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SCHOOL OF ENGINEERING

Industrial Engineering and Management

Toyota motor corporation's production system overview, crisis Management and strategic Audit

Toyota Motor Corporationi tootmissüsteemi ülevaade, kriisireguleerimine ja strateegiline audit

MASTER THESIS

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2. To create a Strategic Audit for Toyota
3. To analyse the Automobile market after the corona and understand the Toyota's answer to the crisis

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ABSTRACT

The aim of this Thesis is to perform a Strategic Audit of Toyota Motor Corporation by assessing and understanding the external and internal factors of the company *(reference 30,* Wheelen, T. L., & Hunger, J. D. (2012). Strategic Management and Business Policy*),* its strengths and possible weaknesses or factors that could damage the Toyota business using a precise methodology. To carry out this Strategic Audit correctly it is essential to understand the working philosophy of Toyota and penetrated its production system so unique and renowned throughout the entire world. It is also necessary to understand its structure and its management system and to analyse the innovations made by the Japanese manufacturer in order to get a production and products of better quality, more secure and more ecological while keeping the most affordable and competitive prizes on the automobile market. This paper will also deal with the coronavirus crisis in the automotive world and its repercussions and the measures taken by Toyota during the pandemic. The author will also propose strategic solutions to limit the economic damage for the Japanese manufacturer.

INTRODUCTION

Japan is currently a country currently at the forefront of industry and innovation, saw the growth of an automobile giant, during the 20th Century, Toyota Motor Corporation. The Japanese automaker is the world's leading vehicle manufacturer since 2007 and has a market value of 51 billion Us Dollars which places it in 7th place among the world's most powerful companies, ahead of Mercedes and the American manufacturer General motors. Renowned for the high quality of its vehicles and its exemplary production methods Toyota. Toyota nowadays continues to innovate the automobile industry and the production method and to inspire all car manufacturers and competitors for all around the world.

In this thesis the author will clarify the reasons that make Toyota a future-oriented brand.

Composed of four main parts:

This thesis will first explain all the characteristics useful for understanding the philosophy and the structure and financial state of the company.

Then the second part will introduce both technological and ecological innovations from Toyota. Analyse the reasons why the Production system that Toyota has implemented is so efficient and effective and understand TMC's vision of assembly lines of the future.

The third part will set up the Strategic Audit based on the previous information in order to generate a strategy allowing a proposal of major axes to follow in order to allow the Japanese company to prosper and overcome challenges and trials that an uncertain future will generate.

Then the last part will deal with the corona Virus crisis in the automotive world and analysis and understand the strategic response from Toyota and suggest some possible solutions to deal with the crisis and bounce back from it.

1. TOYOTA MOTOR CORPORATION GENERAL OVERVIEW

1.1. History and current occupation

The name of the brand comes from the family name, Toyoda. This name was originally transliterated into a hiragana by Toyoda. The city of Koromo specializing in silk, under the Meiji and Taishō era, the Toyota company was first a textile factory. The decrease in demand for raw silk in Japan and abroad, led the city into a gradual decline. It forced Kiichiro Toyoda and his cousin to change their minds and therefore use industrialization in order to make the business survive. This was the beginning of Toyota Motors. In 1936, Toyota marketed its first car called "AA". It was a copy of the acronym near the Chrysler Airflow. Equipped with a 6-cylinder of 3.4 litters, this first model had 1,400 copies. Its production ceased in 1943. Koromo was the group's headquarters. It was renamed Toyota in 1959 in honour of the company. Today, Toyota's headquarters is in Toyota, Japan. Kiichiro Toyoda set up the Just-in-time principle in 1937 which became the essence of the Toyota production system. In 1948, he resigned from his position in the company because of poor sales and a lack of profitability. Four years later, on March 27, 1952, Kiichiro died when he was 57 years old.

Toyota collaborated with the military dictatorship in Brazil in the 1980s. The company passed information about the union's labour activists. Police used it to monitor, harass and arrest trade unionists to prevent strikes.

In 1999, Toyota opened its first factory in the euro zone in France. In 2007, the Toyota Group manufactured 9.51 million vehicles including the production of Daihatsu and Hino Trucks. It became the new world leader as it's more than the 9.259 million vehicles for its main competitor, General Motors, which it had done for 72 years. In 2008, it was the world leader in sales. It showed great industrial performance with a long-term vision and higher profitability. For example, Prius cars became the undisputed leader of hybrid vehicles. It has enhanced the reputation and image of the group.

Nonetheless, the 2008 international monetary crisis caused an unexpected drop in sales worldwide and in the United States where it had the strongest profits. Moreover, together

with the increasing value of the undervalued yen (+23% over 2008 against the dollar) reduced competitiveness of its products. This forced the group to announce its first ever deficit year in its long history.

However, it remained the world's largest manufacturer with 8 million vehicles worldwide in 2009, up from 9 million a year earlier. In comparison, the Volkswagen Group's sold 6.3 million vehicles worldwide. In March 2016, the company posted a turnover of 235 billion US dollars making it part of one of the 10th largest global companies, ranked according to their financial performance and is still nowadays the automotive world leader *(Reference 0,1).*

1.2. Structure of the company Overview

Toyota is known to be one of the biggest companies in the world, it has two main seats (one in Toyota City, the other in Tokyo) and one seat in Nagoya. There are 67,650 employees working for the company. If we also involve the employees of subsidiaries (522 worldwide), there are 299,394 employees in total who are under the order of the parent company (55,000 in Europe). There are 28 NMSC's (National Marketing & Sales Companies) and 2900 points of sale in Europe, 8 factories located in France, the United Kingdom, Poland, Turkey and the Czech Republic, 15 logistics centers (spare parts and vehicles), Toyota collaborates with more than 25 transport companies and more than 200 suppliers of various parts. Toyota has moved away from Taylor's model and traditional organization into a "Sense and Response" model, the "Beyond Budgeting" model. Toyota has become a decentralized organization whose goal is to develop into a flexible and adaptable organization with flexible goals. Beyond Budgeting is a management model for control. The organization is inexpensive and relies on trust. It responds to the needs of external and internal customers and its values and principles are clear and inviolable. In addition, information in the organization is open and transparent. The Beyond Budget is a management model based on two sets of principles *(Reference 4)*.

The management principles with management adaptation process used by Toyota:

The goals based on maximizing the potential for performance.

The evaluation and rewards based on retrospective improvement contracts.

To make the action plan a continuous and integrated process.

To make resources available to the needs.

To coordinate the company's cross-actions according to the dominant client demand.

The base controls on effective corporate governance and a range of performance indicators.

The principles of decentralization:

To provide a foundation of corporate governance based on clear principles and limitations.

To create a high-performance climate based on some success.

To give freedom to local brand decisions that are consistent with the principles of corporate governance and the goals of the organization.

To place responsibility for value creation decisions at the front-line level.

To make people responsible for customer results.

To help open and ethical information systems that provide "one truth" throughout the organization.

Reducing the complexity of the moving process leads to speed and simplicity of the operation in the company. The flexible network enables executives to quickly respond to customized requests by reconfiguring processes.

In addition, it gives the company the ability to respond to emerging threats and opportunities as they arise rather than being constrained by a fixed and outdated plan. The clear principles of corporate governance set a good climate and establish mutual trust required to share knowledge and best practices. In addition, we move to rewards based on the results of a unit or group of businesses. Companies have very low prices.

Not only do they connect the work that people do with the needs of the customer, but they also align products, processes, projects, and structures with their strategy. Companies place the customer's need for value at the center of their strategy and adapt their processes to meet it. Fast response to customer requests is also important. So front-line people must have the authority to make quick decisions.

In the Beyond Budgeting all its components work in harmony and that is why we produce an exceptional and stable success. This success is driven by direct value factors: low costs, ethical reporting, innovative strategies and loyal customers. For Toyota, the Beyond Budgeting model represents a more decentralized way of leading by allowing decision-making and delegated performance accountability to line managers.

Thus, create a working environment with "self-monitoring" and a culture of personal responsibility. This way allows for increased motivation, higher productivity and better customer service. They work according to the "Just in Time" system and the 7 zeros; that is to say no delay, default, stock, breakdown, paper, transport and overproduction. Employees are versatile to adapt Products, but also autonomous to make decisions by themselves. Until now we cannot discern dysfunctions, but the management gives a lot of responsibilities to employees and we must have a lot of confidence in them. Moreover, without bureaucracy, it is more difficult to run the organization. There are more flexibilities which can also become a problem. The model is also very expensive when introduced, but also because of the prohibition to have stocks since it no longer allows economies of scale. Indeed, there is more mass production, because we do a lot of product adaptation. It is also very important to have a very good communication in the company and an important level of knowledge among the employees.

1.3. Overview Toyota Production System

Toyota's production method is based on integrated quality control that has revolutionized the automotive industry. The principle of "just-in-time" ("just in time" or "JIT"), invented by Toyota during the 1930s, has become a model for manufacturers around the world, not just in the automotive industry. The seven zeros (zero delay, default, stock, breakdown, paper, transport and overproduction) form the basis of the just-in-time principle. They ensure a reduction in the time of passage of components and products through the various stages of their development (from order to delivery) to a minimum. The Toyota Production System (TPS) is designed to "pull" the finished product from one end of the production line to the other. In this model, it is the demand that defines the level of production and not the supply, unlike traditional models that have been designed to "push" a maximum of products on the chain, regardless of actual demand. The Fordist model, for example, aimed at mass-producing mass products. Without knowing the exact demand, their goal was to produce as much as possible. The risk of overproduction was frequent. (The eradication of overproduction is one of the basic principles of the Toyota model). Here, spare parts are supplied at the right place, at the right time, and in sufficient quantities, without waste. The model allows the company to decrease the inventory to reduce inventory costs (parts and finished products) to a minimum and specially to get more flexibility and responsiveness. These latter aspects are still the norm for the rest of the industry.

Toyota also explains its success thanks to some fundamental principles applied in the whole company. Fundamental rules guide the design, realization and improvement of each activity in Toyota's production system.

The first rule is the precise role determination: which means each work activity is highly specified in terms of content, sequence, duration, and product which makes each task really specialized and more efficient. The second rule is each client or provider connection must be straightforward and requires an unambiguous mode of instruction and response transmissions to increase the communication skills and avoid any unnecessary mistakes.

Then make the circuit of each product must be simple and direct. As all the rules show the aim is to simplify each step of the whole process both the communication and production process to avoid errors.

And finally, the last rule is that Improvements must be made according to the principles of the scientific method. At the lowest level of the organization (this is where the impact will be most important) and under the control of a person of responsibility which makes sense since the lower step of the production pyramid from the start of the production to the finished product has to be flowless and analysed and under control to assure a perfect production.

1.4. The value of the company

The message from the management Fujio Cho and Katsuaki Watanabe (both executives) emphasize the importance of living in harmony with employees, society and the business environment and enriching society. Toyota's goal in applying these different production systems is not just to reduce wastage and costs. They also aim to offer products of optimal and differentiated quality in order to satisfy more and more its customers (price made by the customer, zero defect, etc.). The zero-defect strategy initiated upstream of production has become a house philosophy that permeates every member of staff. The entire organization is focused on this concept and management as a whole is driving its implementation. The Toyota system is more of a business philosophy than a list of written rules of procedure. The Toyota Institute was founded in 2001 to implement its philosophy in all Toyota plants and communicate the values of the Group to all its employees. The development of visions and objectives, the desire for personal growth, the constant improvement of work processes and respect for colleagues and customers are key aspects for the Group. The "Toyota way", defined in the Code of Conduct ("Toyota Code of Conduct") is applied in all Toyota activities in order to keep the optimum quality of products. The main objective of the Japanese manufacturer is to become the most profitable, most respected and most reliable car manufacturer in the world.

1.5. The employee’s well-being

Toyota also looks after the well-being of its employees and tries to get them involved as much as possible. It gives them more autonomy by entrusting them with, for example, quality control and the initiative to carry out repairs, or even the necessary corrections or adjustments in production. This evolution is made all the easier as the level of general training of employees improved considerably. Similarly, the *Toyotism* system tries to fight against the lack of interest of the workers for their work by diversifying their tasks and avoiding the fragmentation of work as much as possible, but by rotating the workers from one task to another. More motivated workers will prove more effective and more capable of profitable initiatives at the company Positive points and dysfunctions of the structure Toyota has long been considered as a leader and an example in terms of organizational structure and development of production processes. Its production model is unanimously recognized for its results in financial terms and generators of quality.

1.6. The benefits of the structure

Toyota's organizational model is perfectly adapted to a fluctuating environment and demand, since it is totally adapted to the demand. The GST is perfectly suited to a context of weak economic growth and diversification of finished products. He knows how to limit production and rebuild only the necessary vehicles. Toyota's core competencies that distinguish them from its competitors are quality, flexibility and reliability. The management method is therefore rigorous and aims at nothing wrong. Reliability is such that it is the only car manufacturer offering a 5-year warranty on its vehicles. Obsessive vigilance is put in place. Everything is checked regularly, whether the cars are produced in Japan, Turkey or France. Regular checks throughout the chain and on all products: (raw materials, products Ongoing, equipment is constantly taking place). This system, although expensive, allows a significant reduction in costs. Indeed, it allows the reduction and the almost non-existence of the return rate and therefore leads to indirect reductions (No customer dissatisfaction, no decrease in purchases, no products to change ...). The after-sales service is very efficient. All actors from production to marketing are involved in the process of outstanding quality.

Malfunctions of the structure Toyota's mode of operation requires frequent checks, always of production, as well as all activities. These controls are ubiquitous and systematic that has an extremely excessive cost for the company. In addition, changes of tools and machines take place frequently to avoid any problems of production, any defects, etc. These frequent checks, despite their huge cost aren't not a way to avoid a return rate or defects on cars, mechanical problems, which would generate much more significant costs and a significant nuisance for the image of the Brand.

1.6.1. Financial Overview

Toyota from a financial point of view is a giant, it is currently the 9th best valued company by banks and represents a net profit of 2,586,106 million and an operating result: 2,399,862 million. Toyota has an employee count of 370,000 and gross sales of US $ 265 billion, which is more than Colombia's GDP. With its 11 million cars sold in 2018 Toyota is the biggest car manufacturer in the world ahead of General Motors.

The Main Shareholders are Toyota Motor Corporation with 14.3 percent equities and Toyota industries corporations with 7.3 percent equities *(table1)*. Followed by Nippon Life Insurance Co., Nippon Life Insurance, Denso Corporation. Sumitomo Mitsui Trust Asset Management Co., Ltd and others.

Name	Equities	%
Toyota Motor Corporation	466,138,134	14.3%
Toyota Industries Corporation	238,466,000	7.31%
Nippon Life Insurance Co.	110,675,000	3.39%
Denso Corporation	89,915,000	2.76%
Sumitomo Mitsui Trust Asset Management Co., Ltd.	87,606,775	2.68%

The Vanguard Group, Inc.	71,298,244	2.19%
Nomura Asset Management Co., Ltd.	68,242,964	2.09%

Table 1: Main shareholders of Toyota industries corporation (Reference 3)

1.7. Organizational culture

Toyota organization culture can be compared as a hierarchy or an Eiffel tower and secrecy which translated to employees' perception that all decisions must come from the headquarters in Japan. However, the characteristics of Toyota's organizational culture are as follows, arranged according to theses catch words:

The Teamwork

Teamwork allows for better collision of employees and thus leads to better capacities and better performance. In order to integrate teamwork into the company, many team building courses are included in the training of employees from all sectors.

The Continuous improvement through learning

This will allow Toyota through statistics and surveys the logical answers to specific problems. Thus, the work of each employee constitutes a database which will be analysed and useful to understand and learn in order to acquire better results. *"Toyota's organizational culture highlights learning as a way of developing solutions to problems. In this way, the company can continuously improve processes and output with the support of its organizational culture." (reference 9)*

The Quality

Quality is the most important of Toyota's 4 attributes because it allows us to provide finished, quality products while strengthening the bond of trust between the manufacturer and its future customers. *"the company uses the principle # 5 of The Toyota Way, which says: "build*

a culture of stopping to fix problems, to get quality right the first time." "The Toyota Way is a set of principles that defines the business approaches used in the company. "(reference 9)

The Secrecy

Toyota is a silent manufacturer who acts in secrecy. However, more and more cases of both process problem and management issues are brought to light to be analysed and improved by Toyota.

2. TOYOTA PRODUCTION SYSTEM AND INNOVATIONS

2.1. TOYOTA PRODUCTION SYSTEM ANALYSIS

Toyota is known to be the largest automotive company in the world. This success is mainly due to a unique manufacturing method, the TPS 5the Toyota Production System). Designed to be beneficial to customers, employees and products.

The TPS owes its success to its 5 fundamental values (see figure1):

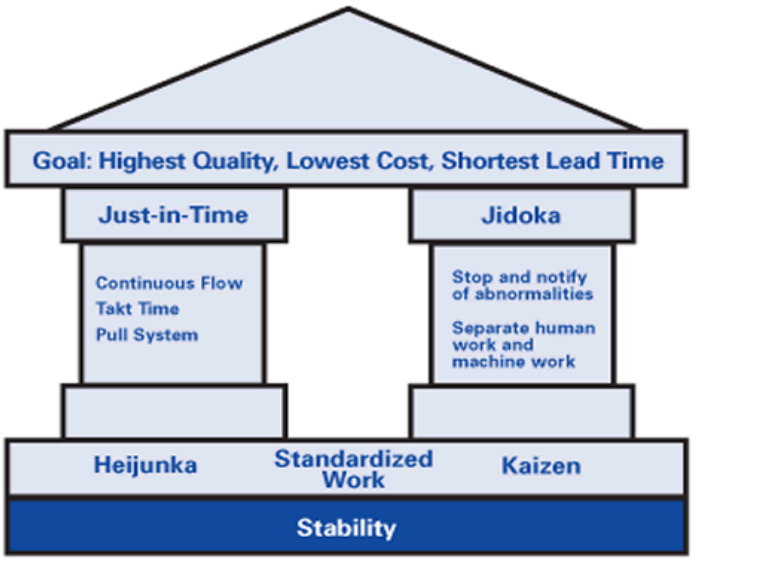
The Genchi genbutsu

The Kaizen

The Challenge

The Teamwork

And the Respect



Toyota Production System "House."

