

Chapter 9

The Role of Projects in the Process of Transforming Automotive Industry



Reinhard Wagner

Abstract The automotive industry is one of the most important industries worldwide. Since its beginnings at the end of the nineteenth century, it has been undergoing a transformation that essentially goes through four phases. Projects play a specific role for the process of transformation. The chapter explains the role of projects in each of these four phases and also looks at future developments. Projects are increasingly at the core of organizing innovation, product development, manufacturing and service delivery. This development, also known as “projectification“, has strong repercussions on the organization itself. Organizational structures, processes and above all mindset and culture adapt to the requirements of project work. People are more clearly in the focus than before. Because companies can only be successful if they can respond flexibly to the new challenges coming from outside, i.e. from the market, competition and society. But that is precisely what distinguishes the automotive industry, after all, that it has been very adaptable and thus sustainably successful up to now.

Keywords Project management · Projectification · Automotive industry · Transformation

9.1 Introduction

The automotive industry is one of the most important industries worldwide. Last year, approximately 70 million vehicles were newly registered, most of them in China, Northern America and Western Europe. In Germany, more than 7 million people are directly or indirectly employed in the industry [8]. A structural or economic crisis in this sector is fuelling fears of job cuts or loss of competitiveness. Triggered by justified concerns about climate change and the responsibility of the automotive industry to contribute to the solution, increases the pressure on all stakeholders to change products, services and working methods towards more sustainability.

R. Wagner (✉)

Tiba Managementberatung GmbH, Perchtinger Straße 10, 81379 Munich, Germany
e-mail: reinhard.wagner@tiba.de

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R. Cuevas et al. (eds.), *Research on Project, Programme and Portfolio Management*,
Lecture Notes in Management and Industrial Engineering,
https://doi.org/10.1007/978-3-030-60139-3_9

With the help of the organizations in the automotive industry, mankind has been able to fulfil its dream of mobility, achieve undreamt-of productivity advantages, generate employment and prosperity and economic growth that is certainly unparalleled. The sector has also made a significant contribution to innovation, new knowledge and technological advancements that have been and continue to be used in other sectors [5]. With more energy-efficient engines, stringent exhaust gas treatment and lightweight construction, major steps have also been taken in recent years towards more sustainable transport. However, the pace of these changes today is far from sufficient to cope with the changed perception of cars in the eyes of society, strict legislation and the undesirable side effects of increasing mobility (e.g. traffic jams) as the population grows.

Since its early beginnings at the end of the nineteenth century, the industry has been subject to constant change. The invention of Carl Benz to motorize carriages formerly drawn by horses triggered a worldwide boom and can be seen as the starting point of the automotive industry. Incidentally, experiments with electric motors were carried out early on, but the combustion engine then prevailed for reasons of weight. This phase can be described as the “pioneer phase” of the industry, as the period at the end of the nineteenth century was strongly influenced by the inventions of pioneers worldwide. The first attempts at assembly line production were then made in the USA at the beginning of the twentieth century and perfected by Henry Ford. This triggered a huge boost in the industry, as large quantities could now be produced for a wider section of the population. As a result, attention was focused on rationalization, process optimization and the efficiency of operations. This phase can therefore be confidently described as the “industrialization phase”. This phase brought tremendous efficiency gains, but these were bought by negative side effects such as unfavourable working conditions or unattractive vehicle models. With the bestseller “The Machine that changed the world” [21], Toyota suddenly became the focus of attention in the 1990s, a car manufacturer from the Far East that promised new growth with new, very flexible concepts. Until then, the main concern had been to optimize production, but now the customers’ wishes for more individual vehicles became more and more the focus of attention. Work processes from the initial idea to delivery were organized in project form. In a ground-breaking article, Christophe Milder uses in 1995 for the first time the term “projectification” [14] to describe this phase and its developments. He highlights the effects on working methods, organizational forms and cultural changes at the French car manufacturer Renault.

The financial and real estate crisis in 2008 hit the automotive industry severely. Even though the industry was able to recover economically rather quickly, nothing has been the same since then. Global distribution battles, serious changes in societal values and trends, technological change and new, disruptive business models in the field of mobility have been shaking up the industry ever since. Suddenly, IT companies like Google are moving into the industry, start-ups such as Uber and Tesla are driving traditional companies like Volkswagen, Ford or Renault ahead, and in many places the car is even given a negative image and banned from the cities. That is why the current time could be labelled as the “phase of disruption”.

In the following, the role of projects in the course of the development of automotive industry will be examined on the basis of the above-mentioned four time periods. Projects and project management are not only considered in a narrow, methodical focus, but also in an entrepreneurial sense, as a means of achieving organizational goals and strategies.

