

CORPORATE SOCIAL RESPONSIBILITY FOR INDUSTRY 4.0. THE CASE STUDY OF THE ITALIAN COMPANY OPERATING IN POLAND

Caputo Domenico¹, Paiano Annarita² and Foltynowicz Zenon³

^{1)YesWeNet SPA (Italy); ^{2)Department of Economics, Management and Business Law, University of Bari Aldo Moro (Italy);^{3)Faculty of Commodity Science. Poznan University of Economics and Business (Poland)}}}

E-mail: domenico.caputo@hotmail.it; E-mail: annarita.paiano@uniba.it;

E-mail: zenon.foltynowicz@ue.poznan.pl

Abstract

Sustainable development must be part of the organization's core business and can not be treated as a chance to satisfy shareholders, customers or the regulator. Operating in a sustainable manner is an advantage for companies and for society. So why are not all companies operating in this direction? The reasons are many and sometimes complicated. The main useful tools to address this issue are CSR culture and the new vision of Industry 4.0.

The article presents various aspects of Corporate Social Responsibility for Industry 4.0 on the example of the Italian company operating in Poland.

Keywords: Corporate Social Responsibility, Industry 4.0, Circular Economy, FCA Poland

JEL Classification: O14, O19, O25, O33, O35, O44

Introduction

Manufacturers are under constant pressure from various circumstances. They must reduce the negative impact on the environment and work time, while increasing throughput and quality, in order to continue to compete effectively. Manufacturers are also not indifferent to disruptions, and in recent years lean manufacturing and automation put additional pressure on them, forcing some of them to even eliminate them altogether.

Another breakthrough in production is already underway, i.e. "Industry 4.0" [Manohar, 2015]. It is a continuation of the three previous phases of industrialization - mechanization, the dissemination of electricity and the automation and computerization of production. It will be a smart production environment thanks to the integrated platform of corporate data systems, Internet of Things (IoT) and cloud computing. Industry 4.0 will provide insight into variables or anomalies that may cause performance problems, such as machine failures, bottlenecks or waste, thereby completely changing the manufacturing sector and fundamentally changing established relationships between manufacturers and consumers of products [Sundblad, 2018]. By introducing Industry 4.0 to their strategies, manufacturers also orientate their organization towards the future. Consumers are increasingly interested in buying products from companies that have introduced CSR principles. Organizations that

can demonstrate low energy consumption or lower carbon dioxide emissions and have better employee welfare policies will be the ones that will be able to compete most effectively encourage and gain larger market shares. [Sundblad, 2018]. According to Sundblad [2018], Industry 4.0 goes beyond creating efficiencies. It also empowers manufacturers to create more customized products, which can help them stand out in a crowded marketplace, and improve loyalty and satisfaction among their customer base.

Manufacturing industry contributes to environmental pollution and social cost. Hence, corporate social responsibility (CSR) functions as a way to reduce the effects of corporate activities, to increase long-term performance and stakeholder trust.

The Industry 4.0 opens up scope for thought and action in the area of corporate social responsibility. There is a very close link between the fourth industrial revolution and CSR. The digitalisation of industrial production has a direct impact on employment and, through this, on society. And if the forecasts are right – 47% of industrial production will be fully automated by 2028 [Rossi, 2017]. Rossi asked:

- if people will lose their jobs because they've been replaced by machines?
- if the numbers of new professionals required by digitalisation (data scientists, automation experts, application or smart device developers, software programmers, systems integrators, etc.) will be greater or smaller than today's factory workers?

- if the boost to productivity and competitiveness will be sufficient to guarantee new jobs for people in companies that lose out to competitors and have to cut their workforces?

According to Visser [Visser, 2011], the history of corporate social responsibility can be divided into five periods: greed, philanthropy, marketing, management, and responsibility. Each period refers to a specific stage for companies: defensive, charity, promotional, strategic and systemic. Naqvi [Al Naqvi, 2018] is convinced that a new CSR era has begun. It is known as the age of intelligence, and the corresponding stage is the cognitive era when machines are implemented in order to radically transform and improve CSR processes. CSR can be seen as a business process and therefore it constantly needs improvement in its efficiency and effectiveness. Industry 4.0 will be the foundation of cognitive CSR in which artificial intelligence technology is implemented in a strategic and integrated way to radically improve the CSR process [Al Naqvi, 2018]. This will be of particular importance to the automotive industry.

