

Management of Innovation as Market Strategy: A Study on Innovation Adopted by Hyundai in the Automotive Worldwide Industry

Valmir Adelino de Moura, Hellen Xavier das Chagas, Rômulo de Souza Fabricio Junior, and Dra. Eliane Simões

Centro Paula Souza—São Paulo/SP—Brasil

Email: valmirmoura@uol.com.br, {hellen.xavier, romulo.fabricio}@gmail.com, eliane@iqeduc.com.br

Abstract—Companies grow when meeting competitive advantages that add value to the customer compared to its competitors. The global automobile industry, a market of extreme competition and appeals for new technologies, processes and materials especially given the focus for sustainability, was the scenario that the Korean Hyundai emerged, launching its first passenger car just 40 years ago and currently already ranks among the four largest global automakers. This study aims to identify: which innovation management strategies have been performed by Hyundai to justify its quickly achieved success. The data collection and the results obtained allow visualizing innovation from a different approach than the traditional, measured by products: the innovative management.

Index Terms—Hyundai, innovation management, competitive strategies

I. INTRODUCTION

The automotive industry has becoming global as the Japanese companies gained substantial competitive advantages in quality and productivity in countries where car demand has become more similar and where transport costs fell, among other causes. Often, innovation is vector of economic growth and enhances the company's globalization, Ref. [1], it is no wonder that the innovation strategies have been gaining more attention from both academic and enterprises [2]. Montgomery and Porter, ref. [3], report that a company creates competitive advantage when it notices an entirely new market opportunity or serves a market segment other companies ignored. When competitors are slow to respond, innovations give competitive advantage. In the automotive sector Japanese companies gained early lead by emphasizing smaller and more compact models and with lower volume whose foreign competitors despised.

Even when the labor cost advantage persisted, Japanese companies were upgrading. They invested aggressively to build large factories to earn advantages in scale economies. Then, they became innovative in technology of process, being pioneering in just-in-time production and promoting various quality and

productivity practices. These improvements led to better quality of their products, lower rates of repairs and better customer satisfaction rates, compared to their foreign competitors [4].

On the path crossed by the Japanese development, Korea studied and copied models and products, shamelessly. Earlier, Japanese industry was the biggest target. "For Korean, copying is not ugly. It's a way to learn how to do what others have created," says Professor William Vaccaro, research, development and innovation manager of Unisinos (Vale do Rio dos Sinos University), São Leopoldo (RS), Brazil [5].

Within its laboratories, Korea created a sophisticated reverse engineering system. From pure copy, it began to aggregate resources. While the Chinese were cheap replicas, it was differentiating itself. Having quality was essential to gain market share in Europe and the United States. "After the Asian crisis of 1997, companies focused on profitability. They adopted quality practices such as TQM (Total Quality Management) and Six Sigma", says consultant John Tae-shik Ha, from SooHO consultant [5].

Companies have achieved competitive advantage through innovative actions. They cover innovation in its broadest sense, including both technologies and new ways of doing things, having a multidimensional high risk and management challenge [6]. Innovation can be expressed in a new product design, a new production process, a new marketing approach, or a new way of conducting training. Many common and incremental innovations are depending more on the accumulation of small insights and advances than on major technological innovation [3]. Many companies even choose to pursue a strategy of working in incremental innovations, being reluctant to take too many risks [7].

II. PROBLEM AND RESEARCH OBJECTIVE

From the factors exposed so far, are the evidence of motivation, inspiration and "sweating" (as will be noted below) for the outstanding performance of Korean giants and particularly in Hyundai. The research problem revolves around, therefore, to understand how from copying cars and assumed Japanese production model,

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the innovation strategies adopted by Hyundai, led to their current success, to do so, the objective of this research is to evaluate which innovative approaches, as well as the search for innovative products, were used by Hyundai company to obtain competitive advantages that led to its success and the climb leading market positions, considering that the description of an innovation model is extremely complex and success results are subject to various reasons, much more than only following a series of rigorous steps [8].

III. THEORETICAL FOUNDATION

The founder of Hyundai Business Group, Chung Ju Yung (1915-2001), was born in a poor rural area, almost medieval. On the fourth attempt to run away from home to emancipate a fate that predestined him to poverty, Chung Yung settled in Seoul, a city where half of today's fifty million South Korean population lives. After working as a mason servant, employed in a rice trading house and owning a small workshop, while not having higher education, he set up a construction company, Hyundai Engineering and Construction [9].