Figure 1: Toyota Production system House (Reference 26)

These values have made Toyota a company known for its efficiency, thoroughness and quality. Taiichi Ohno inspired in the 50th by the American supermarket. The products on the shelves were almost never empty. So, customers could buy the products they wanted without ever running out of stock.

Taiichi Ohno used this concept and converted it into what we call now the lean production. This means that the production process will not start until after the customer's request. Once the production process has started, the parts are instantly transported to the production site and to the production lines. The quantity of parts supplied to workers corresponds to the exact need for production *(reference 26).*

This Principle is qualified as Just in Time and is one of the pillars of the TPS (Toyota production system).

2.1.1. The Just in Time method

The Just in Time consists in ordering the raw materials or the elements to be assembled only when they are used. One of the objectives of this method is to remove intermediate stocks (figure 2).

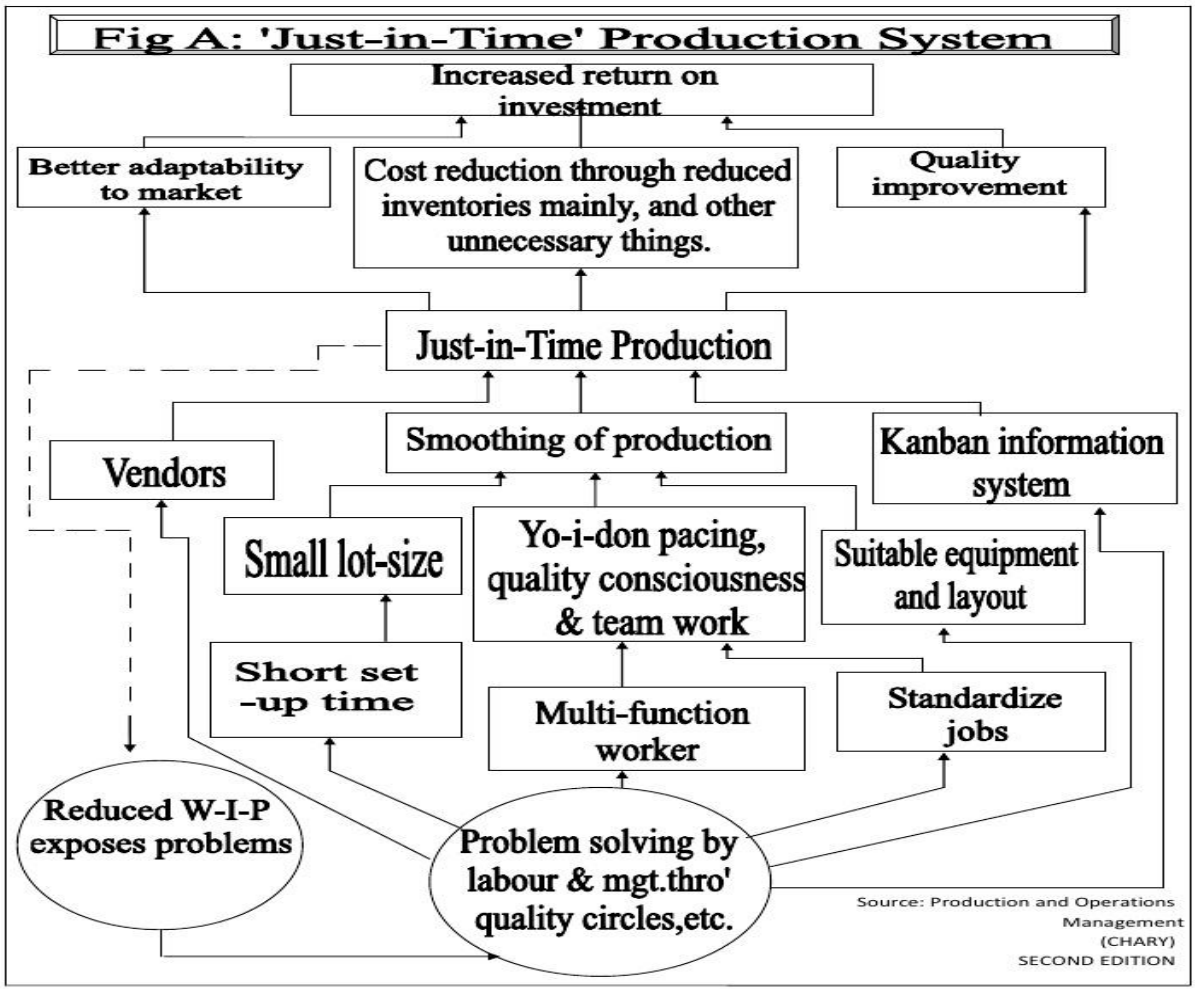


Figure 2: Just in time method (Reference 61)

Conditions for applying the Just in time method:

The just-in-time method can only be applied if the business, customers and suppliers are in a perfect synergy. The company must properly estimate the needs in terms of production and source it locally to limit costs. Moreover, it must ensure the reliability of the transport and delivery network.

To set up a perfect Just in time method like Toyota the 2 most important points are to have a strict management of stocks and orders and surround yourself with a responsive team that agrees to work with flexible hours. *(Reference 42)*

The just-in-time method is demanding, but has many advantages:

These advantages are various. Firstly, it allows a strong reduction of the storage costs because the orders are not constant and depend of the demand. Moreover, it limits the wastes and increase quality of finished products and brings a great flexibility to the production.

The just-in-time method also has some drawbacks:

The Suppliers must be able to respond to just-in-time businesses and accumulate stocks for them: few are willing to accept. Then, the Just-in-time businesses take risks. To minimize them, they must surround themselves well. It is difficult to apply for companies that do not have regular orders. Finally, the lack of stock reduces the control and makes big orders hard to manage.

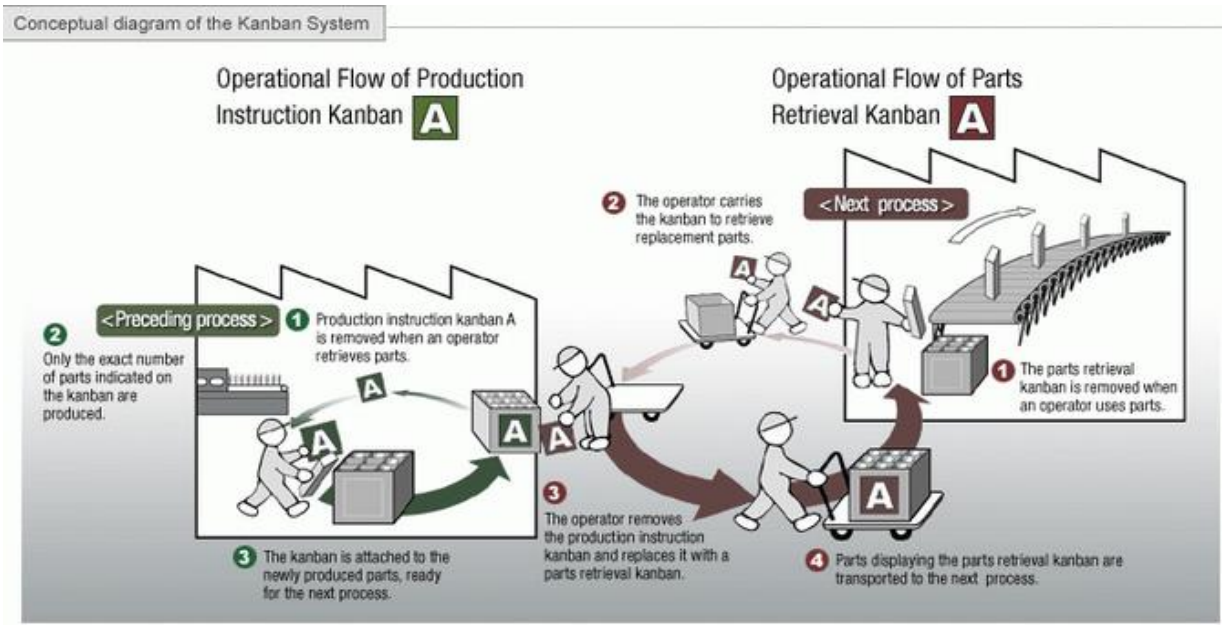
Figure 3: Just in time can be referred as theses 5 terms (Reference 38)

2.1.2. The Method *KABAN*

To allow workers to carry out the method just in time and allow Toyota to carry out its production system, The *Kanban* were used to immediately restock the parts when the stock decreases. A method *Kanban* ("label" in Japanese) is a concept from the late 1950s that appeared in the automotive industry *(Toyota).* It's a just-in-time production system.
The downstream order upstream produce only on demand (pull flow).Therefore it's a just-in-time basis which makes it possible to limit the volume of stocks (and work in progress) but requires perfect responsiveness on pain of "missing" the sale or too long delays.

The objective of this method is therefore to size the stocks as accurately as possible (and to no longer use safety stocks) to reduce the cost. The term Kanban refers to the label that accompanies the container of components. When a downstream station exhausts all components, the Kanban label is redirected to the upstream station as a production order (figure 4). As attractive as this method may seem, it must however integrate production constraints and the need to produce in batches in order to reduce unit production costs. In fact, the Kanban is more suitable for mass production of articles *(reference31).*

Figure 4: The Kanban method schema (reference 31)



The time required to produce a stock, or a component is estimated in advance, thus called production rate. These production rates are perfectly orchestrated and have been tested beforehand. These rates therefore make it possible to have the necessary components in an adequate quantity and therefore to reduce stocks but also to give a rhythm to follow to the workers and therefore to optimize production. All these production rates are organized and controlled by detailed planning called the *Heijunka.*

2.1.3. *Heijunka* explanations and benefits

In the concept of the Toyota Production System, *Heijunka* is the smoothing of production by volume but also the mix produced over a given period.

This technique is used to minimize the unwanted effects of a built-to-order manufacturing process: for example, a company operating strictly in demand manufacturing, if customer orders are high, will manufacture in large quantities, will spend money on overtime, stress staff and push the limits of their equipment, but it will make the same staff unemployed if, the following week, customer orders are low.

The goal of *Heijunka* is to balance or smooth the company's manufacturing program. The products are not directly manufactured according to customer needs. Order volumes are taken over a given period and smoothed to ensure that the same quantity and the same product mix are produced each day *(reference 56).*

The benefits of *Heijunka*:

It smoother and regulate the production and gives predictable manufacturing programs and procure repercussions of this stability on suppliers.
It offers a reduction of stress on the supply chain and a saving of additional hours.
It offers an easier human resources management and a manufacturing on demand over a given period of time.
However, as any concept, *Heijunka* is not perfect and generate some disadvantages. As a

fact, the production does not operate strictly in demand manufacturing and the Inventories are higher than pure demand manufacturing.
This method works particularly well for Toyota because it offers a strong complementarity and harmony with The Just in Time system *(reference 56).*

2.1.4. Analysis of the *MUDA* or 7 wastes

The role of TPS is to improve efficiency by working on low-cost processes and wasted time called *MUDA* or the 7 wastes (see figure 5). Each *MUDA* will be explained and are essential for the TPS *(reference 43)*:

The overproduction

The overproduction takes in account every component or product that has been produced in greater quantities than the customer demand.

The inventory

This concerns everything which is not strictly essential for the realization of the requested functionalities. It can be both hardware (mobilizing more development stations than necessary, reserving too much disk space, etc.), extended but not necessary functionalities (such as access to multiple databases, while we know that only one will be used) or not finalized, or even functional or technical specifications correspond to tools that will not see the light of day for several weeks.

The waiting

Poor organization or distribution of tasks can cause waiting within the project team. A dependency on badly anticipated tasks can force a developer to wait until one of his colleagues has finished before continuing with his work. It can also be machines (server, development machine ...) whose power and performance are insufficient, and which force users to wait for the end of treatments.

The motions

As part of an IT project, this involves, for example, organizing a meeting that is geographically distant from the location of most participants. Moving team members is likely to be a waste of time and money. It is common for travel times to be at least greater than or equal to the length of the meeting itself. The vast majority of development teams have all the tools to organize remote meetings: audio, videoconferencing, screen sharing, collaborative tools and so on.

The transportation

These are all unnecessary movements of equipment, made necessary for example by poor organization of workspaces. This can range from the need to bring your chair to the meeting room because there is a shortage of it, having to go for an overhead projector or a large screen for each presentation or even simply having to cross a building because the only printer is located opposite the project team.

The rework

The time and money lost due to insufficient quality controls can be a major source of waste. Insufficient controls, good practices or non-respected coding standards regularly lead to failures during integration or acceptance tests. The delivery of non-compliant features generally leads to deep customer dissatisfaction and a loss of credibility. The financial consequences may not be negligible.

The over processing

Over processing concerns the realization process itself, or when the realization of the functionalities is more complex than it should be. It can be an overly complex source code delivery or deployment process, for example, which wastes time every time a developer must share his work with the rest of the team.

The goal of the Lean Agile Method is to reduce the costs of a project by minimizing the costs

incurred. The identification of the 7 *Muda* or sources of waste will make it possible to eliminate them and optimize the operation of the project *(reference 43).*

Figure 5: The 7 wastes of lean (reference 57)

One of the main objectives of TPS is to eliminate or attenuate as much as possible all MUDA by optimizing stock, time and production with the maximum profitability and organization possible so as not to overload or workers or machinery. Thus, workers are more organized in their work an and provide work of an excellent quality.

2.1.5. Pillars of the Toyota Production system, the *Jidoka* and the *Kaizen*

The second pillar of the TPS is the Jidoka which means making anomalies visible. Each worker in the production line is authorized to stop the production line as soon as he detects a potential defect. This allows you to understand and quickly find a solution.
This also means that each problem is made visible to all workers in the factory because each production workshop has its own figure and so when it is an anomaly appears on a central table which allows to see which production workshop problems are reported.
Each problem is analysed and used the method of *Genchi genbutsu* which can be translated by going to the source, understanding it and solving it to allow a quality production.

The standardization of the manufacturing process is an integral part of the successful development of TPS, the development and reliability of standardized tasks, contributes to improving the production process and ensures products of good quality.
This conception rigor of reliable, durable and high quality products, all this in a reduced production time.

The Kaizen term means continuous improvement. It's seen as both a process and a philosophy. The Kaizen system is a process which aims at the continuous improvement of a company. This improvement should not result in a significant financial investment. The Kaizen system consists in improving the productivity of a company by making small changes every day. To be effective, all employees, managers and non-managers, must participate by giving ideas.

2.1.5.1 The applications of the Kaizen system

The Kaizen system is one of the most complete quality processes. It encompasses many quality management methods. The first and most important method is the 5S which optimizes working conditions and working time. The TQM, Total Quality Management, which tends towards the perfect quality of a product or service while minimizing losses. The Lean Management, which aims to better manage stocks, losses and waste. And the Deming wheel, whose 4 steps, plan, carry out, verify and act, lead to continuous improvement.

2.1.5.2 The implementation of the *Kaizen s*ystem

Integrating the Kaizen system into a company involves many key factors. This will allow the Kaizen system to reveal its true effectiveness. The first is the creation of a specialized working group in order to generate a real team spirit and synergy. It is also essential to do an analysis and review of the objectives of a company in order to focus its resources on the decisive factors. The Toyota system is very human, that is to say that it considers that each link in the chain must be personally involved in its task, we can find here a correlation with the Japanese way of life where work is like a second family, this is why it is necessary to have an Involvement of employees from each department and at all levels. In the vision of Kaizen delivered by Toyota, good work deserves a reward for stimulating employees to give their maximum, so the implementation of rewards to motivate workers is common. In order to have a constant feedback and a quality work many Information and supervision of changes related to the Kaizen system are regular.

If each of the key factors are integrated into the management and production of the manufacturer the positive repercussions should be an increase in the quality of the products or services sold, a higher productivity and a lower production time. Moreover, it will have a psychological effect on the employees because the working conditions will be better for the workers and the worker involvement will increase. The TPS can be qualified as thinking people system because it is based on the close participation of each link in the chain.

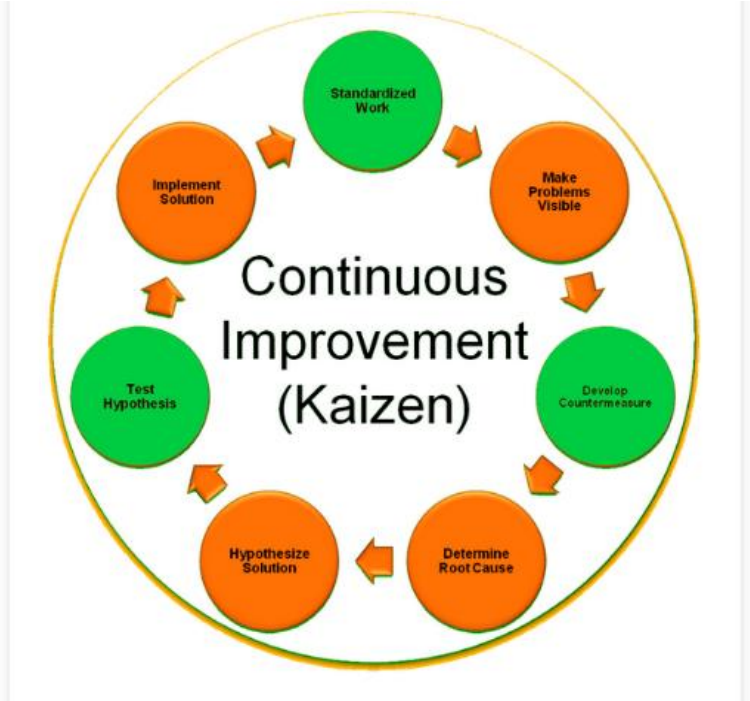


Figure 6: Continuous improvement of the Kaizen (reference 38)

2.1.6. The 5 S analysis

The 5S method makes it possible to continuously optimize working conditions and working time by ensuring the organization, cleanliness and safety of a work surface. It was created for the production of Toyota factories. The 5S method is a management technique that is part of the quality approach. The 5 S are Japanese words Associated to different actions of this process (see figure7).