9.2 The Winds of Transformation and the Importance of Projects

In order to understand the role of projects in a given environment, it is necessary to look at the situation, the contextual factors and the various influences at that particular time. In addition to projects as a temporary form of organization, special attention should be paid to processes, technologies, business models, mindsets and culture. It is not the intention of this article to show every development in detail, but to give an overview and to provide a classification.

9.2.1 Pioneers, Ground-Breaking Products and Exclusive Customers

The success story of the automotive industry began with outstanding engineers. In Germany, Carl Benz, August Horch and Gottlieb Daimler are representatives of the pioneering achievements that were to shape a major industry. However, in the beginning they had to cope with many setbacks and the (economic) successes did not materialize for a long time. Engines were manufactured as a prototype in workshops, built on mobile bases and tested in a terrain that was supposed to be for horses and not for automobiles.

Since the vehicles were rather custom-made and not yet available in large quantities, the definition of “project“ applies pretty much to what the pioneers did. Even though they certainly did not call it like that. The pioneers gathered around them a small number of experts who had to take on special tasks. Cooperation with other workshops or companies was sought only very hesitantly, as everyone was afraid of losing know-how and therefore wanted to keep the group of insiders relatively small. Since work at this stage was naturally capital intensive, the pioneer needed a sponsor who could provide money for the purchase of materials, tools and machines, and in this context the first stock corporations were established.

At that time only few people could afford cars. It was therefore reserved for the upper social class to gain experience with the first cars. In return they were willing to invest money in the development of more powerful engines and “car races” became popular, which promised new impulses and money for the development of engines. These developments began in Europe, but the spark quickly jumped over to Northern

America, where the new technology was intensively studied and own developments were initiated.

The role of projects in the pioneering phase of the automotive industry was therefore to combine new technologies in a workshop with a few employees to create a vehicle and satisfy an exclusive clientele. We don't know much about the methodology at that time, project management in today's sense was not yet available, but "managing" projects still had to be goal-oriented, pragmatic and based on experimentation, as little experience was available [10].

9.2.2 Taylorism, the Quest for Efficiency and Controlled Product Diversity

Assembly line production was already known in Europe and the USA in the production of food before it was applied in the USA for the production of vehicles, first at Oldsmobile and then by Henry Ford. The US American Frederick Winslow Taylor studied the work processes in factories specializing in assembly line production and founded the principle of "process control" of work processes. A clear distinction was made between "brainwork" of specialized planners and "manual work" of the ordinary workers. The process control is prescribed in detail by management based on work studies and work preparation. The term "Scientific Management" was later coined for this.

The procedures of scientific management according to Taylor are based on very detailed studies of work processes. The planning department followed a "one best way" approach and the workforce was instructed to follow it exactly. This has led to a "dehumanization" in the processes of the factory, people were recipients of orders and could not unfold themselves. The paradigm of planning was oriented towards efficiency in order to achieve the greatest possible output with as little material, capital and people as possible. As the market demand for automobiles increased, it was important to achieve larger quantities. However, diversity fell by the wayside. Henry Ford has been quoted as saying that customers can have a Ford in any colour, as long as it is black [3].

Even in this phase of the automotive industry, little attention was paid to "projects". The focus was instead on the ideal workflow organization or efficient processes. In contrast to the previous phase, the processes were split into planning ("white collar") and execution ("blue collar") work. The planning was based on mathematical optimization approaches and graphical representations. Henry Gantt, a student of Taylor's, also became famous in project management for his Gantt charts. Although this form of presentation was invented much earlier, it shows the chronological sequence of dependent steps in an overall task decomposed into individual components.

The optimization of production processes can of course be seen as projects that lead to a continuous stream of improvements from analysis to individual optimization measures. The avoidance of errors, approaches to quality improvement and methods of “Operations Research” had a strong influence on the development of today’s project management. This was revised mainly in the USA in the context of military projects; network planning techniques, critical path method and other analytical approaches mark the beginning of project management, which is still strongly influenced by this time [15].

9.2.3 Projectification, Mass Customization and Global Supply Chains

The oil price shock in the 1970s led to a rethinking in the economy and also in the automotive industry. Customers wanted more individual products and manufacturers responded by broadening their portfolio of products. Naturally, a broader product portfolio required a boost in development activities and greater flexibility in production, which had previously been geared more towards large quantities. Suddenly, an unknown Japanese manufacturer moved to the forefront, which, with its Toyota Production System (TPS) and a flexible response to demand (“mass customisation”), was not only more profitable but also able to react much more flexibly to the dynamic developments on the global market.