As described by Reis [9], by the end of World War II (1939-1945), the founder of Hyundai took advantage of the opportunities created by the financial support from the United States to the develop the region. In addition, after the destruction caused by the painful war between the Koreas (1950-1953), Chung Yung put his company at the service of reconstruction of the new capitalist Korea, which was in a hurry to develop, because only then it could survive.

Still, as discussed by Reis, ref. [9], from 1961, South Korea has undergone a major capitalist revolution, the so-called "miracle of the Han River." At that time, Hyundai's founder interacted with the new stimulus policy to export and easy access to government credit, extending the performance of its business group for the automobile area, so Hyundai Motors was born.

A. Innovation in the Production System: Toyota (TPS) vs. Hyundai (HPS)

According to Ohno [10], the two principles of TPS (Toyota Production System) are Autonomation (Jidoka) and Just-in-Time. Different from Ohno, Shimokawa and Fujimoto [11] emphasize that the TPS is based on two basic concepts: cost savings through the elimination of waste and the recognition of the Japanese diligence to harness the skills and create a favorable working environment, i.e., treating employees as thinking human beings. For Shingo [12], TPS should completely identify the waste (loss), and the main losses are in: Overproduction; time available (standby); transport; processing itself; stock available; handling and production of defective products.

In relation to the HPS (Hyundai Production System) and according to Kang [13], the modularization of processes as well the use of graduated-labor was what boosted the creation of HPS. The Hyundai system is based on a restatement of vertical integration, i.e., the control from top to bottom (gotten from Fordism) and

also from the verticalization of suppliers of critical items, such as Hyundai Mobis and Duckyang, which were subsidiaries of Hyundai and also joined the modularization [14].

To Kang [13], the modularization is the combination of several modules in an automobile assembly process, through the integration of multiple parts or components, and assembling them into a single module. According to Jo [15], modularization is a production method in which parts are assembled on interchangeable subassemblies to be supplied to the last assembling line. One of modularization goal was to minimize the participation of workers in the productive processes of HMC (Hyundai Motor Company). For this the company needed to automate and streamline their production lines. According to Chung [16], the removal of workers in the HMC processes is one of the principles of modularization, given that there was no trust between the HMC and the worker's union that was on strike since 1987, except 1994, for higher wages, shorter working hours, profit sharing and the right of action by workers on decisions over the company management (as in TPS).

According to Lee and Jo [17], installing systems such as ERP (Enterprise Resources Planning), APS (Advanced Planning Scheduling) and SCM (Supply Chain Management) made HPS lean and responsive to changing market conditions, combined with process automation manufacturing. To Chung [16], factory management tried to reduce the cycle time as a mean of increasing the number of units produced per hour worked and this would require the participation and commitment of the workers involved in the processes. But these workers were on the side and did not join the idea. From that, HMC has developed a pillar that would reduce the dependence of workers in the productive process of the HMC, engineers would be the main force of production innovation processes and they are responsible for HPS's kaizen within the HMC.

B. TPS and HPS Systems Analysis

Topics	TPS	HPS
Production System	Pulled	Pushed
Production Control	JIT – Kanban	JIS – MRP
Continuous Improvement	Everybody involved in the process	Only engineers in process
Human-Machine Relations	To improve workers operations	To reduce labor
Relationship with Suppliers	Long-term and synergistic with its partners	Short-term and focus on cost reduction
Relationship with Employees	Commitment, involvement and autonomy with the processes	Operational labor
Productive System Principles	JIT e Autonomation (Jidoka)	Modularization and Technological Engineering

Figure 1. Comparing the interactions of TPS and HPS

According to Lee and Jo [17], Hyundai's Production System pursues in its management the extreme automation in order to reduce labor while in Toyota's System it is used to complement the activity managed by the worker, causing, for example, the "poka yoke" to have different focuses on each system: in the TPS, it is used to prevent failed operations and/or defects and in the HPS it forces the elimination of defective processes, from using intelligent detection systems and correcting flaws and/or defects. The above Fig. 1 draws a parallel between the two systems:

The interesting thing about Hyundai's production system is that it did not adopt the innovation only in the production process or on the factory floor. Hyundai introduced the innovation process in different sectors with different approaches and points of view. This may have been the driving force for its leverage in the market. According to Rocha Neto [18], the innovation process: ... It is essentially economic, because it includes the commercial appropriation of technical and scientific knowledge to introduce enhancement of goods and services used by the society (...) it involves the introduction of products or new or modified services in the market or the pioneering commercial ownership of inventions, knowledge, organizational practices, techniques and production processes.