Seiri corresponds to throw away, recycle, archive, place work tools according to their frequency of use. The main use is to Lighten the workspace of what is unnecessary.
Seiton means to arrange, classify in order to limit physical movement or the carrying of heavy objects, optimize the use of space. *Seiton* helps to make the organization of the workspace efficient
Seiso stand for Cleaning or repairing to increase the state of cleanliness of the premises
Seiketsu is to order documents or their workstation so that another person can find their way around. It will Prevent the appearance of dirt and clutter.
Finally ***Shitsuke*** evokes the rigor and helps to apply the 4 previous operations and maintain them over time. It encourages efforts in this direction: self-discipline *(reference 58).*

The advantages of 5S are numerous:

•less loss of equipment;
• fewer accidents;
• more pleasant working environment;
• openness to more sophisticated quality methods.

Application of the 5S method
Applying the 5S method is beneficial for the company. The 5S method can be used by small, medium and large businesses.

• The 5S method makes it possible to reduce or even avoid:
o disorder,
o loss of documents,
o deterioration of equipment,
o workplace accidents.

• The 5S method optimizes:
o working time,
o working conditions,
o travel,
o indirectly the turnover.

If the 5S method is successfully set up in the company, the employees will experience a better working experience with more autonomy and self-interest for the company which will indirectly increase the productivity. For this success to be lasting, the company must constantly ensure that the rules put in place within the framework of the 5S method are respected, but also reward its employees in case of good results. the 5S management and production method don't only provides instant results through cleaner and more efficient production with fewer errors, but also a real change in the mentality and working ways of employees which can be compared to a working philosophy *(Appendix 2).* It brings an almost automatic rigor favourable to a production close to perfection.

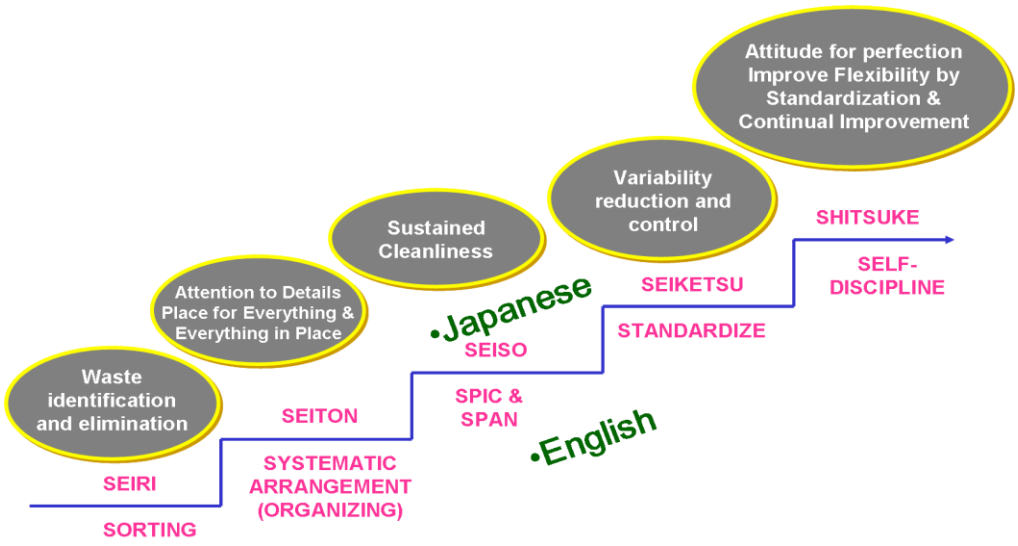


Figure 7: representation of the 5 S (reference 58)

Indeed, an organized and tidy work environment allows a better organization of the employee and better production. For the environment, TPS means much more than the simple desire to respect government standards. The 3 European Toyota factories are ISO 14001 certified and are organized for optimal manufacturing while limiting the impact on the environment. Within the Toyota production system, safety is also one of the top priorities, most Toyota manufacturing sites are certified Ohsas 18 001. This corresponds to the assurance that all employees respect safety standards and that employees work in a holy environment.

All these tools and technics that make up the TPS experienced and approved over many years of experience and testing make the Toyota production system one of the most rigorous and optimal seen to date in the world of production.

2.1.7. The result of the TPS on the productivity

The result of the TPS implementation are visible on this analysis:

"*Productivity in 2005 on the TPS-developed model line compared to results for 2003*

•55% reduction in direct operations

•48% reduction in manufacturing lead time

•68% reduction in work-in-progress products within the line

2)Consciousness and behavioural patterns

•Reduction in excuses for "why I can't do that"

•Employees started to share goals and provide mutual encouragement

•Plants where line improvements were hands-on started to change daily

The system that enables problems in the plant to be identified is still at the level at which it was created. The pull system, which links the supplier to the customer and is the essence of TPS, will be addressed in the future. Currently, therefore, the results are limited to a reduction in Leadtime in the narrow range of the production plants. In the future, we must make changes so we can reduce the lead time company-wide and make our companies and plants more profitable. "(reference 27, p20 Yuichi Saikai)

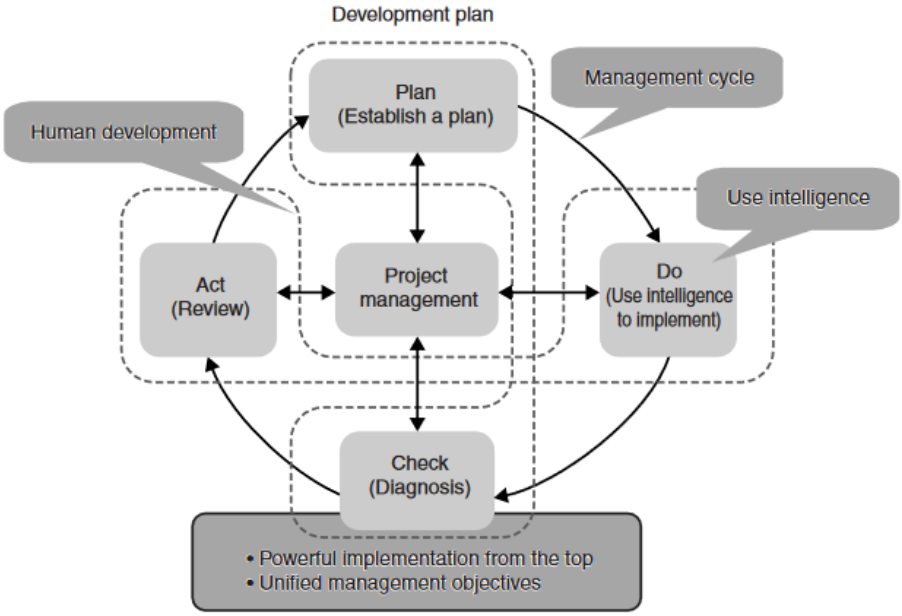


Figure 8: Good management and production system in the center of everything (Reference 27, p20)

Afterwards the implementation of TPS in a production in the example above, it is impossible to denie that the numbers do not lie. Mr. Yuichi Sakai, Mr. Toshihiko Sugano, Mr. Tomohiko Maeda (reference 27) through their research and analysis prove a marked increase in the whole production process. This analysis proves the remarkable efficiency and the incredible thoroughness of the Toyota production system which, through many layers of control and an ability to organize and manage its personnel and its processes as well as its logistical flow through many methods such as Kanban or even the Just In Time, delivers a method close to perfection which still inspires all the major world manufacturers today. But where the TPS shines and stands out as the most inspiring production method, it is not only by its ability to generate a nearly flowless production and product quality but by its workers management, by creating a true professional conscience and self-discipline. It's understandable why Toyota's production method is the gold standard in efficiency, flowless, and error-free production both by its depth and its complexity.

2.2. The major Innovations by Toyota

Toyota has been mainly renowned for its thoroughness and quality, but the Japanese manufacturer surprises in the 21st century. After having established solid bases of its production Toyota finally bounced back on its achievements and invested many efforts in the research and development. Nowadays, Toyota is renowned not only for its production quality but for its direction towards the flexibility of its revolutionary production chains and its leaning towards eco-friendly vehicles such as electric or hybrid cars.

This production mastery of Toyota brought by the TPS allowed Toyota to focus and invest more largely on innovation both in these products and in its production lines (figure 9).

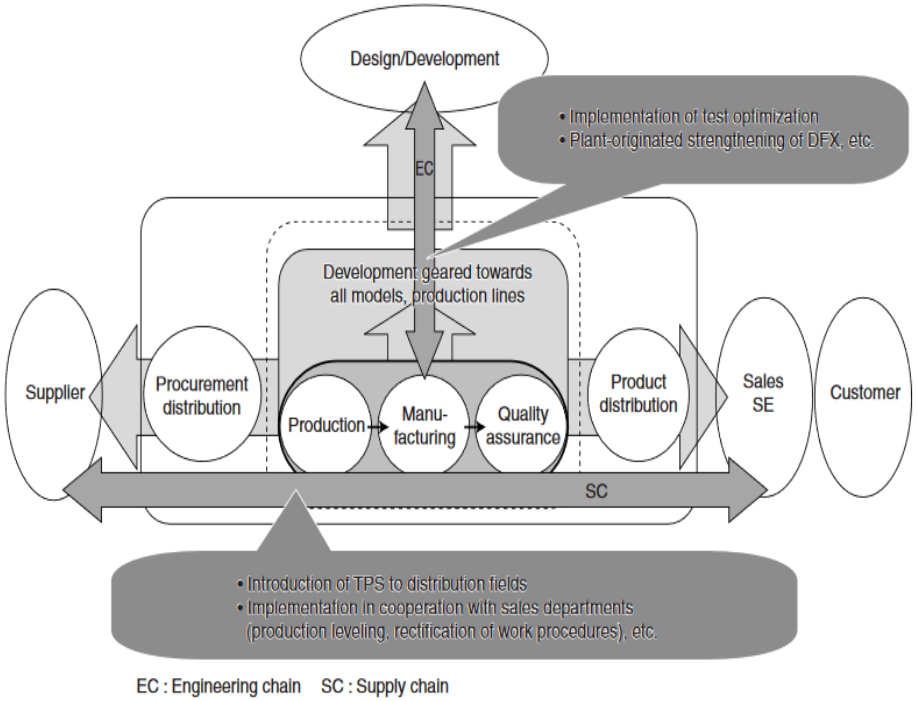


Figure 9: Development towards overall production innovation activities (reference 27, p21)

2.2.1. The revolutionary flexible assembly lines

Toyota does not only have an exceptional quality and industrial rigor but also is in a constant search for innovation which requires the development of their production chain (Example of production Appendices 2).

Indeed, the current production chains present an arrangement such as this one bellow

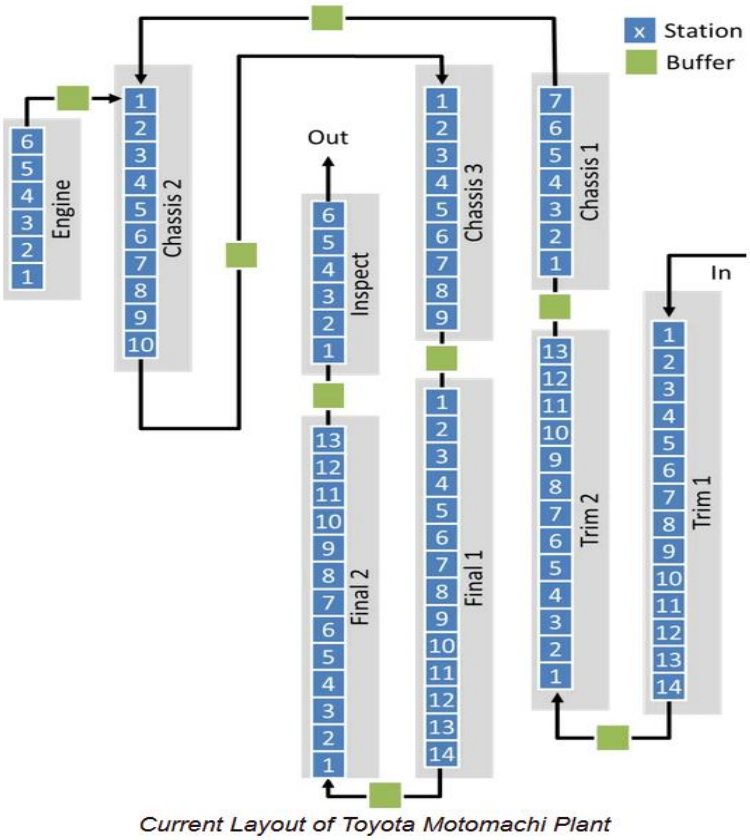


Figure 10 : Toyota current production Chain (reference 35)

A very linear arrangement (figure 10) comprising a multitude of small segments and robots aimed at a very prescriptive task allowing greater ease of work and an easy and logical understanding of the production of a car. Nevertheless, Toyota sees a different problem with this very classic production. It is very expensive in infrastructure and machine and also requires a large space, moreover a problem on one of the workshops and the whole production chain can be paralyzed. The Japanese giant has therefore thought of another method they call Flexibility Configurable Assembly Lines. The idea and concept are simple to

understand. It would be a question of being able to rearrange the production chain by moving the workstations according to the model to be designed and rearranging them. This is possible because the workstations have wheels and can be plug in or plug out depending on demand. So, all the rails, the overhead structured or underground structures are gone.

Figure 11: example of old assembly line (reference 35)

Figure 12: Example of a new assembly line designed by Toyota (reference 35)

The modular and flexible assembly line (figure 12) will be much cheaper, and workers will be assisted by robots and tapeless automated guided vehicles which will no longer follow marks on the ground, but which will be fitted with navigation systems. All the equipment will also be more ecological. This type of assembly line therefore allows better respect of the environment, requires less cost of infrastructure and machine and allows even higher quality while allowing uninterrupted production in the event of a technical problem. Toyota says this revolutionary industry model is profitable and should equip its new factories in this way.

2.2.2. THE ECOLOGICAL INNOVATION

Innovative Toyota engineering does not stop at the production line. Being one of the automotive producers investing the most in research and development, Japanese manufacturers are also known and valued by their exceptional talent in ecological matters. Their hybrid and electric vehicles are among the most efficient and affordable on the market. An example of incredible ecological innovation is the Toyota Motor Corporation's "MIRAI ". In 2014 the first vehicle using revolutionary Toyota technologies including air compressors and hydrogen circulation pumps. It was a question of using hydrogen as fuel and thus of cancelling the emission of CO2.The air compressor also improves the characteristics of the vehicle by sucking oxygen from the atmosphere and compressing it to power the fuel cell. This improves the acceleration and the range. The motor is also cooled and is smaller because there is an incorporation of the compressor into the fuel cell stack. The engine is therefore 16 percent smaller and 50 percent quieter (see figure 13) *(reference 36).*

figure 13: more compact and a lesser vibration (ref 36)

Upgrading the pump and proficiently flowing the hydrogen that didn't experience a chemical reaction in the FC brought about the making of the primary fuel cell stack without a humidifier.

2.2.3. THE SAFETY INNOVATION

Toyota researchers are also experimenting with passenger safety which is the most important point in the auto industry. THUMS (Total human model for safety) is an example of TMC's progress in the field. Indeed, this new model is revolutionary because it reproduces the consequences of a shock on the human body by considering the muscles, internal organs and bones as close to reality as possible (see figure 14).

figure 14: THUMS test (reference 41)

The THUMS was mainly designed because the vehicles of the future will have automatic brakes and it is important to note and test the interaction between the seat belt and the human body, to assure the best comfort and safety to the customers. Toyota therefore asserts itself as a pioneer car manufacturer in terms of innovation.

Whether it is creating revolutionary management or production optimization methods such as the TPS or innovating by rethinking the structure of its assembly lines or redeveloping its factories, pushing technological advances in terms of ecological, robotics or security has their climax. The Japanese manufacturer affirms its genius in all branches of the automobile and confirms why it is considered by many to be the absolute benchmark in terms of quality and innovation.

3. TOYOTA MOTOR CORPORATION STRATEGIC AUDIT

History proves that everything that lasts over time, whether it be a civilization, an empire or even a company or multinational had one thing in common: a strategy, a vision, a plan a way to project yourself into the future in order to grow, expand and finally prosper. Nowadays, where globalism is so present, every decision, both strategic and financial, has a primary impact on the future of each business. So many factors must be taken in consideration from the political, economic, social or even ecological factors.

These strategies, which have been improved over time and through experimentation, makes it possible to understand and make the decisions most likely to provoke a beneficial reaction for the company. Knowing when to take risks, or when to be on your reserves, on which technology to invest or what types of clientele to focus. All these various factors are part of the subjects tackled in a Strategic Audit.

PS : the author considers that the Covid 19 pandemic will not be as relevant in this audit as it should be due to the extreme difficulty even for the best specialist to estimate the damage or the impact it will create on Toyota or on our society. However, the next chapter (chapter 4) will deal with the Covid 19 crisis on the automotive world and its impacts on Toyota MTC.

