Quality of jobs and
Innovation generated
Employment outcomes

QuInnE.eu

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MPT: Management Decision-Making at an Automotive Parts Supplier

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QuInnE - ***Qu**ality of jobs and **Inn**ovation generated **E**mployment outcomes* - was an interdisciplinary project investigating how job quality and innovation mutually impact each other, and the effects this has on job creation and the quality of these jobs.

Drawing on the Oslo Manual, both technological and non-technological innovation were investigated. Through quantitative analyses and qualitative organization-level case studies, the factors, as well as the mechanisms and processes by which job quality and innovation impact each other were identified.

The QuInnE project brought together a multidisciplinary team of experts from nine partner institutions across seven European countries.

QuInnE Project Member Institutions:

- *Lund University, Sweden*
- *The University of Warwick, UK*
- *Universitaet Duisberg-Essen, Germany*
- *Centre Pour La Recherche Economique Et Ses Applications (CEPREMAP), France*
- *Magyar Tudomanyos Akademia Tarsadalomtudomanyi Kutatokozpont, Hungary*
- *Universiteit van Amsterdam, The Netherlands*
- *Erasmus Universiteit Rotterdam, The Netherlands*
- *Universidad de Salamanca, Spain*
- *Malmö University, Sweden*

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The QuInnE teaching cases and teaching notes are based on the confidential field research conducted in the context of the QuInnE project. They are written to provide material for training and class discussion rather than to illustrate either effective or ineffective handling of a management situation. Personal names and identifying information from the research cases have been altered for the purpose of confidentiality. The case studies and teaching notes have been developed in cooperation with RSM Case Development Centre of Rotterdam School of Management, Erasmus University (www.rsm.nl/cdc).

MPT: Management Decision-Making at an Automotive Parts Supplier

Introduction

In October, 2017, Henry Novak, Plant Manager for MPT (Moulded Plastic Technologies), a mid-sized, family-owned, European automotive supplier, walked across the shop floor during his regular 'caravan' morning tour with his senior team. He had an extra reason to be cheerful this morning: the company had recently won another lean production award. Since the global financial crisis, when MPT's family-owners had appointed a new general manager, the company had undergone major restructuring and was slowly making a comeback from the brink of bankruptcy. But with the disruptive changes occurring in the automotive industry, MPT still had a long way to go to secure its future. In particular, executive management was trying to resolve two divisive issues: (1) whether the company make substantial investments in more automated production equipment; and (2) how the company might better respond to RFQs[4] from OEMs[5], as response times and details were often insufficient? Walking around the shop floor, Novak had the answers to both of these questions, and was looking forward to the management meeting later in the day to present his arguments.

Industry Overview

In 2016, 12.6 million Europeans (over 5% of the European workforce) were employed in the automotive industry, of which 3.3 million in automotive manufacturing[6], representing nearly 11% of manufacturing jobs in Europe. The automotive industry was crucial to Europe's global economic leadership position, representing an annual €90Bn in trade surplus. Additionally, the automotive sector was the largest private investor in R&D in Europe, with more than €50Bn invested annually.[7]

But the entire industry was undergoing massive, disruptive change. Looking forward, analysts predicted that by 2025, approximately 25% of new cars would be electric vehicles, and the automotive global value chain (GVC) would be 'turned inside out'. According to one association of car manufacturers, many components

[4] Request for Quotations
[5] Original Equipment Manufacturers, or in this case, car makers
[6] ACEA, European Automobile Manufactureres' Association website, available at: http://www.acea.be/automobile-industry/facts-about-the-industry
[7] Ibid.

in use today, such as drive trains and motors, would lose their importance in the next decade, overshadowed by other electrical parts. Electric vehicles required fewer parts, and these parts would require different competencies in development and production from suppliers.

Looking back over the last two decades, the demand for ever-lower costs had forced European OEMs and suppliers to expand production facilities into lower wage countries, such as those in Eastern Europe. OEMs had been steadily reducing their vertical range of manufacture, from 30-50% to 20% or less. The role of OEMs was increasingly one of supplier management and final assembly, rather than manufacturer.