This last stretch approached by Rocha Neto [18] on the innovation process focused on organizational practices was precisely the one adopted by Hyundai mainly in marketing and quality sectors as it will be discussed below.

C. Innovation in the Marketing Process

According to Ribeiro [19], Toyota changed the way of making cars, Hyundai is changing the way of selling cars.

The Korean came to the US in the 80's selling well, but their vehicles began to show signs of rust, which severely damaged the image of the brand.

The 90s were the litmus test for the company. How to face near-mythological brands such as GM and Ford when your reputation is tremendously affected? Since then, Hyundai has created bigger advantages from its competitors and has increased the value of its brand year after year.

According to Ribeiro [19], when the Korean company began offering 10 years warranty on all their cars, people clashed. But it was enough to cause many people to experience the brand, a new chance was all it wanted (many brands failed because they cannot induce trial). Who would believe that a trade mark that its first impression was very bad could manufacture cars that would hit weight rivals like Omega, Passat and EcoSport - overcome by Azera and Tucson.

When the economic crisis forced dealers to lower their prices, to give discounts ... these "normal" things of sales promotions; Hyundai did something abnormal, launched the "Assurance" - an assurance that gave the buyer the right to return his/her vehicle if he/she lost his/her job. Coincidence or not, several companies from various sectors began to create similar programs that helped the customer to meet its financial commitments.

In another surprising marketing move, according to a study from the Wharton - University of Pennsylvania [20], the company offered the buyers of some of its models the value of US \$ 333 per month for six months, but the secret of the deal was that the agreement applied only to cars on which the company was giving discounts. The buyer may choose the discount or the monthly check (but not both), and the value of the two deals is pretty much the same. The fact is that such programs usually have a very big impact among consumers.

At the same time, it also expanded in Europe and developing markets. MacDuffie (management professor at Wharton [20] - specialized in the automotive industry and associate director of the International Motor Vehicle Program) states that Hyundai Sonata was chosen to be the official taxi car during the Beijing Olympics. The company has also fared better than some of its Japanese competitors in getting market share in India and China. "This is another big and risky bet that gave substantial returns to the company," he says.

According to Oliveira [21], in Brazil, Hyundai has achieved significant growth in the rankings, 9th rank top place in 2011 and from January to June 2014 already is the 5th best-selling brand in Brazil. This proves that in fact innovation in brand products, mainly in the HB20 car, made the sales to increase, and has shown a new way of making popular cars, since the HB20 is the company's popular car and faces competitors weight as the Volkswagen Gol and the Chevrolet Onix.

Besides of its marketing campaign, Hyundai has also used the kind of radical innovation, this kind of innovation is the one that seeks to create new needs to customers. The kind of innovation that revolutionizes the market, create new trends and as a result, new competitors.

D. Innovation in the Quality Process

According to the study from Wharton University [20], while American assemblers struggle to survive, the South Korean Hyundai Motors stands out for its bold marketing and quality improvement massive projects.

It has been a few years that Hyundai began investing in new models and quality programs that gave greater solidity to the company, allowing it to profit amid the crisis that engulfed the global auto industry, according to professors at Wharton [20].

In the '90s, Hyundai attempted to launch a series of expensive cars in the American market, but MacDuffie says the company was "persecuted" for its reputation: "Quality has always been the company's Achilles heel in the US"

Still according to the study from Wharton University [20], from 2001, MacDuffie says Hyundai launched a campaign aiming to improve the quality of its products with a daily emphasis on improvement through new processes at its plants, as well as projects and better quality engineering. At the same time, in order to put an end to its reputation for poor quality, the company announced a ten-year program and 100,000 miles warranty. Hyundai's program was much better than the traditional standard three-year industrial warranty, or

30,000 miles, and guaranteed, above all, the car throughout its life expectancy. "It was risky, but it was undoubtedly very important for the quality improvement improving," says MacDuffie." The company put the plan into action and made significant advances. "In 2009, Hyundai's Genesis car was voted the car of the Year by independent automotive journalists at the North American Automotive International Fair in Detroit.

When Hyundai's Quality program was released, it was greeted not only as another marketing campaign, but also as a psychological affirmation that the economic collapse was not general.