3.1. The current Situation

3.1.1. The overall performance

In 2007, Toyota turned into the world's biggest automaker as far as deals (2,348,000 vehicles sold for the principal quarter of 2007) and creation (2,367 million) deposing the American organization General Motors which had involved this situation for a long time. Regarding benefits and money, Toyota is now the world's best maker for quite a while. The organization is an innovator regarding income ($ 228,258 million until December 7, 2007); preceding General Motors Corporation ($ 185,434 million), Ford Motor Company ($ 168,657 million), Daimler AG ($ 166,407 million) and Volkswagen AG ($ 159,435 million) with a steady spotlight on consumer loyalty, Toyota positions second (after BMW) on the rundown of most appreciated vehicle producers. In the car division, Toyota is the most refreshing brand by customers before BMW, Mercedes and Honda. Most importantly, the escalated showcasing system of the crossover model has added to this positive picture apparent by clients and which has permitted Toyota to remain the main.

3.1.2. The current Performance

The fiscal year of Toyota Motor corporation ended the 31 TH March 2020 (The fiscal information is recognized and certified by USA counting principles)2020 was not particularly a good year for the giant Japanese manufacturer. Toyota's annual vehicle production will be 8,958,423 units, which corresponds to a drop of 18,372 units compared to the previous year and a drop in revenue of 30 trillion yen, or 1 percent of Toyota's revenue. Operation income went from 2.4675 trillion yen to 2.4428 trillion yen which is a significant drop. This would be due to the crisis and the worldwide spread of the pandemic Covid 19 expressed by TMC operating Officer Kenta Kon. Sales in Japan increased by 13,372 units, however in North America and Europe, a decrease in sales of more than 60,000 units. In Asia also a decrease of 70,000 units and in other regions of the world by 45,000.This was a disastrous year for the Japanese manufacturer, however, TMC manages to stabilize at a net

profit of 6 percent which is a very acceptable figure and the automotive sector is in a current crisis (especially German manufacturers who lose up to 20 percent profit).TMC by its organization and its exemplary reactivity manages to decrease the economic impact caused by the crisis (see figure 15).

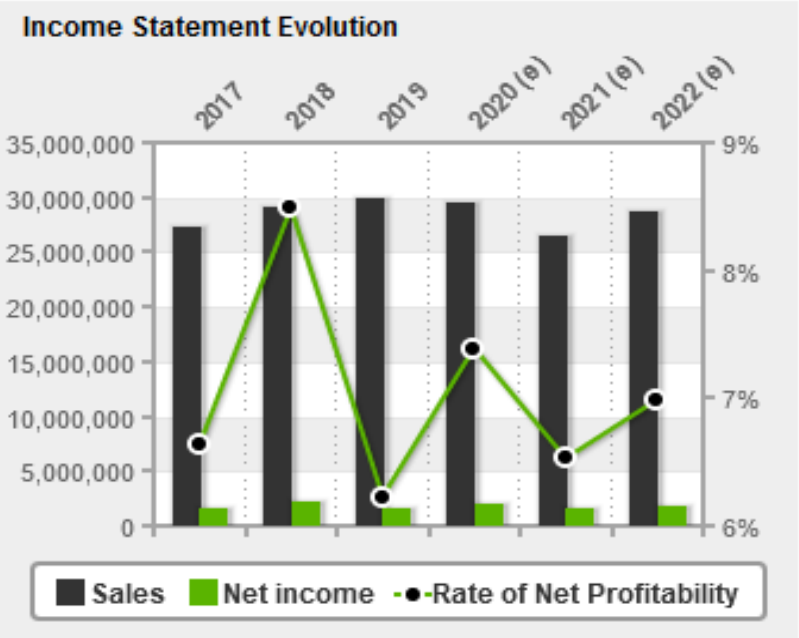


Figure 15: Toyota Income satement evolution from 2017 to 2022 (reference 23)

the exchange rate or currency fluctuations have a strong impact on businesses, because it can determine the market power of a company, generate periods of economic crisis or, conversely, periods of extreme growth. The rate fluctuation of the yen was stable until the Covid 19 crisis appeared that made the value of the yen went from 112 yen for 1 US dollar to 103 for 1 US dollar (see figure 16).

The current value of the Yen is 107,5 yen for 1 US dollar (2019/2020).

Figure 16: Yen fluctuation over the year 2019/2020 in US dollar (reference 23)

3.1.3. The market share:

Despite the current downturn in the global automotive market, affected by the slowdown in the Chinese economy and the current pandemic. The Japanese giant Toyota published record results and has the largest share of the automotive market (10.24 percent) ahead of the German manufacturers and the giant General motors (see figure 17).

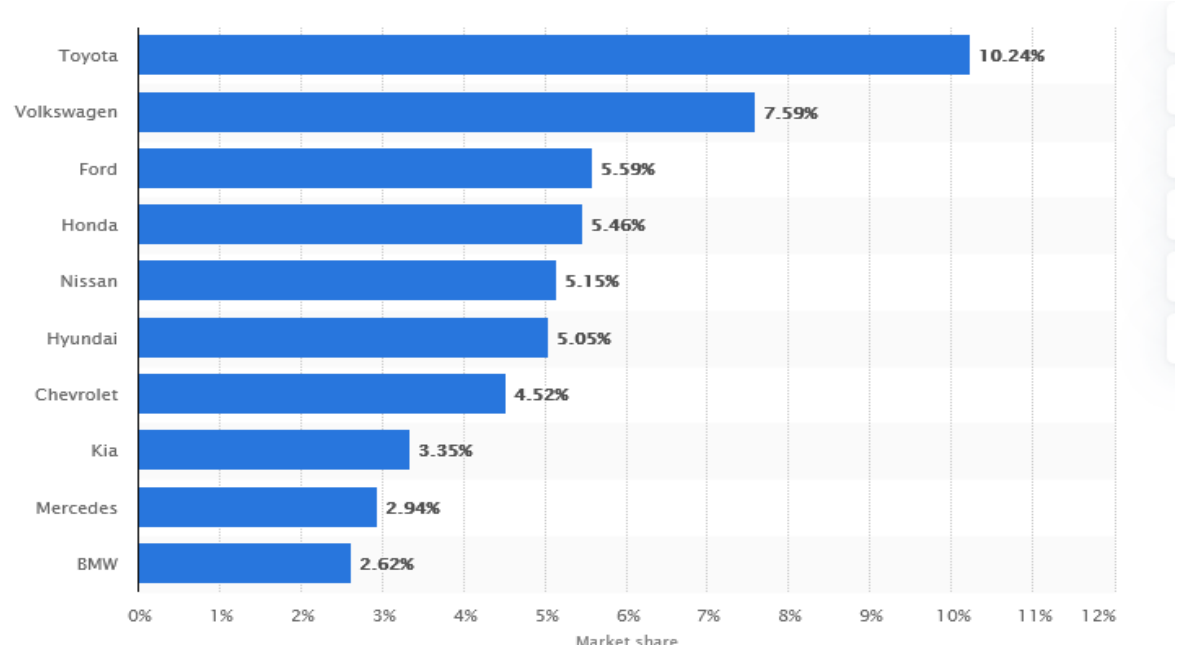


figure 17: Automobile market share (reference 22)

3.2. The Strategic Posture

In order to provide a precise and exact analysis of a multinational company, it is essential to understand its philosophy, its essence and its vision. The Strategic Posture will be divided into 4 parts which will allow us to understand and analyse the turn, both strategic but also philosophical, that TMC (Toyota Motor Corporation) will decide. The strategic posture is essential to analyse correctly in order to provide adequate information to the most intelligent strategy to implement.

3.2.1. The mission:

The mission and vision of Toyota is clear, and their own statements are:

**Toyota lead the way to the future of mobility, enriching lives around the world with the safest and most responsible ways of moving people. Through our commitment to quality, constant innovation and respect for the planet, we aim to exceed expectations and the rewarded with the smile. We will meet our challenging goals by engaging the talent and passion of people, who believe there is always a better way. * (reference 28)*

This deep discourse symbolized by many points the Toyota philosophy which consists in advancing humanity in the right direction. A direction which, according to them, must be focused on individual and collective respect but also the respect for our planet Earth by proposing numerous technological and ecological innovations. However, what remains the most important to TMC is the customer satisfaction, offering vehicles that are pleasant to drive and good, quality wise.

3.2.2. The objectives

In order to be able to transmit this Toyota philosophy to the world, it is necessary to set up coherent objectives each semester which will allow the company to follow a guideline which will lead the objective to formulate strategies allowing to fulfil these objectives.

At its current level, the 2 major objectives of TMC are of course to remain the world's leading car manufacturer and to establish its position on the competitive market.
But these 2 objectives are finality to be done it is necessary of course that the Japanese company keeps a strong brand recognition while continuing to provide quality, to provide vehicles of a great safety and pleasant to use on a daily basis. Also, to provide an unbeatable value for money specially to spread in countries emerging notably in Asia or South America. Toyota also proved their commitment to the future, whether it be new technologies such as electric cars or hybrid engines. The Japanese giant invested in technology focused on the well-being of the planet.

The main objectives:

Toyota's objectives are diverse, but their main aim is to dominate the competitive automotive market. In order to do this many factors are necessary such as an improvement in the affordability while keeping a strong brand recognition. Safety is an indispensable area in all industries and providing world-class safety to protect the lives of customers seems obligatory to the serenity of the Toyota empire. Beyond safety Toyota makes a point of honor to deliver cars that stimulate and even inspire and earn smiles from our customers, while thinking about the future and in vesting into more ecological vehicles such as electric and hybrid cars.

3.2.3. The strategic goals

To achieve all these objectives, it is necessary to ensure a better value for money than the competition. This is only possible by having a more optimized production than the competition, an optimal organization and management, better logistics and good relationships with suppliers.

In addition to own a management capable to focus on the most urgent, the most important and profitable points in order to maximize the benefits.

Staying at the cutting edge of technology is essential for TMC by investing in Research and Development and effectively developing innovations in the automotive or industrial production sector.

The main goals:

To assure a high quality for a low price

To base controls on effective corporate governance and a range of performance indicators.

To maximize the potential for performance

To coordinate the company's cross-actions according to the dominant client demand.

To make resources available to the needs

To keep a strong R & D capacity (hybrid and electric car)

3.2.4. The policies

Toyota exact statement:

**We, Toyota Motor Corporation and our subsidiaries, take initiative to contribute to the harmonious and sustainable development of society and the earth through all business activities that we carry out in each country and region, based on our Guiding Principles. We comply with local, national, and international laws and regulations as well as the spirit thereof, and conduct our business operations with honesty and integrity. In order to contribute to sustainable development, we believe that management interacting with its stakeholders as described below is of considerable importance, and we will endeavour to build and maintain sound relationships with our stakeholders through open and fair communication. We expect our business partners to support this initiative and act in accordance with it. *(reference 25)*

The strategy of the corporation is based on the formation of a true professional conscience in all the levels and the branches of the multinational. It is necessary to create in a strong hierarchical structure, an individualism and an extreme confidence in all the meshes of the company.

To achieve this, exemplary quality, an excellent organization and relations of exchange, a good communication with the suppliers and the shareholders are essential. This is the result of discipline and organization like no other implemented by TMC for half a century.

3.3. The Corporate Governance

Corporate governance is a set of rules that a company decides to adopt to balance powers within its management and more generally between all stakeholders.

The corporate governance procedures put in place can address different subjects:

- the decision-making method which is based more on consultation.
-the power of managers, especially executive managers.
-the appointment and remuneration of officers.
-developing strategies.
-performance management.
-reporting and auditing and the compliance with legal, accounting, tax or company-specific regulations.

Corporate governance is based on 4 fundamental rules that are essential. The transparency, which means that each actor has the right to reliable and complete information. Then the decision-making process must be efficient and correctly distribute powers between the actors and the performance evaluation system must be put in place. And finally, the effectiveness of the governance chosen must be evaluated *(reference 20).*

3.3.1. The Board of Directors

The board of directors' task is to provide solutions to business problems and to validate strategies whether it's production or financial to ensure a bright future to the company. They must supervise the top management too and are responsible of the hiring or firing of the most capital and high responsibilities spots. Most of the member of the Board director are the most powerful shareholder of the company *(reference 21).*

In the case of TMC, the number of board director is represented by 9 participants. The 5 most relevant are Akio Toyoda president CEO and representative director. Takeshi Uchiyamada is the chairman, Kenta Kon the chief Financial Officer, Shigeki Terashi is the Chief technology Officer and Executive VP and Seiji Sakai the IT and information System Manager.

The 4 other members of the board director are Didier Leroy too, Ikuro Sugawara, Teiko Kudo and Sir Philip Craven. It can be easily seen that even though the company is a multinational, almost all the members of the board of directors are Japanese. This information is invaluable for the understanding Toyota's state of mind and its hierarchical vision.

indeed, most of the members are Japanese which means that the multinational remains very nationalist and all decisions are taken in Japan by Japanese. Also, to noted that even in foreign countries the top managers are mostly Japanese too. Thus, TMC retains a nationalist control over the multinational. This configuration is both an advantage because the decision making is very clear and linear, but it can cause different flexibility and cultural issues.

3.3.2. Top Management

The Toyota's decision-making system is extremely detailed and explains a slow but constant growth lasting more than 50 years. Each domain of the structure must make a report which is analysed and discussed then goes up in the hierarchy. then a shareholder's meeting take place which decide of which project to select or dismiss. When it's done the information goes back to the board of director analysed again to finally have the president giving the final direction.

This method of decision-making has many advantages because it limits strategic errors through numerous successive analyses of different bodies of the company. But it represents a long time to travel from the bottom of the hierarchy up to the board of directors (see figure 18). The chairman and members of the management committee are elected by the board of directors.

Toyota declaration:

"As our policies concerning selection (and dismissal) of senior management and appointment of director candidates, we carry out comprehensive evaluations from the viewpoint of placing the right persons in the right positions. "(reference 19)

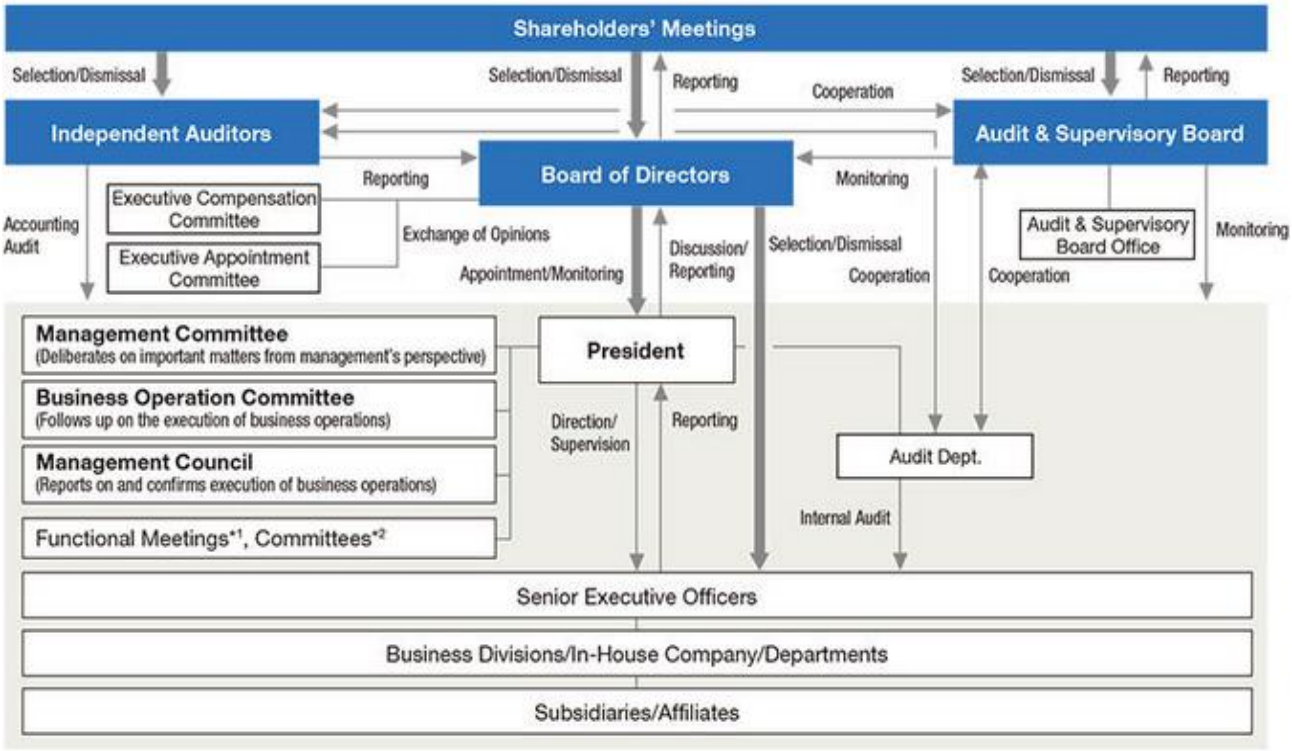


Figure 18: Toyota corporate governance report (reference 19)

3.4. The Environments Analysis using SWOT matrix or PESTEL matrix method

The environments analysis (see figure 20) is a step-in order to be able to effectively apply the PESTEL method and generate a correct SWOT matrix *(reference 30,* Wheelen, T. L., & Hunger, J. D. (2012). Strategic Management and Business Policy). The principle is as follows, to analyse all the variables inside and outside the Toyota company. Each of these factors influence the expansion of the multinational will then be classified by order of importance and by category (threat or opportunity and strength and weakness).As soon as this ranking is made a SWOT (Strength Weakness Opportunities Threats) matrix can be generated. The finality of this matrix makes it possible to generate 4 strategic hypotheses allowing an action plan tracing the main lines to follow so that the company is successful. SWOT analysis is a strategic planning tool that helps entrepreneurs identify their strengths and weaknesses, as well as the opportunities and threats in their market or environment. Most often used to launch the company as part

of the business plan, it is however an interesting tool to prepare strategic decision-making and as a starting point for a team discussion *(see figure 19).*

Figure 19: Example of SWOT matrix (reference 17)

The PESTEL model is used to analyse and anticipate the opportunities and threats of the macro-environment (set of external variables that have a positive or negative impact on the business).