Concurrently, OEMs were increasingly delegating design and development responsibilities to suppliers, and integrating suppliers earlier in the product development process. Suppliers who could provide R&D services, such as engineering and software development, had gained in importance in the GVC. However, OEMs still dominated the industry, as even when a supplier jointly designed and developed parts and sub-assemblies with the OEM, there was no guarantee that this same supplier would be awarded the production contracts.

Together, the two trends of expansion into lower wage countries, and demand for supplier product development skills, had led to a slow shift eastward, not just of production, but of development competencies, of some major players in the automotive industry. Referring to a large supplier, an industry expert stated: 'The heart of the company is emigrating.' While an automotive company could be highly profitable, individual production plants and development offices in Western Europe were constantly under threat of closure.

Within this tough industrial landscape, automotive suppliers faced increasing demands from OEMs, not only for earlier and greater involvement and responsibility in the product development process, but also for low costs, expected to further decrease over the production cycle. To keep lowering costs, one of the major trends among manufacturing industries in high labour wage countries had been an increase in automation. For mass production of parts, automation worked well: despite high initial investment costs and lengthy lead times to begin production, once production actually started, the length of mass production runs amortized investments and produced substantial savings.

The conditions that OEMs imposed on suppliers included:

- Tenders based on a 'best of best' calculation, using benchmark targets of the lowest costs of competing suppliers across Europe. Target prices that the OEMs were willing to pay left low margins for suppliers with higher wage costs, notably in Western Europe;
- Demands for 'quick savings': calculated productivity increases in the first years of production, which essentially transferred the savings from the suppliers' learning curves to OEMs;
- Shifts of risk toward the supplier: with regards, for example, to production volumes, material prices, and exchange rates. Increasingly, suppliers had to assume responsibility for failure costs, guarantee claims, and liability risks;
- Demands for extended specification sheets for products, as well as for production guarantees and staff representation by the suppliers at certain OEM production sites, even extending to Asian production plants;
- Implementation of an extended system of quality control along the value chain. Most suppliers had quality certifications that were regularly audited by customers and by independent certifiers.

While relying on the innovative capacity of suppliers to an increasing extent, OEMs were also executing restrictive target pricing in tenders and calling for extended cost transparency. Further, to avoid 'single sourcing', and therefore complete dependence on one supplier, OEMs were cooperating with competing suppliers. It was within this contradictory and highly restrictive setting that automotive suppliers were now competing.

Competition

In automotive production, plastics processing was a mature industrial technology, and competition was fierce. As few companies had the dedicated R&D resources and budgets required for technological innovations in this mature product segment, competition could be divided into three groups:

- a small group of large, global suppliers, with extensive financial resources, able to develop technical innovations;

- a larger group of competitors similar to MPT in size, innovative and technical capacity, and financial strength;
- an even larger group of smaller, build-to-spec contract manufacturers', that produced parts designed and developed elsewhere.

Competition also differed based on the sourcing strategies of the customer OEMs. Price was always the primary concern, but some OEMs also looked for specific services or competencies from their suppliers.

Cost pressure was very high, as target prices for most OEMs were calculated based on labour costs of eastern European companies. According to Novak, it was difficult for MPT to win a bid for non-premium products due to its substantially higher labour costs, as well as higher overheads and infrastructure costs. In addition, as some competitors' Eastern European facilities were located at a similar distance as MPT from the major OEM production sites in Europe, transportation costs did not give MPT a competitive advantage. As Novak pointed out: 'If you take a look on a map and you apply a circle of 1000 km around major production sites of our customer OEMs, you'll see that competitors' production sites in the Czech Republic, Slovakia, Hungary, and Austria are within this same range.' The situation was different in the US market, where MPT had its production sites very close to customer OEM plants; accordingly, lower transportation costs would often make a difference in a competitive bid.