The starting point for Toyota is the expectations of its customers. Translating these into requirements for the development and manufacture of vehicles and still practicing the greatest possible efficiency and cost savings became the famous TPS [16], which is still replicated in many companies today. Toyota uses the term “project” rather sparingly and mainly in connection with development activities that are a “series of problem-solving cycles” [4]. Nevertheless, the term “project” has gained new attention and a new meaning in the context of balancing the many development activities (“portfolio of projects”).

Toyota’s new management approaches have also been closely monitored and partially implemented by western car manufacturers. Christophe Midler analysed the developments at Renault over a longer period of time and in a remarkable contribution he coined the new term “Projectification” to describe the development. On the one hand, this refers to the increasing number and importance of projects in some companies and, on the other hand, to the transformation these companies are undergoing due to the greater importance of project work. Midler desc “The firm affected a transition from the classical functional organization in the 1960s to project coordination in the 1970s, and since 1989 to autonomous and powerful project teams. Search advanced project management has profound and destabilizing effects on the other permanent logics of the firm (task definitions, hierarchic regulations, carrier management, functions and supplier relations). The “projectification” process is still under way, to adapt these permanent processes to the new context” [14].

Midler states that not only is the role of projects increasing, but also the role of project management is becoming more and more important, moving from a rather coordinating function to the centre of product development. As a result, the organizational allocation is also changing and formerly subordinate project managers and teams (“temporary organization”) suddenly become more powerful and thus come into competition with the powerful departments (“permanent organization”). As result, matrix organizations, project management offices (PMOs) and autonomous organizations for innovative vehicle models are emerging. Studies by the German Project Management Association show that the share of project work in total working time in the manufacturing industry has now reached almost 50% [7]. Project work dominates value creation, even far beyond the boundaries of a single company across the entire supply chain, i.e. internationally or even globally. Companies are developing into project-oriented enterprises that place projects at the centre of economic activity. Strategies, structures, processes and cultures change within the framework of project orientation [13]. Competence in project management is central, not only for those directly involved in project work, but also for executives and suppliers of the projects, right up to top management.

9.2.4 Disruption, Co-creative Networks and Innovative Mobility Solutions

The years from 2008 to 2010 mark the end of an ongoing upswing in the automotive industry. Instead, manufacturers and suppliers find themselves in a state of intense change, which is primarily based on global competition between the parties involved, disruptive technologies and business models, and socially altered value concepts, to name just a few of the factors. Increasing climate change with its consequences for the environment and society is calling into question the business of the entire automotive industry.

The “Diesel scandal” brings the industry into disrepute and stimulates a rethink in politics and society, which increasingly demand alternative drives or mobility solutions. The comet-like rise of start-ups such as Uber and Tesla also coincides with this period. At times, both achieve a higher valuation on the stock markets than all German car manufacturers combined. Uber does not have a single vehicle but uses digital processes to manage its collection service worldwide. Tesla focuses early on full-electric vehicles and the batteries they need. Initially smiled at, other manufacturers such as Volkswagen quickly follow suit and change their model policy away from the combustion engine and towards fully electric vehicles.

Autonomous driving solutions, alternative concepts for urban mobility and other innovative ideas require companies to rethink the way they work themselves as well as the way they cooperate with other companies. Hierarchical structures are too slow for a dynamic and increasingly complex environment, decisions must be taken locally, by professionals with access to the markets. Development processes require

agile, self-organized ways of working by people with outstanding professional, social and personal skills. Co-creative networks with complementary partners are the “new normal” for project work. Project managers are network managers and moderate the numerous participants towards the common goal.

Increasingly, the product of the industry, i.e. the vehicle, is getting out of focus. Services, such as car sharing solutions or carpooling, are bringing new opportunities for value creation beyond the manufacturing of vehicles. The use of energy from the battery of vehicles helps to cover the electricity demand in cities in times of low energy production. The connectivity between vehicles, mobile devices and the environment creates additional value adding opportunities. Previously separate technologies and sectors are mutually beneficial and help to create more sustainable solutions for the environment and society.

Digitalization, Industry 4.0 and many other developments require a transformation of the automotive enterprise [2]. Projects and programmes are suitable forms for these changes, not only for technological but also for organizational transformations. Companies are becoming agile businesses, scaling agile working principles from individual projects up to the level of strategic business development and turning the entire corporate management upside down [18]. In the next section, the new demands on those involved will be dealt with in more detail.

9.3 Emerging Requirements for People, Organizations and Society

The changes in the automotive industry described above present new challenges for people, organizations and, beyond that, society. On the one hand, the individual needs a new mindset in order to better deal with the developments, e.g. openness and flexibility in dealing with changes [20]. On the other hand, concrete competences are needed for project work, which not only include the frequently taught methodology, but above all social and context-related competences, as described in detail in the IPMA Individual Competence Baseline (IPMA ICB) in its current version [11]. Qualification and certification in project management, agile or classic, plays an increasingly important role and is fostered by corresponding efforts on part of the companies.