The PESTEL model offers to its user to a global vision of its environment, since it distinguishes six categories of macro-environmental influences which can impact your activity, and which form its acronym:

Politics: all the decisions taken by national and international governments (fiscal policy, foreign trade, etc.)

Economic: all the factors which influence purchasing power and consumer behaviour (inflation, unemployment, disposable income, interest rates, etc.)

Sociological: all of the social characteristics that play on purchasing power (demography,

religion, leisure, work attitude, income distribution, etc.)

Technological: all technological innovations that can disrupt the existing market (private or public investment in R&D, new patents, transfer speed, etc.)

Ecological: all the regulations and constraints linked to sustainable development (waste treatment, energy consumption, environmental protection laws, etc.)

Legal: all the regulations and legislation which govern the labour market and companies in all sectors (labour law, commercial law, security standard, law on monopolies, etc.)

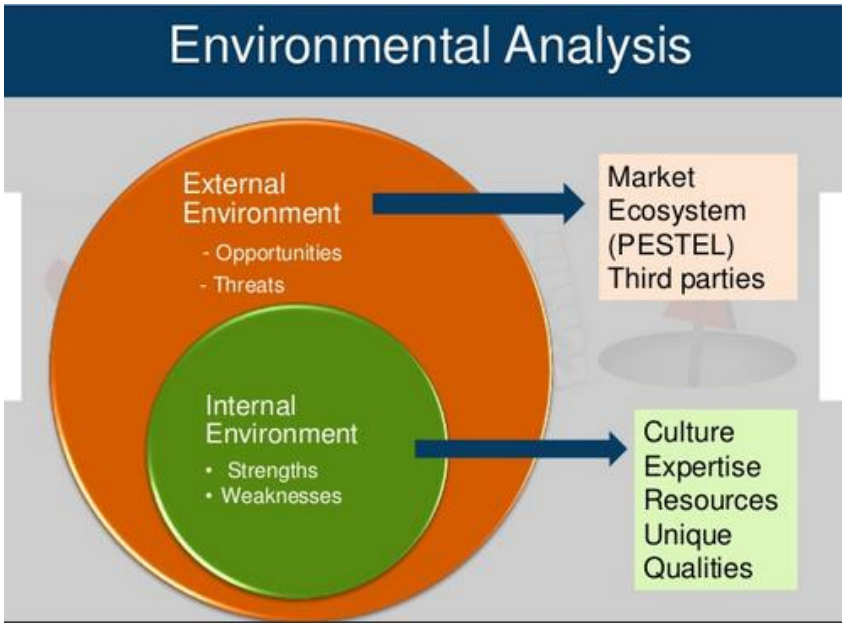


Figure 20: environmental Analysis representation (ref 59)

For this strategical Audit case on TMC, the PESTLE method and matrix will be set aside in favour of the SWOT Matrix because it offers a result with several solutions and is more efficient in many cases.

3.4.1. The External Environment

To successfully formulate the best strategy for the future of Toyota, it's mandatory to analyse a multitude of factors that affect TMC's success in a positive or a negative way. This part will first of all deal with external factors, which TMC has no control or impact over.

It can be described as variable, but which will have a significant impact on the success of the Japanese manufacturer. All these external factors can then be analysed and classified in 2 categories, threats or opportunities *(reference 30,* Wheelen, T. L., & Hunger, J. D. (2012). Strategic Management and Business Policy*).*

This method of strategic analysis will then give the opportunity to classify which opportunities are the strongest and therefore on which to invest the most and which threats are the most important and thus mitigate them to the maximum.

The external environments can be divided into several categories:

- **Nature physical environment**
- **Task environment**
- **Societal environment**

Each of these categories comporting many different factors will be analyse in the case of Toyota Motor Corporation. It's important to understand that these factors are not stable and can change every year since the needs, the social and physical environment is in constant movement and that the industries technologies and methods are evolving too.

Even if these 3 categories are different, there is a link between each of them and each category can't be analysed individually.

3.4.1.1. Nature physical environment

The natural and physical environment has a huge impact on any multinational because it must comply with the rules of nature. Indeed, the climate, the fluctuations of temperature or the level of the oceans, the water resources available, the natural resources available have different reactions throughout the world. These factors will therefore directly change the strategy adopted by Toyota depending on its location.

For example, the biggest environmental factor for any car company is the fluctuation in the price of oil which is after various conversions converted into fuel.

This fluctuation is dependent on the daily use of petroleum but especially on its scarcity. Logic dictates that the larger the nature reserves, the lower the price. Today the largest reserves of petroleum collected are located in Saudi Arabia and Venezuela. However, after the oil crisis in Venezuela because petrol there isn't as pure and more difficult to transform than in Saudi Arabia and in the Persian Gulf the economy of the country has collapsed.

However, oil is not the only player who can destabilize Toyota. The fluctuation in the price of raw materials is a major one. The price of steel and raw materials coming from the 4 corners of the world to produce Japanese vehicles influences the world automobile market.

Environmental regulations are also dependent on the environment which affects any automobile company or any type of production. All these factors cited are threats to TMC because these factors cannot be controlled and greatly affect the economic stability of the Japanese manufacturer. Nevertheless, the establishment of Toyota in more than 70 different countries and on the continents constitutes a great opportunity. It allows Toyota to establish its domination in the competitive market and gives greater readability to the brand.

3.4.1.2. Societal environment

The societal environment corresponds to all the factors that we could qualify as cultural, political, legal, technological or even economic. All these factors affect and determine the customs of customers and how different countries will behave both culturally and economically.

The different opportunities that TMC can exploit in these various fields are firstly the individual freedom which is becoming more and more universal in the world. As an example we can speak about the women's driving rights in Saudi Arabia, which open up a new clientele in Persian Golf, which is not negligible, but also a population in constant increase (the estimates more than 10 billion people in the world in 2050). This increase of the population presents in the long term a multitude of new customers to conquer and therefore a multitude of new commercial strategies to initiate.

However, the 2 biggest opportunities for Toyota are the extensions of many emerging countries such as Brazil, India or on a large part of South America. These countries are the future of Toyota because they represent the new strong potential of possible customers. Nevertheless, it's essential to be subtle in the way of approaching the situation because it is difficult to invest in emerging markets while maintaining a strong presence in countries already invested by the multinational.

Another huge opportunity for TMC is the current global trend, which is very much geared towards ecology and therefore the excessive demand for hybrid vehicles or electric cars. This field is one of the assets of the Japanese manufacturer because it invests heavily in research and development and has a range of hybrid or electric vehicles very efficient and popular. On the other hand, the societal threats that the multinational can meet is mainly located on political axes, in particular a bad reputation between China and Japan which persists, and which overshadows the opening of the flourishing Chinese market for the Japanese manufacturer. Also, the Brexit which is initiated in the United Kingdoms and which will upset all the business installed mainly in London. Moreover, world economy is shaken up by the border tax and trade protectionist policies under President Donald Trump administration which hinders non-American companies in their expansion in the richest country in the world (United States of America).

The health crisis caused by the Covid 19 was the essence of an economic, political and social crisis which greatly affects the automotive world causing a strong global recession. However, this factor is too recent and not yet stabilized to have a clear judgement on its impact and it will mostly depend on the efficiency of the world and the modern medicine to answer properly to this threat. Finally, the last threat noted is in the current customs of people mainly in big cities which favour public transport more and more because of their low cost and ecological aspect.

3.4.1.3. The task Environment

The task environment constitutes the different forces that push the market to be competitive and if some of these forces vary in some countries or continents?

For the example of TMC, the opportunities in this area are the incredible and growing number of possible automotive markets in the world. Whether in already developed nations like Europe, East Asia; or north America where the need is stable and the sales high but still in the emerging locations of the globes which opens an incredible number of profitable spots for the automotive business. These opportunities are then accentuated by the inexhaustible reputation of the Japanese giant, by its value for money as by its after-sales service.

Nevertheless, the automobile market presents an extreme threat which is due to an outstanding competitiveness, whether it is the German brands which have a strong presence especially in Europe or the giant General Motors in the United States passing by emerging brands like Peugeot in Europe.
As one of the most competitive markets in the world where it is important to understand the needs and expectations of customers based on their culture (what works in Asia does not necessarily work in the united states) and also innovate (new technologies, hybrid or electric vehicles).
The threat of substitute of product or services is still omnipresent in the automotive world.

3.4.1.4. Opportunities and Threats (SWOT)

External factor analysis summary highlight Toyota's most relevant opportunities or threats. the first column gives the name of the external factor when the next column determines whether it is an opportunity or a threat (where *O* stand for opportunities and *T* for threats). The weight shows the importance of the factor and the rating score correspond to the importance of the reaction of this factor. (0 means the reaction is low and 5 correspond as the highest reaction). The weighted score corresponds to the coefficient between the weight and the rating. higher is the weighted score and stronger is the factor and it determinate a capital point to elaborate the strategic audit *(reference 30,* Wheelen, T. L., & Hunger, J. D. (2012). Strategic Management and Business Policy*).*

External factor analysis summary of TMC (Toyota motor corporation):

External factors	Opportunities or threats	weight	rating	Weighted score
Implantation all around the world	O	0.06	5	0.30
Fluctuation of petrol and raw material	T	0.08	5	0.40
Environmental regulation due to pollution	T	0.07	4	0.28
Very strong competitivity in the automobile area	T	0.10	5	0.50
Threat of substitute product or services	T	0.08	4	0.32
Many possible markets (so clients) all around the world	O	0.07	5	0.35
Strong brand reputation to expend on new market	O	0.08	5	0.40
Market in emerging economies	O	0.07	4	0.28
Public transport preference	T	0.05	3	0.15
Border tax and trade protectionist policies under trump administration	T	0.06	2	0.12
Toyota facing problem with the Brexit	T	0.04	2	0.08
Bad relationship of japan with China	T	0.07	3	0.21
Increasing demand of electric or Hybrid car	O	0.06	5	0.30
In some country women are more and more allowed to drive	O	0.03	2	0.06
Global population growth which indicate more future customer	O	0.02	1	0.02

Pandemic corona virus causing great economic damage to the entire world	**T**	**0.06**	**3**	**0.18**
Total		**1**		**3.95**

Table 2: external factor analysis

This table (see table 2) considers the maximum of external factors in order to determine the opportunities and threats affecting Toyota. In addition, all these factors are hierarchized from the most important at least with a rating system. This step must be done thoroughly to have a correct final SWOT evaluation.

3.4.1.5. The Industry Matrix

The Industry Matrix is a comparison tool that highlights the strengths and weaknesses of different organizations of the same field. At the occurrence it is the automotive field with 4 giant manufacturers, TMC the Japanese manufacturer and subject of our analysis, the German manufacturer Mercedes and the French manufacturer Peugeot which will be compared in the main competitive areas such as the quality of the product, the brand reputation, the Market share, the customer service, the Financial position, the Global presence and the investment strategy.

It is important to specify that this table was established by the personal knowledge of the author and therefore it was not in any way an official table of a classification of cars manufacturers.

	weight	TOYOTA	MERCEDES	PEUGEOT
Product quality	0.15	4	5	3
Brand reputation	0.10	5	5	3
Market share	0.12	5	4	2
Customer service	0.8	5	4	4
Financial position	0.10	5	4	3
Price	0.15	4	2	5
World implantation	0.12	5	4	3
Investment strategy	0.8	4	4	5
Score	**1**	**4.56**	**3.98**	**3.20**

Table 3: industrial Matrix

According to the industry Matrix (see table 3), TMC is the most efficient car manufacturer and this has its unbeatable value for money and its strong reputation for quality and its presence in all continents.

3.4.2. Internal environment

The internal environments cover all the factors that TMC has a direct impact on. As an example, it can be the management of its hierarchy and its administration or its financial strategy and its order of priority for investment or its logistics or its technological research priority *(reference 30,* Wheelen, T. L., & Hunger, J. D. (2012). Strategic Management and Business Policy*).*

For this the internal environment is divided into 3 distinct groups which will be explained covered by this essay.

- **The corporate structure**
- **The corporate culture**
- **The corporate resources**

3.4.2.1. The Corporate Structure

The corporate structure is representative of the functioning of the company in its interior, everything that makes its organization. The way each decision is made, its structure and its hierarchy. This factor is essential because it determines the speed and efficiency of strategic decision-making for the company and its internal structure.

The organizational system and structure of Toyota is Pyramidal, which leads to a strong hierarchical inclination very representative of the Japanese culture. In fact, each one has a very precise place and must carry out his task in a very restricted framework which can seem like a strength because it allows a simpler management and a more organized work but can be a brake to the creativity and the personal employees' decision making.

This very hierarchical system very suitable for Japan and its working method can be a weakness because the new working model for coming from the Nordic countries (Sweden or Norway) offers a lesser hierarchical structure and a lower power distance between the employees. This lower management is very effective and strengthens individual decision-making. Another weakness that a structure such as TMC can include is a problem that any large, especially industrial company encounters which is a lack of flexibility in many fields (for example stopping the production of a type of vehicle that is not very popular).

this lack of flexibility can be crucial in a world where the watchword is reactivity. (we must keep in mind that Toyota is rather efficient in terms of responsiveness compared to its size and that it is a recurring problem in the entire automotive industry) *(reference5,7).*

Nevertheless, the internal structure of Toyota is an example of decision-making control, because each information goes back in the hierarchy and is constantly controlled by the upper branch and each decision is taken meticulously after numerous analyses and subjections from many specialists in many branches of the business.

3.4.2.2. The Corporate Culture

The corporate culture expresses the customs and cultural differences that Toyota may encounter, in fact Toyota is a Japanese company which managed to keep its own philosophy, an intern structure and a very nationalist management despite its expansion in the world and therefore as it has been said previously with a strong hierarchy *(reference 10).*

What is interesting is to understand how Toyota through this philosophy of work manages to transmit it in other cultures where work takes less space than in Japanese culture. This is a weakness of TMC because its way of working can be delicate to enforce in many countries and thus requires a managerial change in these. An example is one of the biggest and most recent industry in Europe of Toyota is located in France and we can imagine that this decision wasn't random. The French working methods and the management characteristics are not that different as you can see below, except the masculinity the statistics are very similar (see figure 21).

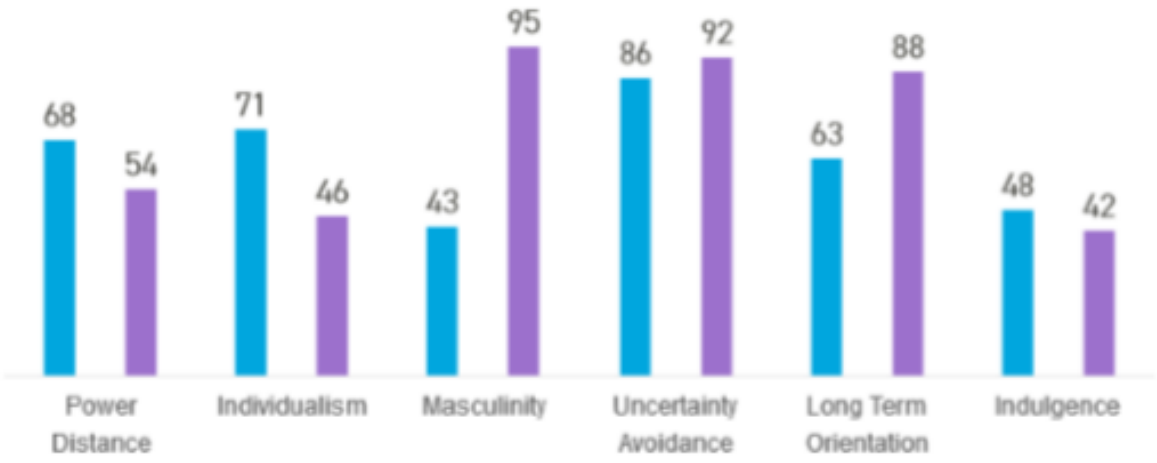


Figure 21: The Hofstede's Comparison between France in blue and Japan in purple (reference 10)

The Hofstede's Comparison of Japanese and French (France in blue and Japan in purple)

The power distance represents he degree of inequality among people in a population that a country considers normal.

The Individualism is the point at which people feel they are expected to take care of, or are cared for by themselves, their families or the organizations to which they belong. When the masculinity versus femininity shows the point at which a culture promotes dominance, authoritarianism and the acquisition of things. Against a culture that promotes people, feelings and the quality of life.

The degree to which people in a country prefer structured situations over unstructured ones is here represented by the uncertainty avoidance.

The long-term orientation is oriented towards the future, like saving money and being persistent. In the short-term values oriented towards the past and the present, such as respect for tradition and fulfil social commitments.

However, Toyota always promotes quality over quantity in its worker management with a large number of skilled workers and constant feedback from each part of the process. In addition the Japanese manufacturer put a point of honour has an admirable respect for each country working and ecological laws.

3.4.2.3. The Corporate Resources

The corporate resources correspond to every Toyota's marketing, financial, logistical, production and technological factors.

To start on the marketing and financial plan the Japanese manufacturer is based on the positive image of the brand and the high quality of its products, nevertheless the marketing plan and the unchanged vision of the business by Toyota which may seem archaic may be lacking.

