016/J.PROENG.2014.03.022

Bessant, J., & Francis, D. (1999). Developing strategic continuous improvement capability. *International Journal of Operations and Production Management*, *19*(11), 1106–1119. https://doi.org/10.1108/01443579910291032

Brunet, A. P., & New, S. (2003). Kaizen in Japan: An empirical study. *International Journal of Operations and Production Management*, *23*(11–12), 1426–1446. https://doi.org/10.1108/01443570310506704

Burnes, B. (2004). Emergent change and planned change - Competitors or allies? The case of XYZ construction. *International Journal of Operations and Production Management*, *24*(9), 886–902. https://doi.org/10.1108/01443570410552108

Chapman, R. L., Murray, P. C., & Mellor, R. (1997). Strategic quality management and financial performance indicators. *International Journal of Quality and Reliability Management*, *14*(4), 432–448. https://doi.org/10.1108/02656719710170675

Danieles, A. (2017). Evolution of cluster policy in Hungary - 2000-2020. Retrieved July 28, 2021, from https://clustercollaboration.eu/news/evolution-cluster-policy-hungary-2000-2020

de Meyer, A. (1998). Manufacturing operations in Europe: Where do we go next? *European Management Journal*, *16*(3), 262–271. https://doi.org/10.1016/S0263-2373(98)00003-6

Dmytriiev, I. A., Shevchenko, I. Yu., Kudryavtsev, V. M., Lushnikova, O. M., & Zhytnik, T. S. (2019). The World Experience and a Unified Model for Government Regulation of Development of the Automotive Industry. PUBLIC POLICY AND ADMINISTRATION, 18(3), 46–58. https://repository.mruni.eu/handle/007/16042

Doolen, T. L., van Aken, E. M., Farris, J. A., Worley, J. M., & Huwe, J. (2008). Kaizen events and organizational performance: A field study. *International Journal of Productivity and Performance Management*, *57*(8), 637–658. https://doi.org/10.1108/17410400810916062

Helmold, M. (2020). *Lean Management and Kaizen*. Springer International Publishing. https://doi.org/10.1007/978-3-030-46981-8

HIPA, H. I. P. A. (2019). *Automotive Industry in Hungary*. https://hipa.hu/main

Ibn-Mohammed, T., Mustapha, K. B., Godsell, J., Adamu, Z., Babatunde, K. A., Akintade, D. D., Acquaye, A., Fujii, H., Ndiaye, M. M., Yamoah, F. A., & Koh, S. C. L. (2021). A critical analysis of the impacts of COVID-19 on the global economy and ecosystems and opportunities for circular economy strategies. *Resources, Conservation and Recycling*, *164*, 105169. https://doi.org/10.1016/J.RESCONREC.2020.105169

Ioana, A. D., Maria, E. D., & Cristina, V. (2020). Case Study Regarding the Implementation of One-Piece Flow Line in Automotive Company. *Procedia Manufacturing*, 46, 244–248. https://doi.org/10.1016/J.PROMFG.2020.03.036

Kshirsagar, Manoj & Teli, Shamanand & Gaikwad, L. & Dept, Engg & Scoe, & Kharghar, Navi & Mumbai, & Maharashtra, & Professor, Asst & Engg, Mech & Dept, & Bvcoe, & Belpada, Navi. (2014). Analyzing Supplier Selection with Lean Philosophy: A Review. 2. 70-75.

Ludwig, C., & Simon, H. (2019). *Solidarität statt Standortkonkurrenz. Transnationale Gewerkschaftspolitik entlang der globalen Automobil-Wertschöpfungskette* (pp. 198–212).

Ma, S., Hofer, A. R., & Aloysius, J. (2021). Supplier dependence asymmetry and investment in innovation: The role of psychological uncertainty. *Journal of Purchasing and Supply Management*, 27(2), 100674. https://doi.org/10.1016/J.PURSUP.2021.100674

Malerba, F., & Mani, S. (2009). *Sectoral Systems of Innovation and Production in Developing Countries*. Edward Elgar Publishing. https://doi.org/10.4337/9781849802185

Pichler, M., Krenmayr, N., Schneider, E., & Brand, U. (2021). EU industrial policy: Between modernization and transformation of the automotive industry. *Environmental Innovation and Societal Transitions*, 38, 140–152. https://doi.org/10.1016/J.EIST.2020.12.002

Popescu, D. (2015). Kaizen-driven approach while managing industrial projects. A scandinavian company succeeds in Eastern Europe. *Management and Pro-*

duction Engineering Review, *6*(1), 26–35. https://doi.org/10.1515/mper-2015-0005

Simms, C., Frishammar, J., & Ford, N. (2021). The front end in radical process innovation projects: Sources of knowledge problems and coping mechanisms. *Technovation*, 105, 102214. https://doi.org/10.1016/J.TECHNOVATION.2020.102214

Statista. (n.d.). *Österreich - Umsatz der Industrie nach Fachverband 2019 | Statista*. 2019/2020. Retrieved October 29, 2020, from https://de.statista.com/statistik/daten/studie/1022817/umfrage/umsatz-der-industrie-in-oesterreich-nach-fachverband/

Szabo, J., & Fabok, M. (2020). Infrastructures and state-building: Comparing the energy politics of the European Commission with the governments of Hungary and Poland. Energy Policy, 138, 111253. https://doi.org/10.1016/J.ENPOL.2020.111253

Varga, B. O. (2013). Electric vehicles, primary energy sources and CO2 emissions: Romanian case study. Energy, 49(1), 61–70. https://doi.org/10.1016/J.ENERGY.2012.10.036

Veres, C., Marian, L., Moica, S., & Al-Akel, K. (2018). Case study concerning 5S method impact in an automotive company. Procedia Manufacturing, 22, 900–905. https://doi.org/10.1016/J.PROMFG.2018.03.127

Wengel, J., & Shapira, P. (2004). Machine tools: The remaking of a traditional sectoral innovation system. In *Sectoral Systems of Innovation: Concepts, Issues and Analyses of Six Major Sectors in Europe* (pp. 243–286). Cambridge University Press. https://doi.org/10.1017/CBO9780511493270.008