But the transformation is also hitting companies with full force. Among other things, conventional ways of working, organizational structures and even familiar management principles are being called into question. If one starts to put people more clearly at the center of value creation in the company (as in the pioneering phase described above), they can regain motivation and respond in a competent and flexible manner to possible changes in the context of the project.

The company enables self-organization in the form of projects in order to co-creatively develop new and market-oriented solutions together with customers, partners and internal stakeholders [12]. At Tiba Managementberatung GmbH, together

with companies from the automotive industry, new concepts for project work have been developed that offer answers to the challenges of our time. Projects in the automotive industry must meet the requirements of two worlds: On the one hand, work with a repetitive character, which requires classic project planning and control principles in near-production areas. On the other hand, the innovation work, which requires rather agile approaches. Both are not conceivable in isolation from each other but must be harmonized as optimally as possible. Digitalization and artificial intelligence methods are used for this purpose. In this respect, we also call this next stage in the evolution of project management at Tiba “Project Management 4.0“ [1].

A prerequisite for agile work is certainly also a change in the set-up of the company. Voluntary action of employees requires clear space to manoeuvre as well as a protected environment, which allows new ideas to be experimented and tried out. In order to include as many perspectives as possible in finding solutions, a complementary team (“real team”) should be formed, which works iteratively on the solution concept until the so-called “wow effect” occurs (“iterate to wow”). If possible, this is done with the involvement of the customer, so that immediate feedback can be incorporated into the solution and a real customer benefit is achieved (“customer benefit”). The coordination with the strategic orientation of the company as well as with all parties involved in the project is of course important and takes place via regular meetings, intensive communication and a close exchange with higher levels of the company (“mutual tuning”). After all, the biggest change takes place in management. An authoritarian leadership-style and micro-management no longer have a place in this environment, as they demotivate the team and give only a limited understanding of how to find solutions. True leadership supports the team in its work, sets a broad framework and helps with necessary resources and advice (“supportive management”). The latter of the seven “Tiba Principles for Agile Work“ [9] is certainly one that places the greatest demands on change, as it scratches at the previous self-image of managers.

Nonetheless, companies that want to be future proof must face the challenges and transform themselves in the above-mentioned sense. This is done based on a detailed analysis of the requirements of the market, technological developments and the expectations of the employees towards the company. The latter is particularly important because “Generation Z“ makes high demands on companies regarding the working environment and can often choose between several job opportunities.

But society is also facing new challenges in the volatile environment of the automotive industry. Employees and companies need a reliable legal framework within which they can operate. New forms of temporary work in projects not only have positive aspects. Work and leisure time are increasingly blurring in global project teams. Projects are an interesting field of activity for motivated people, but project managers often overload themselves in this situation and run the risk of burnout [6]. New forms of work require the acquisition of new skills, e.g. in dealing with digital technologies or in co-creative project work. This is not only a task for companies but is also a responsibility of society.

9.4 Conclusions and Outlook

This article dealt with the serious changes that the automotive industry has undergone in the more than one hundred years of its existence. Projects and project management in different phases of development sometimes play a more or less important role. While projects were unconsciously the organizational form for the pioneers at the beginning, project work has been pushed into the background by the Taylorism and the quest for efficient processes in the first half of the twentieth century. Only after the oil price shock in the 1970s and the reorientation of the industry did project work experience a renaissance through “projectification“. Today, the automotive industry is strongly projectified compared to other industries. Projects are not only the preferred form of developing new products and services, but are also used for changes in the organization and corporate culture. Project management is trendy. However, project management has also changed a lot. In addition to classic, plan-driven project management, the importance of agile approaches is growing significantly. This also demands changes in strategy, processes, structures and culture.

Change and transformation happens within the scope of projects. In this respect, the right mix of project and change management is of great importance. Managers should understand that projects are not only a way to create innovative products and services, but also to successfully implement their business objectives. According to a recent survey by the Project Management Institute (PMI), top managers consider organizational agility to be an essential prerequisite for future success, along with investing in the right technologies and ensuring relevant competences [17].

In future, projects will be used in all areas of an organization, in addition to the more technical areas, also in HR and finance, supply chain management and associated networks of partners. Developments in the area of “Smart Cities“, for example, show that a large number of stakeholders are coming together in projects to enable or further improve mobility. On the one hand, the city government, urban planners and public administration are called upon to create the prerequisites for mobility in their cities and urban areas. Subsequently, a large number of companies, such as automobile manufacturers, suppliers and innovative service providers, work together with the users to bring appropriate mobility concepts to life [19]. In the future, therefore, there will be no limits to project work. It will permeate all areas of our lives and society.

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