"The company tries to empathize with the plight of people," says David J. Reibstein, marketing professor at Wharton University [20]. He says the quality program is similar to the warranty that Hyundai used to install confidence in the consumer. "There may be some hesitation when buying, because people do not know whether they will be employed in the future, but the guarantee offered by the company gives them the safety net they need and allows them to say," I will not be out of the market ". It is evident that the market needed some encouragement. "Hyundai has provided this encouragement" she says.

Reibstein notes that the proposal was revolutionary, was subsequently adopted by other companies. Pfizer has a similar program that ensures the users of its products the opportunity to continue receiving the medication they need should they lose their job. "It works with any product," explains Reibstein. "It has to be a product with a high degree of risk. The strategy reduces the risk to the consumer. "Hrebiniak (a management professor at Wharton University [ref. 20]) adds that the company is now at the forefront of advocating stricter environmental measures for the industry: it has pledged to meet the new federal standards for energy five years from the deadline. As the rules say, the cars will have to run 35 miles per gallon of gasoline by 2020. "Such a measure is simply another chapter in the company's differentiation strategy - with that, she wants to say, 'We are modern, our staff is of the highest quality', says Hrebiniak. "It is on TV. The company has earned the title of Car of the Year. It was the first to help people in difficulty to overcome the barriers. Now, in relation to the environment, it is leading once again".

IV. METHODOLOGY

The research method used was the literature drawn from already published materials such as books, magazines, publications in journals, scientific papers, monographs, internet, among others. It aims to put the researcher in touch with all the material ever written on the subject in study.

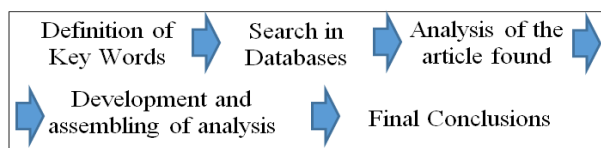


Figure 2. Working method applied to the search. (Adapted Ref. [22])

The working method used in this research was the replication methodology used by Tomaszewski, Rocha, Rodrigues, Lacerda, e Veit, [22] as shown in Fig. 2.

The following keywords were searched in databases (Google Scholar and CAPES): Hyundai Production System, Hyundai Innovation and Competitiveness and Hyundai Production and Quality System. Regarding the Toyota Production System, the following keywords were researched: Toyota Production System, Toyota and Toyota Production System.

V. RESULTS ANALYSIS

Synthesizing innovation features for the competitiveness of Hyundai, Siqueira [23] draws attention to the aggressive HPS strategy production system deployed from 1998 when the company was restricted, which used the foundations of the TPS system, changing at that time radically its production strategy to differentiate from other assemblers.

The company followed by a reasonable time the foundations of TPS, especially just-in-time concept, so that its unit in Ulsan, the largest industrial complex in the world, is next to the harbor. Once ready and inspected, vehicles go directly to the courtyard that leads to the port, which doesn't take more than three minutes, and can be sent to all parts of the world. These are some characteristics of their productive efficiency and innovation in operations and logistics. Hyundai focused their strategies on innovation and automation of its production lines, which ensures greater reliability of its products. This is the winning combination of participatory production system with innovations.

Regarding the design innovation of its cars, one of its greatest weaknesses, Hyundai rounded the situation with the participation of Italian studio designers to develop tailored cars. One of its most successful models in Brazil, I30, was carried out by German designers. Plants outside the United States are strategically located in emerging countries, which reduces the labor cost (Innovation and Cost Strategy). The labor costs in Ulsan plant in Korea today are 20% lower than Toyota in Japan, which emphasizes the principle of innovation in cost.

When founder Ching Mong-Koo's son took over the company, he changed all directors who were managers or accountants by training engineers in a clear innovation management, establishing there the first major change. Another company's strategy to differentiate itself was the fact of being the first assembler to give five-year warranty on their cars, an innovative action of quality and marketing in the automotive segment. To ensure this action, the company, which had about 100 inspectors, had then a thousand quality inspectors in its production line to be able to maintain that warranty, another innovation and here a quality innovation. In 2005, the company had to delay by six months the launch of its car Sonata, for not having its quality assured. For a long time the Japanese companies were the reference of quality of its cars, but after several announced recalls, perhaps caused by outsourcing to developing core security components, their models were put into question [23].