However, the financial security is stable and wealthy from to good economy management that generate a small but stable growth throughout the 20 Th and 21 Th centuries. Nevertheless, this balance may be badly influenced by a certain dependence to the automobile field on raw materials and on petroleum prices fluctuation.

The production and logistics aspect of Toyota is an example to follow. Toyota managed maintains mutual trust with these material suppliers and an industrial rigor which offers one of the most efficient automobile production lines.

This remarkable management of the logistic and industrial process is one of the strong traits of Toyota and which helped to forge this prolific reputation.

TMC is one of the automotive companies that invests the most in research and development and innovates the most, which is a significant advantage to look to the future. It is also one of the manufacturers with the best skills in electric and hybrid engines.

In terms of manpower, Toyota has more than 370,000 employees which is a very large work force and a major asset, there are nonetheless weaknesses in personal management such as a very strong hierarchy between the worker and the employees proper to the Japanese mentality and a high level of stress in certain branches of the company.

3.4.2.4. Strength and weakness (SWOT)

Internal factor analysis summary highlight Toyota's most relevant strength and weakness. The first column gives the name of the internal factor, when the next column determines whether it is a weakness or a strength (where *W* stand for weakness and *S* for strength). The weight shows the importance of the factor and the rating score correspond to the importance of the reaction of this factor. (0 means the reaction is low and 5 correspond as the highest reaction). The weighted score corresponds to the coefficient between the weight and the rating. Higher is the weighted score and stronger is the factor and it determinate a capital point to elaborate the strategic audit (see table 4).

External factor analysis summary of TMC (Toyota motor corporation):

INTERNAL FACTORS	Strength or Weakness	WEIGHT	RATING	WEIGHTED SCORE
Hierarchical organizational structure	W	0.07	5	0,35
Lack of flexibility due to size of the company	W	0.06	5	0.30
Strong control and feedback on every decision	S	0.04	4	0.16
Problem to adapt to some working culture	W	0.03	3	0.09
Constant feedback from part of the process	S	0.04	4	0.16
Good respect of each countries works and ecological laws	S	0.03	4	0.12
High quality standard and qualified worker S	S	0.06	4	0.24
Powerful brand value	S	0.09	5	0.45
Unchanged vision of the business by Toyota for 50 years	W	0.05	5	0.25
Strong investment in Research and dev	S	0.06	5	0.30
Strong electric and hybrid skills	S	0.05	5	0.25
Product recall	W	0.06	5	0.30
Good proximity with the material suppliers	S	0.05	4	0.20
Remarkable gestion of the logistic and the industrial process	S	0.06	5	0.30
Great financial health	S	0.07	5	0.35

dependence in certain markets	W	0.05	4	0.20
More than 370 000 employees	S	0.06	4	0.24
High work intensity and stress in some area of the compagnies	W	0.04	2	0.08
Hierarchical relation between workers and employees	W	0.04	3	0.12
Total		**1**		**4.46**

Table 4: External analysis summary (TMC)

This table takes into account the maximum of external factors in order to determine the weakness and Strength of Toyota. In addition, all these factors are hierarchized from the most important at least with a rating system. This step must be done thoroughly to have a correct final SWOT evaluation.

3.5. Analysis of Strategic Factors

The SFAS table consists in selecting the strategic factors of each most important (which means with the highest weighted score) and determining category to form the SWOT matrix. These factors will be crucial to the SWOT and TOWS matrix (see table5).

SFAS	SWOT	WEIGHT	RATING	WEIGHTED SCORE
Powerful brand value	S	0.11	5	0.55
R AND D (electric and hybrid car mostly	S	0.10	5	0.50
Financial security	S	0.9	5	0.45
strong competitivity in the automobile area	T	0.11	5	0.55
fluctuation price of oil and raw material	T	0.10	5	0.50
Strong brand reputation to expend on new market	T	0.9	5	0.45
Many possible markets (so clients) all around the world	O	0.9	5	0.45
Increasing demand of electric or Hybrid car	O	0.8	5	0.40
Unchanged vision of the business by Toyota for 50 years	W	0.7	5	0.35
Hierarchical structure	W	0.7	5	0.35
Threat of substitute product or services	W	0.9	5	0.45
Total		1		5

Table 5: Analysis of strategic factors

3.6. The strategic Alternative and the Recommended Strategy

(SWOT and TOWS matrix): *Table 6: The SWOT and TOWS tables*

Internal / External	Strenghts (S) Strong brand value R AND D (electric and hybrid car mostly) Financial security	Weakness (W) Unchanged vision of the business by Toyota for 50 years Hierarchical structure low flexibility
Opportunities (O) Strong brand reputation to expend on new market Many possible markets (so clients) all around the world Increasing demand of electric or Hybrid car	Use the TOYOTA massive implantation all around the world and respectable quality reputation to sell to all potential new customers and stay ahead of competition in emerging countries	highlight a change in brand philosophy and promote new Toyota electric and hybrid vehicles in emerging markets.
Threats (T) Very strong competitivity in the automobile area Reserve of oil / fluctuation price of oil Threat of substitute product or services	to overcome the strong automobile competition and the too strong impact of fluctuations in the price of petrol by investing even more in the research and development of new hybrid or electric vehicles or new technologies allowing to consume less gasoline. The sale will be a success thanks to the excellent reputation of the TOYOTA brand and its excellent financial situation.	propose a less pyramidal and more flexible organization of the company and a less archaic vision in order to market differently from the current competition.

TOWS	S	W
O	3	1,5
T	3,4	2,1

When all the factors are classified and listed in the SWOT matrix above (see table 6), 4 different strategies can be developed according to the guidelines in the table. It is important to understand that if all the previous analysis steps are not carried out meticulously, the results of the SWOT engine cannot make any sense and propose a strategy which is hardly or even not viable at all. Then the 4 strategies appear (SO, ST, WO and WT).

In order to select the most viable and successful strategy there are 2 steps to follow. First the personal analysis which will allow you to determine if the strategies seems viable, then secondly the TOWS Matrix which allows mathematically to give a hierarchy using coefficient and a final value which gives an order of priority to the strategy the most efficient.

Four strategies emerged from the matrix. The first **Strength/Opportunities** uses the TOYOTA massive implantation all around the world and respectable quality reputation to sell to all potential new customers and stay ahead of competition in emerging countries. This strategy is not viable because it would consist in admitting to an absolute monopoly and would stop competitiveness and innovation. The second choice **Weakness /Threats** Propose a less pyramidal and more flexible organization of the company and a less archaic vision in order to market differently from the current competition. this solution may be viable but has many flaws because it does not fully meet the future challenges that the Japanese manufacturer will encounter. reorganizing the organization of the company will in no way change the threats to the environment. This may nevertheless offer a possible improvement to the Toyota system. The third strategy **Weakness/opportunities** Highlight a change in the brand philosophy and promote new Toyota electric and hybrid vehicles in emerging markets.

The last one **Strengths/Threats** seems to be the most viable option and the one mathematical choice by the TOWS matrix. It consists to overcome the strong automobile competition and the strong impact of fluctuations in the price of petrol by investing even more in the research and development of new hybrid or electric vehicles or new technologies allowing to consume less gasoline. The sale will be a success thanks to the excellent reputation of the TOYOTA brand and its excellent financial situation. This decision is an investment to the long term and to the future and to develop research into other fuel than petroleum using the strong reputation of the Japanese manufacturer. This vision of a future less dependent on oil should be a source of inspiration for other manufacturers who should overturn the world of the automobile. Moreover, this decision makes even more since with the current state of the economy and the Covid 19 crisis and seems to be the decision followed by Toyota during the pandemic. When the future is uncertain it is necessary to make effective decisions and anticipate future customer needs and decisions as well as anticipate trends.

3.7. The Implementation Table

Table 7 : The implementation table

Strategic Factor	Action Plan	Priority system	Who will implement	Who will Review
Powerful brand value	Stay in the same quality philosophy that TOYOTA offers for many years with high quality products and a strong after sales service.	2	marketing and public relation Department	committee and board of directors
R and D	Investing more money in the new technologies (hybrid and electric car) and stand out from the concurrence.	1	R AND D department	Board of directors
Financial security	making the right investment and keep making the right financial and marketing decisions.	4	Finance department	Audit commission
Competitivity in automobile area	Stand out of the concurrence by offering new concept and invest in emerging new market while keeping the high TOYOTA quality and standard	1	Production and trading department	Board of directors
Fluctuation Price of petrol	Try to be less dependent of the oil fluctuation by investing gin new technologies like electric care or hybrid or other concept that will reduce drastically the petrol consumption.	3	Financial, trading Rand D department	board of directors and audit commission
Threat of substitute product or services	however the automobile sector is one of the most diversified and competitive. The best way to counter this threat is to offer different concept or technologies and gain a certain monopoly in the market.	3	Trading and production department	Board of directors

This implementation table (see table7) gives a lot of essential information to the implementation of this strategy implemented through the SWOT matrix. Indeed, each strategic factor is implemented in the table which provides an action plan for the framework of each factor but also a priority system and the information of which body of the company will take care of setting up this strategy. The action plan column determines the actions that Toyota could take to resolve or improve the strategic factors. The next column (Priority system) presents the priority order of the tasks that Toyota should carry out knowing that 1 corresponds to the most important task and 4 the least urgent or relevant.

Present on the automobile market for more than 80 years and having asserted itself as the world automobile leader for more than 10 years, TMC had to create, invent and innovate in

the automobile sector.

By the bias of this audit and strategic analysis, it is possible to affirm that despite the Toyota archaic and pyramidal structure which can be improved on certain points such as its very hierarchical vision not suitable to some type of culture and a flexibility issue due to the size of the company that Toyota is greatly improving by their new industry model. The Japanese giant has been able to cultivate its own history and learn from its past mistakes to keep only the methods and techniques beneficial for the future of the company. By its exemplary production method, its exceptional value for money and its financial management offering excellent stability, TMC is also convinced that the future of the automobile lies in new technologies and the reduction of dependence on petroleum. The automaker has managed despite extreme competition to stand out in these many factors and presents an undisputed example of industrial rigor and innovation.

The strategy formulated by the author of this essay which root for a focus on new technologies and deviate from the current universal dependence to fuel (petrol) is in agreement with Toyota's philosophical line which advocates for a better future, customer satisfaction and the respect of the environment. In a world where the future is an uncertain value, where climatic conditions are deteriorating and natural resources are only logically decreasing and at the precipice of a new economic and health crisis, it is essential for all car manufacturers to adapt and even to anticipate standards, manners and needs of tomorrow. It is thus, the course of action of Toyota in this 21st century. always be one step ahead of hazards and future needs. Whether it's innovating its way of thinking about its production with the TPS (Toyota Production System), investing in less polluting vehicles or even reinventing the structure of its factories to make them more adjustable, more flexible and ecological.

The intensive investment to a better more efficient, greener and safer products is a testimony to Toyota’s commitment to this new challenge and a proof that the spirit and the vision of Kiichiro Toyoda has survived the decades and has remained intact to this day.

4. TOYOTA MOTOR CORPORATION COVID 19 CRISIS MANAGEMENT

The automotive sector is facing a crisis unprecedented during the 21st century. For two years, the sector had already announced effect reductions for the years to come, in connection with the profound transformation of the sector (automation, relocation strategies and conversion to electricity). The conversion to electric had started but was found to be sensitive to shocks. the start of 2020 saw an unprecedented event in the history of the 21st century the pandemic *Covid 19*. The virus sinks many countries into quarantine and propels the world into a financial insecurity. Every economic sector is affected by this unprecedented crisis which will have an impact in the decades to come on the world, our way of conceiving society and our way of consuming. The sector on which we will focus is the automotive sector, one of the most affected because this crisis causes customers to fear the years to come and a difficulty in projecting into the future. However, this crisis can have a positive impact on the long term and change codes and ways of producing or consuming that may not be adapted to the future challenges of our society. This chapter will analyse the current situation of the automotive world and the impact on the Japanese giant Toyota. Beyond the short-term measures necessary to relaunch the market, it will be necessary to learn the lessons of this global crisis. It is time to lay the foundations for world industrial strategy for the automotive sector, consistent with the objectives of combating air pollution and climate change. It is a condition of survival of many constructors in the sector.

4.1. COVID's impact on the Automotive market

The automotive world is affected as much in its production than in its distribution and logistics. But the biggest current challenge is to regain the confidence of the future buyers who can no longer project themselves and lose the desire to invest money in a car *(reference 44).*

The consumer confidence Index dropped immensely which is naturally correlated with the decrease in average GDP per capita, confidence which is itself linked to the intention to buy a car (figure 22).

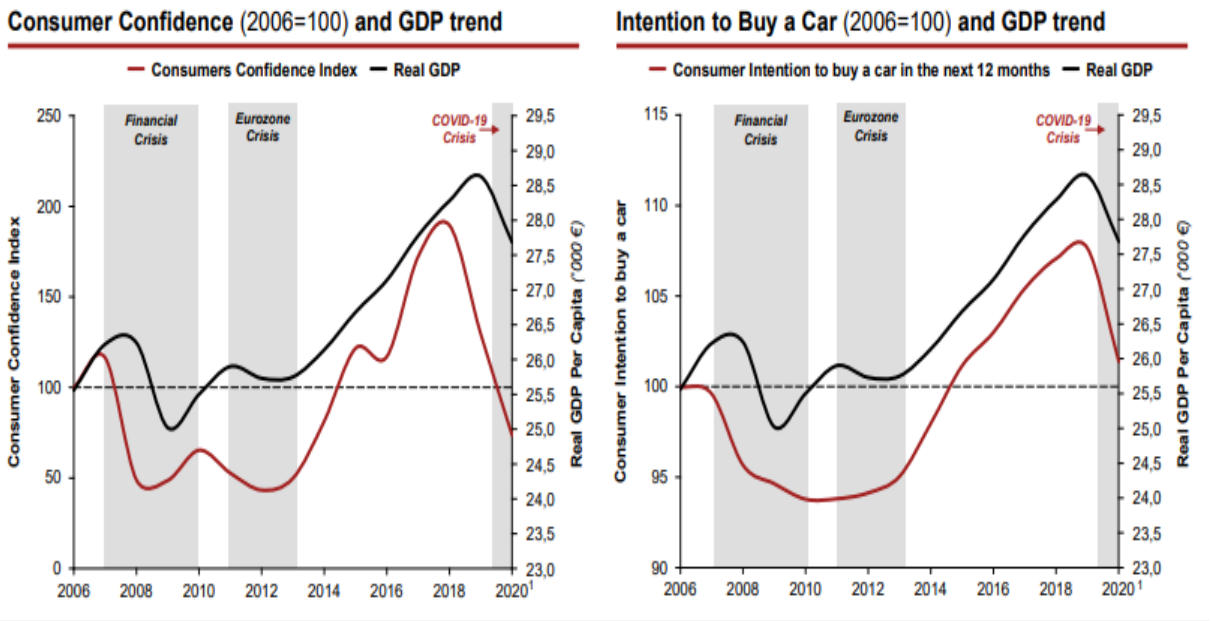


Figure 22: consumer confidence index (reference 44)

The estimates of sales and production in Europe has never been so low with a loss of 50 percent of sales in Spain at the end of 2020 and a drop in production of 55 percent in France and 45 percent in UK (figure 23).

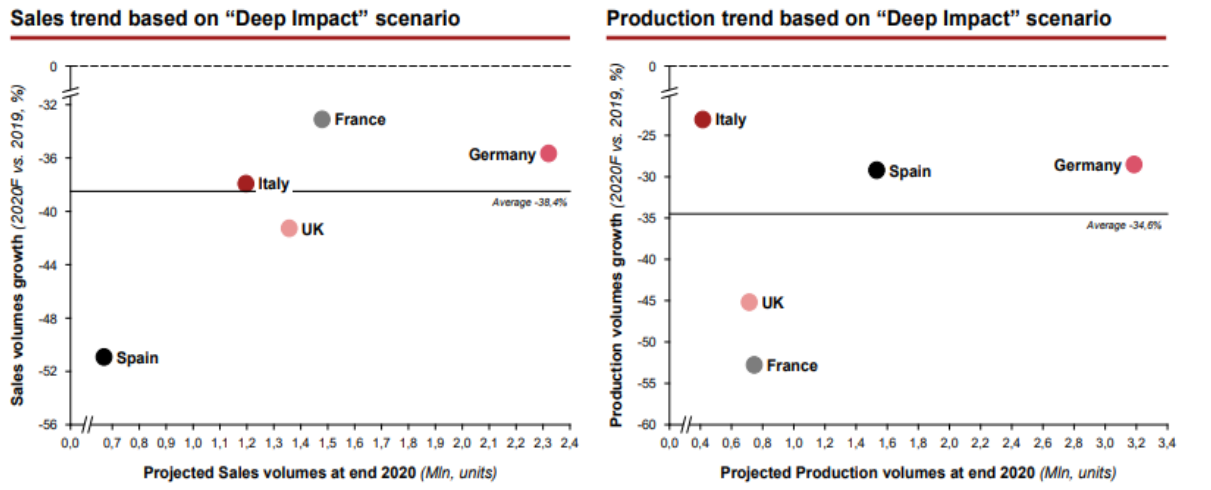


Figure 23: estimation of the sales and production in Europe in 2020 (reference 44)

Thus, the estimates of the global automotive market are rather disastrous since they estimate a decline in growth which was from 3.4 percent to 2.1 percent until 2024 in Europe (figure 24).