OEMs developed vehicle product lines based on automotive 'platforms' -- sets of key mechanical components, such as the underbody and suspension, steering, wheelbase, and powertrain -- on which to build their product lines. This meant that OEMs could produce a limousine, an estate car, a cabriolet, an SUV, and a coupé based on the same platform type. The use of platforms allowed car manufacturers to globalize a product line, by adjusting the non-platform, design-driven modules to appeal to local tastes, and to reap global economies of scale through optimal utilization of manufacturing plants on common platform components. However, as common platforms focused on a car's underbody, suppliers of the 'top hat' portion of the vehicle were faced with an increasing variety in parts required to differentiate car derivatives produced on the same platform. Further, the extra equipment for car interiors had significantly higher profit margins, especially in premium car segments, so OEMs tended to extend interior equipment variations. For MPT, as well as for other suppliers of the design-driven 'top hat' of the vehicle, the great variety of parts to be produced for each platform required batch, not mass, production, which meant longer lead times and reduced economies of scale. The challenge for MPT was now one of flexible delivery and versions of parts while ensuring high quality and production efficiency.

Company Overview and Strategy

MPT produced moulded plastic components for the premium car segment, primarily supplying German, Japanese and US OEMs. As a mid-sized company with a large number of design and development engineers, as well as industry certifications required for quality production, MPT was focused on becoming and remaining a development partner, not just a contract manufacturer, to its customers in the premium car market.

MPT was comprised of three divisions: a production unit, a technical development unit, and general services, encompassing sales, distribution, purchasing, and HR.

Of the several hundred employees working in the production unit, the average age was 45, with nearly 100 employees over the age of 50. MPT had an aging, but highly experienced, workforce.

To remain competitive in such a challenging industry, MPT had defined a set of 4-5 product families in which the company was highly capable. MPT tracked customers and competitors along these main product lines to remain aware of current and potential market developments and opportunities. Its internal efforts focused on coping with demands for product innovation and development, perfect quality, reduced costs, and production globalization.

MPT had made specific choices along these four strategic dimensions. MPT would not become a technical or product innovator in their market segments, as this would exceed the financial and technical capabilities of the company. Instead, MPT was focused on becoming a 'fast follower'. To this end, MPT was observing customers and competitors in its main product families to anticipate product evolution and customer needs, and seize opportunities quickly -- such as building a new production unit close to an OEM's -- when required. Also, quality had always been, and remained, a stand-alone and central aspect of MPT's offering. Quality covered not only delivery of impeccable products to customers, but also, reliable expertise on their products' technical aspects -- such as what could be produced and how, and what changes or modifications were feasible

Consequently, MPT's proposal to OEMs was not price leadership, but flexibility, technical expertise and the highest quality product possible. In essence, MPT's goal was simply to position itself as being the best at what it knew how to do:

- applying technology in a highly flexible way according to the demands of customers, with 100% delivery performance and zero defects;
- increasing the quality and timeliness of its responses to OEM tenders
- widening its production capabilities, for example, with injection moulding, to capture a higher share of the value-added of its products.

Response to OEM Tenders

At MPT, the product development process was complex, involving multiple stages for approval and many resources. Historically, MPT had waited for a formal tender from OEMs; the Sales department received and then launched the necessary research and response. OEMs required technically detailed responses from their suppliers, with transparent calculations, that sometimes amounted to 1500-page documents. Suppliers were typically given a response time of 3-4 weeks. For this Herculean task, experts were required from all of MPT's departments: technical processes, production tools, purchasing, material logistics, design engineering, quality, and sales and production cost controllers, as well as a production launch manager, who would oversee the initial production stages, and a programme manager who would lead the teams and have entire product and cost responsibility. Stages of development included a design or 'concept' phase, followed by prototyping, testing and product launch. Along the way, there was a formal approval process for each stage. Timely and detailed responses to RFQs were often hindered by functional walls between the different experts, each working in their own office, with the ensuing, and foreseeable, miscommunications and conflicts between project members. In particular, there was a lack of communication and coordination between sales and production departments, which had been known to cause severe economic and production-related problems because technical prerequisites and feasibility were not sufficiently checked in advance of bids.

The company's efforts were currently focused on improving the production processes. As management was dealing with daily production issues, it had little time to worry about the processes involved in responding to tenders. But Novak knew that solutions for improving production processes could also be applied to product development and MPT's response to tenders.