Hyundai seeking as pillars of its innovation, its potential creative engineers, the deployment of technologies, quality control and aggressive marketing strategies, eliminated serious obstacles to innovation, such as lack of qualification of professionals, difficulties in interacting with new technologies, lack of knowledge of the consumer market and difficulties to deal with the risks [6].

VI. CONCLUSION

As can be seen in the article, Hyundai has grown because it innovated, chasing all the attributes of innovation: from R&D (Research and Development) to design and product; quality and guarantees; costs; management and marketing. Assemblers have to be aware of the innovations of their competitors so they can anticipate or react as quickly as possible to avoid losing market share.

This study suggests future studies on the influence of interested groups and the pressures that characterize the paths followed by companies and other institutions participating in the innovation process here reflected and studied, emphasizing the possibility of expanding the understanding of the peculiarities inherent to the innovation subject, not only for the automotive industry but for any industrial sector or services, since having a product or service that meets the needs with exceptional quality or above the average offered, combined with a business model that allows fast and secure access to this well, is almost a guarantee of success for the company.

This article hopes to contribute further to the academic community, using Hyundai's as an example that companies do not need to harness innovation only to the development of new products, since innovation, as seen, can and must be present in the organizations strategic management organizations from the innovation perspective in all sectors and not only in the manufacturing one.

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Valmir A. Moura, was born in São Paulo/SP–Brazil in 1960, received the B.S. in Business Administration from UNICID - University of São Paulo City in 1981. He has three Post Graduation: first one in Supply & Logistics at Costa Braga University in 1991, other one in Production Engineering at UNIP–Paulista University in 1996, and one MBA in International Market at USP–University of São Paulo in 2002. He is attending a Master Degree course in Management and Technology in Production Systems at CEETESP - Centro Estadual de Educação Tecnológica Paula Souza in São Paulo in 2015. For the last 40 years, He has been working with Logistics and Distribution (multi modal Transportation) and Supply Chain Management as well. Mr. Valmir is interesting in development innovation and technology to apply in management operations areas.



Hellen X. das Chagas, was born in Santos/SP –Brazil in 1989, is graduated in Technology in Logistics and Transports at Fatec Rubens Lara-Santos / SP; MBA in Foreign Trade at Unimonte-University Center of Monte Serrat in Santos/ SP; Master's degree student in the course of Management and Technology in Production Systems (search line in operations management and logistics) at CEETESP-

Centro Estadual de Educação Tecnológica Paula Souza in São Paulo/SP. Professional acting in foreign trade with more than 10 years career as an analyst, import manager and working with Customs Classification of goods in the harmonized system, and professor of Foreign Trade and Logistics at Senac Santos. She is interested in studying the areas of foreign trade, logistics and supply chain management.



Romulo de S.F. Junior received the B.S. in Law School from Federal University of Amazonas in 2004 and B.S. in Data Processing from University of the State of Amazonas in 1999. He is Master Degree candidate in Management and Technology in Production Systems at Centro Estadual de Educação Tecnológica Paula Souza in São Paulo in 2014. He has been working with research and development of technological projects since 2000 in partnership with firms,

Research Institutes and Universities. Mr. Romulo has an interest in the field of innovation technology, management and culture of innovation, agile project management and virtual teams.



Eliane A. Simões is a Civil Engineer, graduated from State University of Londrina in 1980, with a master degree in Transportation Engineering by Federal University of Rio de Janeiro in 1983, with a doctorate in Construction Management by State University of São Paulo in 1998 and post-doctorate in Distance Learning by University of São Paulo in 2010. She is now a Professor at Centro Estadual de Educação

Tecnológica Paula Souza, as a coordinator of the Master Degree Program in Production Engineering. She is also a Consultant on Management and Education Areas in many organizations in Brazil. The three last publications of Dr. Simões are: 1. Use of the SCOR Framework in service industries: an exploratory research. Geórgia (USA): POMS Conference, 2014; 2. Gestão Sustentável do Trânsito em Cidades Pequenas e Médias: Uma Abordagem para Cursos MBA/EaD, Rio Grande do Sul (Brazil): Revista Tear de Educação, Ciência e Tecnologia, 2014; 3. Preparo Técnico e Profissional em Ead para Gestão de Trânsito: Uma Análise a partir de programas apresentados na Internet. Rio de Janeiro: Revista EaD em Foco, 2013. Dr. Simões has interest in the field of Management and Innovation, Project Management, Education and Services Management.