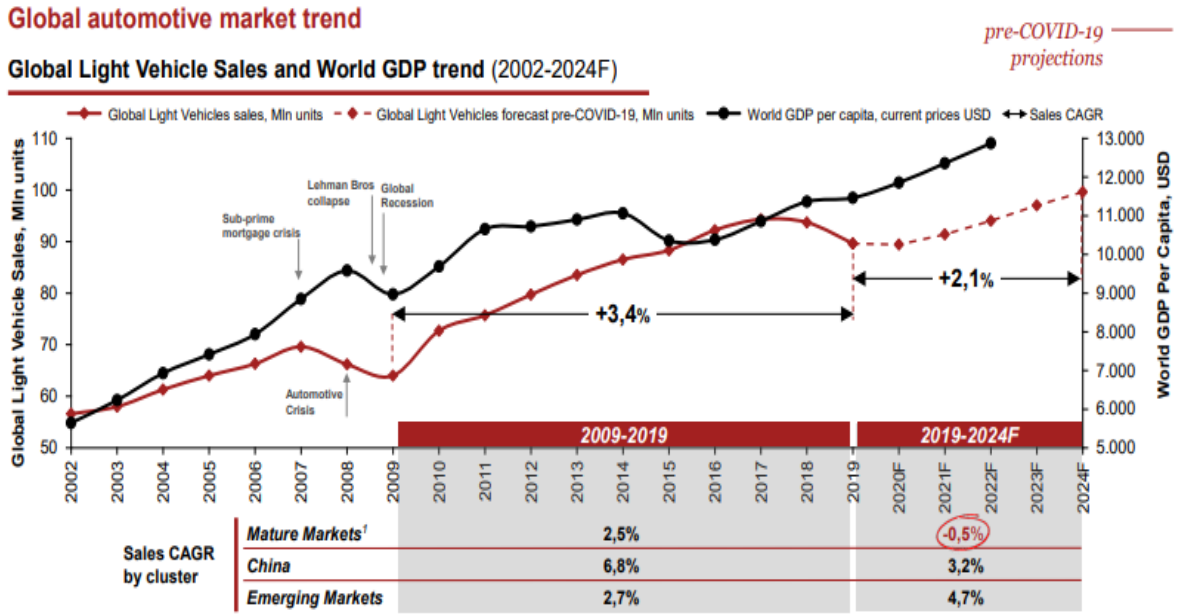


Figure 24 the estimation of the global automotive market (reference 44)

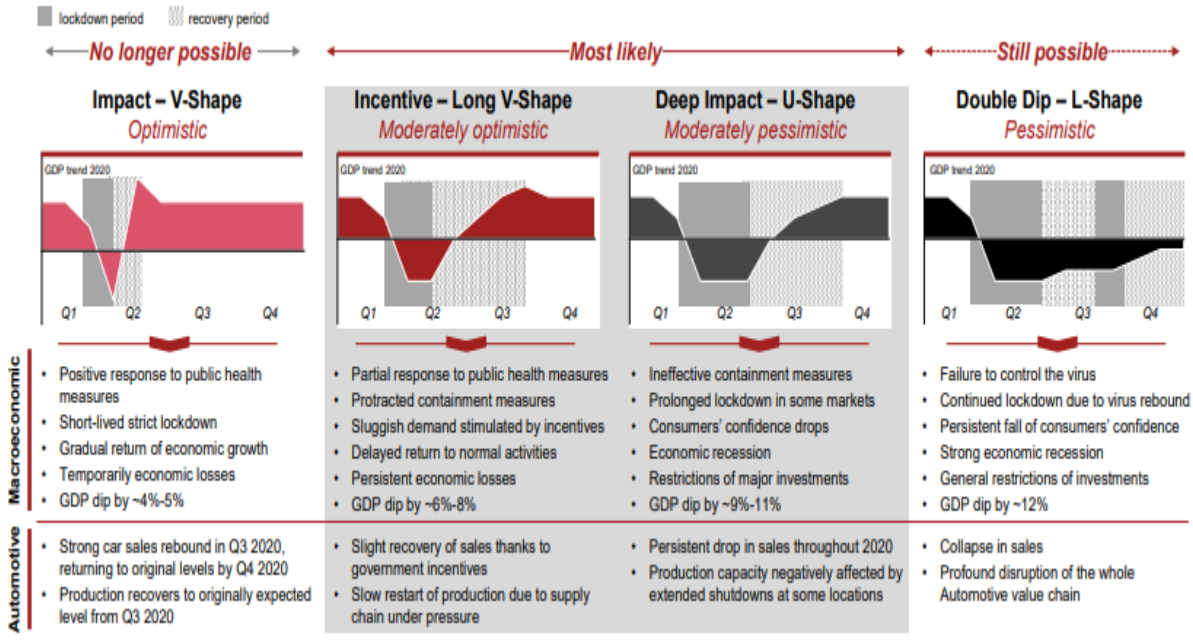


Figure 25: Impact of the Covid 19 estimation on the European GDP (reference 44)

It is possible to observe the various estimates of the economic impact caused by the Covid 19 during the month of March 2020, which means at the start of the crisis. some estimates are optimistic, others moderate and others pessimistic. It is therefore possible in winter 2020 to judge that the pessimistic estimate was the closest one because it is estimated a loss of GDP in Europe beyond 12 percent and a second containment for many European countries such as France or the Germany. This information helps to understand the economic disaster and the difficulty of managing this health crisis.

4.2. The Negative impact of Pandemic on the Japanese Manufacturer (Toyota)

It is obvious that no automaker is spared by this global crisis and Toyota is no exception. Indeed, the situation for the manufacturer along this year 2020 is catastrophic. The Toyota president Mr. Akio Toyoda explains: *The coronavirus has dealt us a bigger shock than the 2008 global financial crisis, "during an interview in the media, he added:" We anticipate a big drop in sales volumes, but despite that we are expecting to remain in the black. We hope to become a leader of the country's economic recovery." (reference 52)*

Indeed, the numbers don't lie, and the scale of the disaster is such that every link in the production chain is severely affected and in danger. Toyota Motor Corp sees 80% profit drop as coronavirus pandemic wipes $ 14 billion off car sales * which is the lowest year in 9 years in Japan.

The crisis crushes the production of all car manufacturers and its logistics, leaving factories deserted and unusable. But the most painful is the consumer's confidence and desire to invest in times of crisis. all these factors cause a snowball effect that shakes the Japanese manufacturer.

Toyota sales in numbers:

"TME highlights Jan-Mar 2020:

- *Total sales: 271,937 (-2.45% year-on-year)*
- *Market share: 6.6% (+1.3 ppt year-on-year)*
- *Total hybrid sales: 141,088 (-1.60% year-on-year)*
- *Hybrid mix: West Europe: 64% - East Europe*: 22% - TTL: 52%*

Toyota highlights Jan- Mar 2020:

- *Toyota sales: 253,644 (-2.6% year-on-year)*
- *Top sellers: Yaris Range (55,126); Corolla Hatchback & Touring Sports (38,077); RAV4 Range (37,063)*
- *Top gainers: Corolla Sedan (+58%); Corolla Hatchback & Touring Sports (+36%): RAV4 (+21%), Highlander (+202%)*
- *Top hybrids: Corolla Hatchback & Touring Sports (35,383); Toyota C-HR Hybrid (27,719); RAV4 (19,982)*
- *Total hybrid sales: 128,553 (-1.3% year-on-year)*
- *Hybrid mix: West Europe: 61% - East Europe*: 23% - TTL: 51%*

Lexus highlights Jan-Mar 2020:

- *Total Lexus sales: 18,293 (-0.51% year-on-year)*
- *Top sellers: NX Range (5,016); UX Range (4,632); RX Range (4,306)*
- *Top gainers: UX range (+209%); RX (+4.3%)*
- *Top hybrids: UX Hybrid (4,383); NX Hybrid (3,803); RX Hybrid (1,452);*
- *Total hybrid sales: 12,535 (-3.7% year-on-year)*
- *Hybrid mix: West & Central Europe: 97% - East Europe: 1% - TTL: 68%" (reference 45)*

Toyota Motor Corporation reported a dramatic loss from the April to June period which melt from 619 billion Yen last year to 158 billion what equals to a profit plunge of 74 percent and the vehicles sale diminished of nearly half the previous amount.

As an example, Toyota sold in 2019 2.3 million vehicles during the June quarter against 1.2 million this year. The biggest damage was caused mainly by the lock down which caused a quarterly sale dipped of 40 percent ($ 43.6 trillion). All the markets have been affected mainly the European and American market which will take much longer to recover than the more flexible and dynamic Asian market.

The company said: "*Toyota's sales were hurt in nearly all global markets, including the U.S., Japan and Europe. Sales were starting to recover in China, where the outbreak began late last year. The impact of COVID-19 is wide-ranging, significant and serious, and it is expected that weakness will continue for the time being*." *(reference 60)*

It should nevertheless be understood that each crisis is necessary in order to bring out changes in the way of conceiving the future. Thus, Toyota has understood it very well and is using this moment of weakness to invest in future technology as said, "*We cannot stop investing in the future," (reference 61)* Operating Officer Koji Kobayashi told reporters.

4.3. Toyota's answers to the crisis

Toyota, like many historic multinationals, is not a beginner in crisis management, it must be said that the Japanese manufacturer has successfully weathered the financial crisis of 2009 as well as the scandal of August 2009.

Within a multinational, decision making is one of the most important aspects for a multinational to flourish and especially for it to thrive for decades. This is the case of Toyota whose response is the measures taken were made very quickly after the first signs of global health crisis.

Indeed, the first point on which the Japanese manufacturer insisted is to contribute to the restoration of public and global health as quickly as possible. It makes sense that sales and trade in all fields whatsoever are at their peak in an economically healthy society. For this society to be economically healthy, public health must also be so and the Covid 19 pandemic is harming this public health. This is how Toyota recognizes that it is necessary and profitable

to provide collective assistance to many countries by means of helping to obtain masks but also by allowing ambulances to have vehicles at their disposal from Toyota.

Thus, Toyota places itself in the philosophy of mutual aid in order to get out of the crisis because its perspective on the situation is not to come out of this dire situation alone but that everyone gets up in order to create an environment conducive to a resumption of the global.

Toyota has therefore invested heavily in the production of 3-D printed face shields, COVID-19 masks, and ventilators and respirators. In addition to this, Toyota is changing its sales outlook for customers who are in a phase of uncertainty favouring used vehicle sales. In addition, Toyota is easing car loan payment terms and offering used rental vehicles instead of new ones to help cash-strapped customers in the face of growing uncertainty in the global market.
"As COVID-19 infections spread, many Monozukuri companies have started to produce medical face shields and protective gowns, as well as masks and other items." (reference 53)

Moreover, to make payment easier Options include payment extensions and deferred location payments. By doing so, Toyota also helps to contribute to its image of mutual aid and a better future.
Sabrina Caputi says: "*I think the social sphere has a very big impact on the emotional connection with a company. People want to know what companies are doing, in a very practical way, to help society and their institutions get through this very special time. So, to share a few examples, Armani, Bulgari and Esselunga (a famous supermarket chain) were among the organizations that donated to support hospitals. And that has a very big impact on how people view these companies. "(reference 51)*
Toyota is also very concerned about the well-being and safety of its employees, which is why all the work and production system has been modified to cope with this pandemic but Toyota intends to keep the main of its national factories open and does not give up its national production in Japan of 3 million vehicles per year which seems to be a real challenge during the crisis.

It was crucial for Toyota that the minimum number of people lost their jobs as the president expressed it and that it would be a great injustice and that it is better to lower general wages temporarily than to fire staff or to close factories and thus losing production centers which could create a future for many great professionals in many fields.

In order to continue to produce while maintaining safety for the personnel, the following measures have been taken:

firstly, it is necessary to work intelligently, as Sabrina Caputi explains, and to imitate as much as possible the personnel present on the production sites. 60 percent of people will work remotely from their homes. *"Workers and workers present must keep a minimum distance of 6 feet between them and, sanitize the work areas and regularly monitor the temperature of the employees to ensure the safety of the workers. Companies have also installed plastic screens or partitions along assembly lines to isolate staff, redesigned workspaces for small meetings and made the wearing of masks or screens mandatory." (reference 51)*

And finally, each link in the chain from the worker to the site manager are in constant communication to leave nothing to chance. All the site directors of each country make calls via videoconference in order to understand and suggest ideas or useful modifications for the future and communicate the mandatory steps to follow for in order to keep our workers safe.

It is obvious that this crisis will bring many new concepts to be explored in the future.

Toyota's optic to get out of this difficult phase is to create new alliances and thus not to act individually but collectively. Indeed, Toyota helps and even finances its raw material suppliers so that no one is completely ravaged by the crisis and thus allow when the market will be less hostile to bounce back and put its exemplary production back into operation as quickly as possible. Thus, notable alliances have recently been formed between Toyota and joint venture agreements (JV) forming United Fuel Cell System R&D (Beijing) Co., Ltd. (FCRD) with five Chinese OEMs, including Beijing SinoHytec, China FAW Corporation Limited, Dongfeng Motor Corporation, Guangzhou Automobile Group and Beijing Automotive Group.

This will make it possible to supply fuel cells for vehicles built in China and thus increase the relationship which is not often easy with its Chinese employees. Toyota plans to introduce fuel cell SUVs and commercial vans and trucks by 2025. In addition, the automaker is working on hydrogen filling stations in conjunction with various partners. It aims to generate half of its global sales of electric vehicles by 2025.

Also, Toyota Motor Corporation and Dentsu Group Inc have also formed an alliance by creating a joint venture owned 66 percent Toyota and 34 percent Dentsu (see figure 26). The goal of this is to digitally transform Toyota to improve its communication strategy. One of the companies will focus on improving Toyota's marketing strategy to create "exceptional customer trust", while the other will work on digital transformation and the use of data to improve customer relationships *(reference 54).*

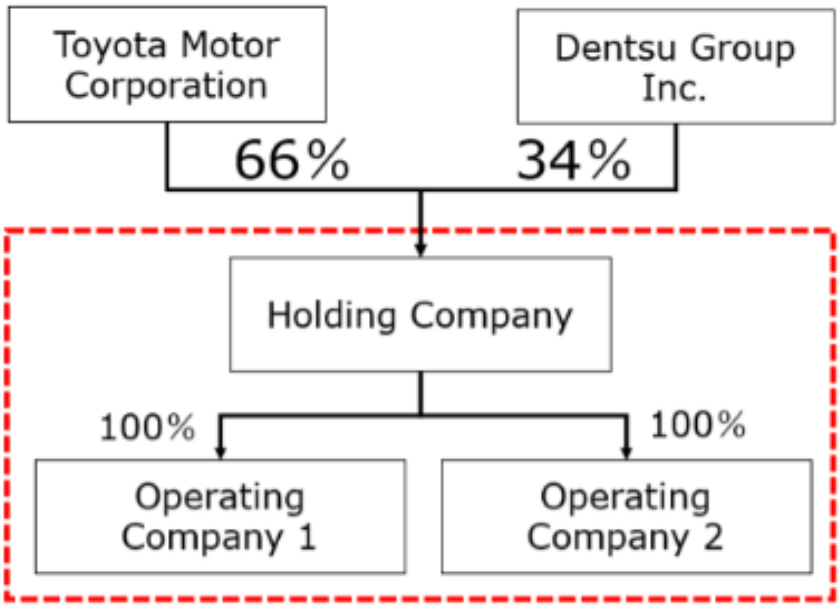


Figure 26: Toyota Motor Corporation and Dentsu group common project (reference 39)

*I*n order to underline Toyota's absolute desire to overcome the crisis "together" and to strengthen or even create alliances. The CEO of Toyota expresses these words *(reference 52):*

"We have also changed our company's thinking about alliances." Our basic stance is that alliances are not for taking control of partners based on the logic of capital, but rather for respecting each other and for cooperating through work with like-minded partners."

"As a result, within an extremely short period of time, we have been able to establish a network with many partners, including those from other industries." And I view this as also being a part of earnestly engaging in the sustainable development goals, or SDGs, for which international society is aiming, with the stance of "no one will be left behind." (reference 52)

4.4. Toyota is using a period of low production and sales to provide a technological and ecological transition

History has proven that it is during the most tormented and perilous times that the greatest inventions or transitions are possible. The same is true of economic and health crises. Now that the whole world is reviewing its sanitary measures and that expectations and demand are at their lowest, it is on this timing that Toyota decides to invest a large sum of money and resources in research and development and in a transition ecological. Toyota is not the only multinational to use this. Using a period in which factories no longer produce at the same rate to consider a different way of consuming. All this could then give birth to a technological, ecological or even ideological revolution about how we consume in the future.

The Japanese constructor's CEO suggest: "*Also, with undergoing a "complete redesign" into a mobility company in mind, we are also engaged in recomposing our assets, such as by revising our cross-shareholdings and selling underutilized real estate. Summarizing our initiatives over the past several years, I think I can say that we have freed ourselves from a hitherto theory and are constructing a theory for a new Toyota in a new era." (reference 52)*

4.5. Author suggestions to minimize the damages of the crisis and to bounce back for a flourishing future

This part of the thesis is only personal and corresponds to the author's own interpretations and ideas after reading numerous documents and articles dealing with the crisis and its impact on the automotive world and Toyota. It is in no way a procedure to follow and in no case the claim to be the solution. this sections nevertheless provide ideas for solutions that Toyota or other automotive or other companies to combat the current crisis. But by no means the viable solution in the absolute. Moreover, many of the hypothetic ideas given in this chapter were already considered or executed by many automobile constructors Toyota included.

The current situation is rather disastrous mainly in the American and European markets where the crisis is expected to affect the GDP of each country by at least 10 percent. Countries whose

tourism is one of the largest forms of income are expected to suffer the most such as Italy, France and Spain with an estimated 15 percent loss of GDP. It is therefore possible to say with certainty that the Automotive market is found in Deep impact -u shape or Double Dip -L.shape. And Toyota's 40 percent sales loss accompanies these estimates. But then what would be the solutions and the main ones that the main car manufacturers could adopt in order to limit the damage of the crisis both on production and economically?