Introduction of Kaizen

MPT had a long history of crisis experience and redundancy plans; previous cost-cutting and restructuring programs had only provided short-term relief. So convincing employees who had experience in many failed programs to buy-into yet another restructuring program would be difficult -- too much doubt lingered over the credibility of management initiatives. However, in 2010, MPT's new general manager was convinced that substantial changes in the company's production processes were required for the company to remain competitive in the automotive GVC. He brought in an external consultant and launched the transformation of MPT to a Kaizen-based organization.

Kaizen was a production philosophy of Japanese origin aiming at continuous improvement of production and service processes (see Appendix I for a listing of the 10 Basic Kaizen Principles). Improvement was realized by small, incremental innovations and stepwise optimization efforts on the shop floor. After wide adoption in the '80's and '90's, the concept had faded from public attention. However, MPT had yet to incorporate and reap the benefits of this tried-and-true production philosophy.

To build a common understanding of managers and shop-floor employees on the methods and functioning of Kaizen, numerous workshops were launched in all company units to develop a roadmap for implementation and to teach participants in a hands-on way how Kaizen worked. Roughly 30 people from different company units were brought together and divided into smaller sub-groups to analyze difficulties in production processes in selected areas. These initial workshops focused on a pilot unit of the production plant in which employee-generated ideas were then implemented, so employees could see how their ideas were actually being used.

Concurrently, managers developed a joint understanding of what was important for them in implementing Kaizen. They defined certain principles, tools and measures to be used in the company. For example, MPT production managers defined a standard of 'Gemba 80': in Kaizen, 'Gemba' meant activity on the shop floor; so for MPT production managers, 'Gemba 80' required that they be active at least 80% of their time on the shop floor.

Workshops were held regularly every two weeks, to initiate, implement and track Kaizen improvement projects. Workshops had a morning and an afternoon component: to better support the learning processes of the participants, afternoon workshops focused on a reflection and discussion regarding key learnings, and attained or ongoing objectives discussed earlier in the day.

Workshops were a mix of management, supervisors, and -- depending on the project -- operators, mechanics, maintenance staff and other workers. Workshops always included a mix of Kaizen-experienced staff as well as newcomers to the Kaizen philosophy. Ideas generated during the workshops were then implemented together with management support, and when required, additional resources provided by management.

Throughout these workshops, management always stressed the idea of keeping solutions simple and low-cost, instead of turning toward expensive automated or hi-tech solutions, with the objective of controlling production processes and avoiding mistakes by the simplest means possible. For MPT's ever-smaller production batches, manual production and assembly remained more flexible and required shorter lead times than automated solutions. Manual work that was well-supported by specific tools and specially-designed workplaces -- for example, where two workers could work side-by-side -- would allow MPT to reach high levels of productivity and production flexibility, while keeping costs for technical assembly equipment low. As a consequence, workers were learning to work in different workplaces, and management had begun compensating these multi-skilled workers accordingly.

Four key tools had been developed during the Kaizen implementation process:

1. Morning 'caravan': Beginning in 2010, the plant manager toured the factory every morning at 8 o'clock, to see first-hand what was happening and what problems might emerge. Accompanied by six managers from Quality, Control, HR and other functions, they discussed the problems and production planning with production supervisors and team managers. However, they soon realized that they were not in direct contact with the production units. They consequently developed and applied the 'Gemba 80' principle and began visiting all production units, directly contacting the employees on-site. Their focus was on supporting local and practical problem solving.
2. 'I-plan': A planning table, used in production control and planning in each production unit, to bring together information on available resources (staff, material) and production progress (workplaces, production batches etc.). Contrary to ERP-planning, 'I-Plan' was always up-to-date within a two-hour horizon and able to make changes within one shift if necessary

(in contrast to the ERP system, which always needed a manual or automated capture of production data for a recalculation of the present state).