Most of the claims are already taken care of by Toyota and I regard their response to the crisis as exemplary.

4.5.1. The sanitary measures

It is important to make measures to protect employees from the virus mandatory, so wearing a mask must be mandatory, a safe distance between workers and also remote work for those who can. In addition, it is important as it has been done in certain factories (it has not been done since the Second World War) to use inactive productions in order to produce as many masks as possible.to help hospitals as much as possible in order to ensure that the economic cycle picks up slowly.

4.5.2. The economic measures

This factor is the one of which Toyota is exemplary indeed in these difficult times it is better to tackle the crisis in an intelligent way. It is therefore necessary not to close any factories because this decision would cause irreversible damage in the long term (this solution is expensive but possible for a multinational with a solid cash flow like Toyota) and not to fire employees because they are according to the criteria. of highly skilled Toyota and represents the recovery of the multinational. One solution consists in reducing wages at all levels of the hierarchy in order to make it possible to make precious savings. It is also important to enter into communication with different potential allies and to create a positive mutual help for the two protagonists and mainly to recreate contacts in the markets or the restoration of demand

and supply (Asian market) especially with companies and make and that the various suppliers (raw material or subcontractor) and partners of Toyota not to bankrupt. Chinese. It is also necessary to adapt its business to customers and households. In times of crisis, provide appropriate offers and services based on the drop in per capita GDP in each country. And so be understanding (do not increase prices and sell used vehicles). It is also necessary, like Toyota now, to use this period of low production to invest in the future and thus rebound in the long term. Do not lower research and development resources and even inject money into this branch of the company.

4.5.3. Ecological transition to electric motors

To start a technological transition there are many factors to consider. The first point is to invest in this branch and in the production of new more efficient electric motors. It is also necessary that the government of each country proposes more attractive bonuses for the customers who will take the step towards a new type of energy consumption and thus will take the risk of taking a step towards the future. In addition, it is necessary to invest in numerous electrical terminals which will allow an extension of this new type of vehicle.

It is also essential to encourage competitiveness and to create small companies specializing in the manufacture of more efficient electric batteries (serious lack of competitiveness in this field and of new and numerous shared vehicle services).

However this last point is not the only responsibility of the manufacturers but especially those of the governments which must encourage this ecological and revolutionary movement giving all the keys and the means necessary to make this transition and also and mainly to the customers to leave their zone of comfort and take a big step into the future.

CONCLUSION

In these times of uncertainty and doubts, what has this crisis taught us?

Well, it showed us the fragility of our globalist and interconnected society and of our system of consumption and production.

A few months ago, it was unthinkable that such an event could produce such an economic and social crisis calling into question the foundations of our modern society. Even nearly all the biggest multinationals are badly affected and can now be described as giants with feet of clay.

Then why is Toyota considered as an example in crisis management? Well, because the Japanese manufacturer has incredible patience and real efficiency in making the right decisions at the right times and has absorbed the crisis without harming its future potential to rebound when the global economic and social situation has recovered. This excellent management, Toyota MOTOR owes it particularly to its deep motto and aims at a company that wishes to be useful and benevolent to society and to its objective of a better world and a better future *("no one should be left behind ","I believe that it is necessary to cultivate Toyota people in the world who can wish for and take action for the happiness of those other than themselves")*. Toyota thus continues to fight for an ecological transition and invested in large quantities so that this period allows an acceleration in this direction.

So, what should be remembered from this health crisis except the fragility of our current society. Well, you must use it like a lesson so as not to redo past mistakes. It should also be seen as an exchange of a renewal and a holy departure not only for the automotive industry but for all areas. Perhaps we need to rethink our way of consuming and producing and our relationship with our planet which is our habitat and our home.

as the *Toyota CEO said (reference 52): '" While taking a walk around a pond, I saw birds, turtles, fish, and the like scurrying about. All living creatures, other than human beings, are going about life as before. Only human beings are running about in confusion. Perhaps this is a good opportunity to change our perception of the world being a theatre in which human beings play the leading role."*

Maybe it is time for human beings to stop running around in confusion and changing their outlook on life and society, only then can radical changes be made.

Nonetheless, Toyota Motor is fighting body and soul against the economic crisis that the world is going through and as the CEO of Toyota says: "*To this is what I will devote my own heart and soul, for the" COVID-19 era " and "post-COVID-19 era.(Reference 52)"*

List of References

[0] The chronology of Toyota history “official Toyota”: http://www.toyota-global.com/company/history_of_toyota

[1] The story of Sakichi Toyoda 3 “Toyota official”: https://www.toyotaindustries.com/company/history/toyoda_sakichi/

[2] Toyota claims world’s Best-selling automaker Title (April 2008): https://cars.usnews.com/cars-trucks/daily-news/080424-toyota-claims-world-s-best-selling-automaker-title

[3] Toyota shareholders (2019): https://www.marketscreener.com/quote/stock/TOYOTA-INDUSTRIES-CORPORA-6493686/company/

[4] The Forbes ranking of the biggest companies in the world (2020): www.forbes.com/lists/results

[5] The Toyota structure company Overview (31 march 2020): https://global.toyota/en/company/profile/overview/

[6] Beyond Budgeting as a mindset and a framework for action “Franz Roosli PhD June 2018 p1/3” : https://bbrt.org/wp-content/uploads/2018/06/R%C3%B6%C3%B6sli_Kaduthanam_Beyond-Budgeting-as-a-mindset-and-a-framework-for-action.pdf

[7] Organizational structure Toyota, September 2018 by Lawrence Gregory: http://panmore.com/toyota-organizational-structure-analysis

[8] Organizational structure (the case of Toyota): https://biz.libretexts.org/Bookshelves/Management/Book%3A_Organizational_Behavior/14%3A_Organizational_Structure_and_Change/14.1%3A_Organizational_Structure%3A_The_Case_of_Toyota

[9] Toyota’s Organizational Culture characteristic analysis, (2017 by Pauline Meyer):

http://panmore.com/toyota-organizational-culture-characteristics-analysis

[10] The Hofstede’s Comparison of Japanese and French (2019): https://www.hofstede-insights.com/

[11] (November 2018). The Strategic Planning Process for Toyota Marketing Essay. Retrieved: https://www.ukessays.com/essays/marketing/the-strategic-planning-process-for-toyota-marketing-essay.php

[12] Toyota Analysis Harvard by Thembani Nkomo, p1/16 (2013): https://scholar.harvard.edu/files/tnkomo/files/analysis_of_toyota.pdf

[13] Toyota strategic issue: https://www.researchprospect.com/strategic-issues-at-toyota-a-case-study/

[14] Toyota SWOT Analysis: https://strategicmanagementinsight.com/swot-analyses/toyota-swot-analysis.html

[15] The Toyota mission statement: https://mission-statement.com/toyota/

[16] The Toyota Global Strategy (April 2003): https://www.toyota-global.com/pages/contents/investors/presentation/2003/pdf/041603.pdf

[17] The SWOT template and explanations (graphic) : https://www.conceptdraw.com/How-To-Guide/swot-template

[18] Toyota Moto SWOT and PESTLE Analysis (2020): https://www.swotandpestle.com/toyota-motor/

[19] Toyota Corporate Governance(graphic): https://www.toyota-industries.com/csr/management/governance/index.html

[20] Introduction to Corporate Governance (Deloitte December 2016, p2/15): https://www2.deloitte.com/content/dam/Deloitte/nl/Documents/risk/deloitte-nl-risk-good-governance-driving-corporate-performance.pdf

[21] Corporate Governance and Board of director definition: https://www.investopedia.com/terms/c/corporategovernance.asp

[22] Automotive market share (Toyota ahead graphic): https://www.statista.com/statistics/316786/global-market-share-of-the-leading-automakers/

[23] Toyota fiscal year (graph): https://www.marketscreener.com/quote/stock/TOYOTA-MOTOR-CORPORATION-6492484/company/

[24] Currency Japanese Yen value compared to US dollars(graphic): https://tradingeconomics.com/japan/currency

[25] Toyota CRS (Corporate social responsibility)Policy: https://global.toyota/en/sustainability/csr/policy/

[26] Toyota Production System (schema): https://www.toyota-europe.com/world-of-toyota/this-is-toyota/toyota-production-system

[27]Introduction to Toyota TPS Yuichi Sakai p 14/22 (January 2007): https://www.fujitsu.com/global/documents/about/resources/publications/fstj/archives/vol43-1/paper02.pdf

[28] Toyota official TPS : https://global.toyota/en/company/vision-and-philosophy/production-system/

[29] Toyota lowest annual profit due to the Corona virus: https://www.reuters.com/article/us-toyota-results-idUSKCN1US0E2

[30]: Wheelen, T. L., & Hunger, J. D. (2012). Strategic Management and Business Policy: Toward Global Sustainability p34/p41

[31] The Toyota business model: https://pradeepsingh.com/toyota-business/

[32] Toyota European manufacturing plants(schema): https://www.toyota-europe.com/world-of-toyota/feel/operations/made-in-europe/manufacturing

[33] The lean production and 7 wastes explanations: https://medium.com/drill/lean-production-the-method-that-made-toyota-the-most-valuable-car-brand-in-the-world-13279db0b224

[34] Innovation Model Analysis of Energy Vehicles Jian-hua Liua , Zhan Meng: https://www.sciencedirect.com/science/article/pii/S1877705817302485

[35] Continued Evolution of the Toyota Assembly Line: https://www.allaboutlean.com/toyota-assembly-evolution-2/

[36] Toyota innovative new technologies : https://www.toyota-industries.com/innovation/future/technology_1/index.html

[37] Toyota new technologies : https://www.toyota.com/seo/technology.html

[38]: Toyota explanation of the philosophy KAIZEN (schema): https://www.startupguys.net/take-your-startup-to-the-next-level-using-kaizen-philosophy/

[39] Group Dentsu and Toyota make an alliance (schema): https://www.group.dentsu.com/en/news/release/000321.html

[40] Toyota teaching robots to help people in their homes: https://pressroom.toyota.com/tri-teaching-robots-to-help-people-in-their-homes/

[41] Toyota THUMS (total human model of safety, schema) : https://pressroom.toyota.com/testing-testing/

[42] Just in Time manufacturing (schema) http://solutionbuggy.blogspot.com/2017/05/just-in-time-jit-manufacturing.html

[43] The 7 wastes explanations and utility: https://leanmanufacturingtools.org/77/the-seven-wastes-7-mudas/

[44] The Impact of the Covid 19 on the European Automotive Market by Francesco Papi p1-31(2020): https://www.strategyand.pwc.com/it/en/assets/pdf/S&-impact-of-covid-19-on-EU-automotive-market.pdf

[45] Toyota first quarter sales Post Covid 19 2020: https://newsroom.toyota.eu/toyota-motor-europe-posts-first-quarter-sales-results-amid-covid-19-crisis/

[46] Toyota profit plunges 74 percent during the Covid 19 2020: https://economictimes.indiatimes.com/news/international/business/toyotas-profit-plunges-74-per-cent-as-coronavirus-pandemic-halves-vehicle-sales/articleshow/77387446.cms?from=mdr

[47] Effect of the Covid 19 on the automotive industry 2020: https://www.mes-insights.com/the-effects-of-the-coronavirus-on-the-automotive-industry-a-941116/

[48] Weekly Update of the Covid 19 impact on the global automotive industry 2020: https://www.counterpointresearch.com/weekly-updates-covid-19-impact-global-automotive-industry/

[49] Can the Automotive industry adapt to the Covid 19 2020: https://oxfordbusinessgroup.com/news/can-automotive-industry-adapt-covid-19-world

[50] How did Toyota responded to the Covid (mask fabrication and help to the hospital) 2020: https://www.robertstoyota.com/blog/how-did-toyota-respond-to-the-covid-19-crisis/

[51] Interview of Sabrina Caputi, Corporate Communication and External Affairs Senior Manager at Toyota Motor Italia 2020: https://www.reptrak.com/blog/communicating-during-crisis-how-toyota-motor-italy-responded-to-covid19/

[52] Interview with the Toyota President Akio Toyoda 2020: http://www.autoreportafrica.com/how-toyota-plans-to-confront-covid-19-crisis-akio-toyoda/

[53] Toyota vows to stay profitable amid Corona virus and action against the pandemic 2020: https://www.nasdaq.com/articles/toyota-vows-to-remain-profitable-amid-coronavirus-crisis-2020-06-12

[54] Toyota and Dentsu team up to improve marketing strategy 2020: https://www.autonews.com/automakers-suppliers/toyota-dentsu-team-improve-marketing-strategy

[55] How Toyota is stepping up against Covid 2020: https://www.forbes.com/sites/bryancampbell/2020/03/30/critical-healthcare-supplies-are-coming-from-all-corners-of-the-automotive-industry/?sh=3b4e498c1dc2

[56] Heijunka explanation: https://www.villanovau.com/resources/six-sigma/heijunka/

[57] The 7 wastes of lean schema: https://kanbanize.com/lean-management/value-waste/7-wastes-of-lean

[58] 5 S visual system : http://www.epplans.com/external/menu43/menu1.html

[59]: Environmental Analysis representation (schema):

https://www.slideshare.net/asprse/swot-analysis-45654095

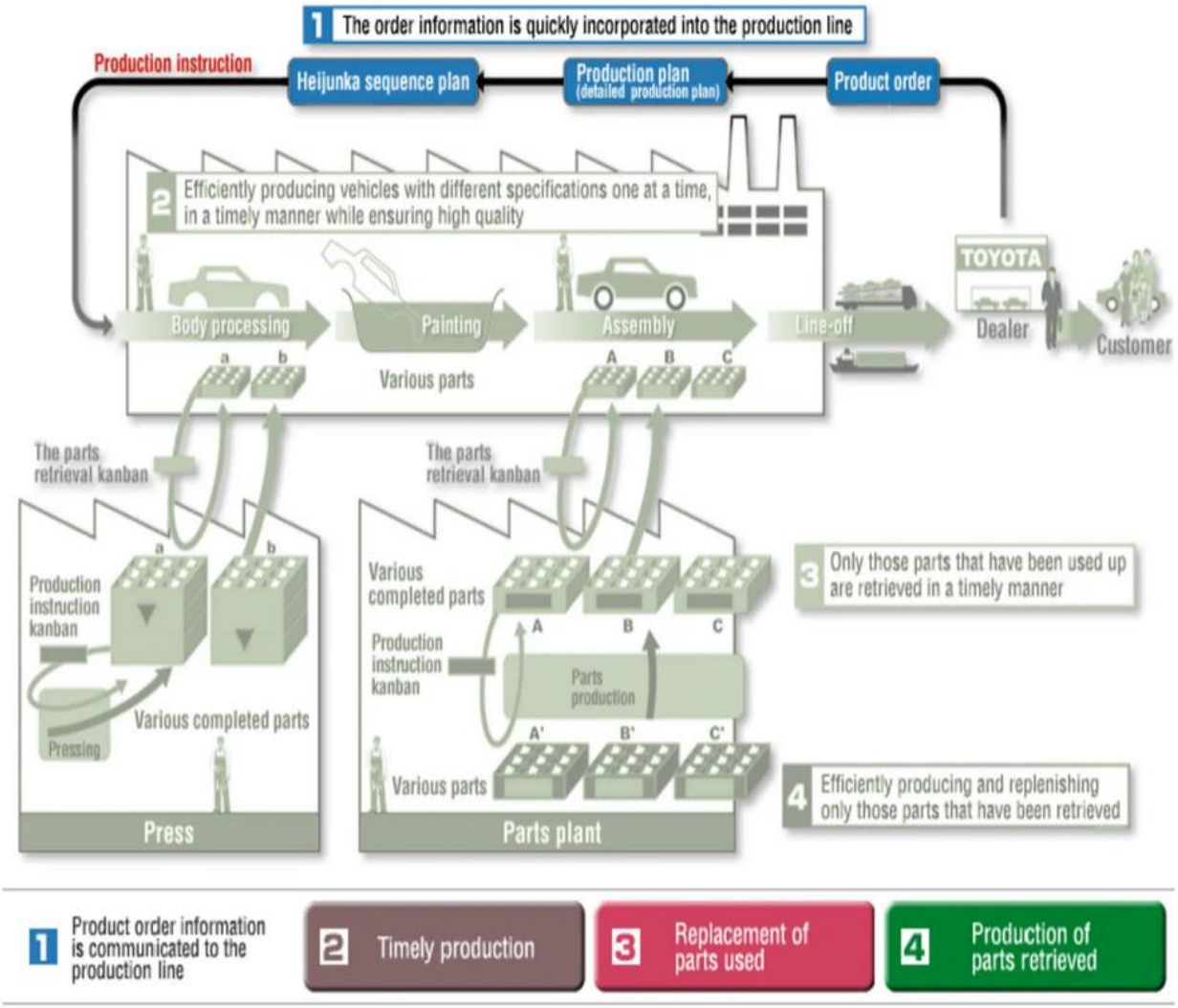
[60] Toyota profit plunges 2020: https://www.washingtonpost.com/business/toyotas-profit-plunges-as-pandemic-halves-vehicle-sales/2020/08/06/876329cc-d7ab-11ea-a788-2ce86ce81129_story.html

[61] Interview with Operating Officer Koji Kobayashi https://fr.reutersmedia.net/article/consumerproducts-SP/idUKL4N2CU17G

[62] Just in time graph: https://www.slideshare.net/leonine1989/fig-a-jit-system-diagram

Appendices

Appendix 1 : *Toyota production exemple (reference 31)*



Appendix 2: *The 4 P model philosophy (Reference 31)*

The 4p model of the Toyota way indeed explores more of that philosophy.