3. ’StreamMap’: A self-designed tool for value-stream mapping, to create an optimized layout for specific production processes. Participants -- employees in charge of the production processes, as well as line workers -- were invited to join the discussion to design the best process using simple tools, such as wallpaper, pencils, flipcharts, and post-its. Paper cards were used to describe difficulties at certain points of the process. Even if something went wrong in designing the map, it wasn't difficult or expensive to start over. The picture they designed together fostered a common understanding of the sequential steps required for production. The jointly designed wallpaper was then used as an input for the engineered design of the workplaces.
4. 'Hands-on' room: A Kaizen-project work room, with no chairs and no expensive conference room equipment, only flipcharts, posters and self-adhesive post-it notes. Every morning for 1-2 hours after the 'caravan', plant managers met with changing participants to check for advancement of ongoing Kaizen projects. All projects were continuously tracked. Any problems that could not be solved at the shop-floor level could be brought in to the 'hands-on' room, usually by the team supervisor and the workers in charge. Within a limited amount of time, first steps for a solution were defined. The absence of chairs encouraged participants to be efficient in discussion, as these could only be conducted standing up.

Outcomes

The development of these tools had cascading effects, triggering not only a redesign of production flows, but a plethora of small and incremental changes in production processes, communication, lower functional 'walls', and the layout and design of workplaces. Machines were rearranged according to the new designs developed by ’StreamMaps’. High storage racks disappeared. Every tool was allotted to a defined place. Production-related material, as well as deficient parts, were also attributed to precise storage places. Visibility and clarity -- even down to the light color of the repainted shop floor -- redefined the production facility. A structured ‘I-plan’ was implemented for the introduction of new products in production processes, forcing the previously reluctant engineering division to work with production units to improve the pre-production development stages of a new product. The supervisors’ workplaces were relocated to the middle of the workshops from their separate offices, in compliance with the Gemba80 initiative. When a problem occurred, the workers first tried to solve it themselves, but if they were unsuccessful, a signal light at that workplace was switched to red, and the production process stopped. Supervisors, now present on the shop floor, could then easily come in to support employees in solving the problem. The goal was clear: focused, efficient, high-quality production from cooperative, interdependent teams.

As Kaizen was implemented while regular business and production continued, it was initially met with some resistance. After the first six months when the novelty wore off, management had had to sustain implementation efforts through dogged leadership before the intended output for the whole company became visible. But two years after initiating Kaizen changes, employees had become convinced of the usefulness of this production philosophy, and results for the company began to show.

Novak characterized the Kaizen implementation as an investment in the mindset of employees and management. It wasn't just that productivity and profitability both showed positive trend lines. There was a lot more greeting and smiling in the company compared to former times. Workers and supervisors realized that management was listening to them, and that their skills and opinions were of value to the company. Additionally, they no longer felt left alone with production problems, and blamed for mistakes and low performance. At the same time, the notion of ‘it’s not my responsibility’ was not accepted anymore. For Novak, this was a crucial point for continuous improvement:

> *Employees are responsible for what they do, but they need to get the support they require and not be left alone anymore with trouble. The company’s advertising slogan -- 'Made by People' -- stands for this strong focus on staff and for a new mindset.*

Even the employee Works Council had positive feedback on Kaizen:

> *The crucial point is that in the Kaizen process, workers feel that their knowledge and experience are respected: management and engineers listen to them, and they can see that their ideas are implemented and their work is improved. To put it bluntly, we had 15 years of sh... before.*

This improved communication and cooperation within the company led to an increase in both employee and customer satisfaction. Customer feedback on

Kaizen measures was very positive, as traceability and quality increased. Additionally, with quality integrated into the production process itself, there was no longer a need for specific preparation of audits.

This last fact triggered Novak's key idea for improved product development processes. Why couldn't improvements that Kaizen had triggered in production also be applied to MPT's response process to OEM tenders?

Conclusion

Novak did not track the ROIs of individual Kaizen projects, but rather, viewed the many outcomes as a whole -- and the trend lines were very positive. Based on the Kaizen principles that he had learned over the last seven years, Novak was certain of what he would advise MPT's executive committee with regards to automation. Concerning improved responses to OEM tenders, he had a good idea of what needed to be done. Sitting down in an empty office next to the 'hands-on' room, Novak began jotting down his plans for MPT's future.

Appendix I. The 10 Basic Kaizen Principles

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 that then the expertise of 1.
9. Base decisions on data not opinions.
10. Improvement is not made from a conference room.