Why is it especially in the automotive industry? The demand for customer services has increased along with several non-automotive companies that are looking for customer engagement channels outside the point of sale of vehicles. Original equipment manufacturers (OEMs) are losing significant opportunities in product planning, new services and timely response due to the lack of information about customer or vehicle data. Direct interaction between the OEM producer and the customer or vehicle will help them to understand and evaluate customer preferences and thus increase the efficiency of operations [Manohar, 2015]. Industry 4.0 will present some of Mega Trends, which are to be key factors in the transformation of the automotive industry, namely Cloud computing, cyber security, Big Data analytics, and Internet of Cars. Industry 4.0 will create conditions to shape the future of the automotive industry. By using such innovations as 3D printing, robotics and common IT technologies, OEMs will improve product design and transform traditional forms of production and supply chain. As the needs of the automotive industry are changing towards complex products, minimum lead times, raw materials savings and non-standard products, it is certain that most industry players will adopt this transition. For example, the automotive industry is expected to account for 20% of the 3D printing market by 2025. This change in the industry will create a situation in which the workforce will be responsible for a smaller proportion of the overall production costs. The cost advantage in countries with low labor costs will fall sharply.

The emergence of new business models will eliminate disparities between industries. Horizontal and vertical convergence will be more real than an independent approach. For example, it is expected that the cooperation of the healthcare and automotive industry will increase. Thanks to this, health, wellness and wellbeing will become a distinctive feature of the brand outside of automated vehicles.

The development caused by Industry 4.0 and its impact on the automotive industry will require a joint effort by all ecosystem partners (OEMs, decision makers, suppliers, end users, etc.) to increase reliability and bring great benefits. Such synergistic efforts will increase end-user awareness of the huge potential of Industry 4.0, which will eventually lead to increased demand for new services and, as a result, to the sustainable development of the automotive industry [Manohar, 2015].

Companies in the automotive industry are opening research centers dedicated to Industry 4.0. One such created is Centro Ricerche Fiat: Industry 4.0. Their latest achievement is the DIDA platform [DIDA, 2019]. DIDA (Digital Industry Data Analytics) is a platform for analyzing shop floor data, developed by Engineering and tested by the FIAT Research Centre as part of the OEDIPUS project. OEDIPUS (Operated European Digital Industry with Products and Services) is part of EIT Digital's Digital Industry Action Line and focuses on creating innovative solutions for European actors in the manufacturing sector. The DIDA, a business intelligence platform for the collection, management and visualization of big data derived directly from IoT sensors installed on production lines, makes it possible to collect, store, analyze, filter and visualize a substantial amount of big data from a variety of sensors located on the production lines (e.g. from sensor-equipped welding cells) within an FCA factory.

This issue also enters to the FCA in Poland. Recently at the industry conference dedicated to Industry 4.0 Jagosz from Fiat Chrysler Automotive showed how to eliminate the problems associated with ergonomics using cooperating robots [Jagosz, 2019].

In this paper we present the application of CSR concept, in particular concerning the environmental issue, and the innovation tools of Industry 4.0 within the Italian automobiles company operating in Poland.

FCA in Poland

The economic relations between Italy and Poland have very solid roots. This is thanks to long-term relationships of companies, which have been operating in the area for long time. One of these is Fiat Polski, in Poland since 1932.

FCA market in Poland is growing steadily with the phenomenon of delocalization for many reasons: the main one is the need to contain the costs and relocate to countries where labor costs much lower. One of the most important plants is that of Tychy, which we will discuss in the next section.

FCA being a multinational must interface with the territory, the environment and the workers: the stakeholders. Hence, sustainability reports have been elaborated addressing matters as gas emissions, water footprint, energy consumption, policies adopted with workers. So we can have a complete view of how the company operates in all aspects. Let's study the FCA case and show how greening can help even on the turnover as well as the image.

In the last report of sustainability of FCA [FCA, 2018], the company set the goals, even, through sustainable products and responsibility of the management manufacturing for reduce the impacts on the environment. The basic concept is producing for the environment and sustainability, minimizing the waste during all the value chain

Producing in the perspective of a circular economy concept

All the steps of value chain are important and FCA take care, minimizing and solving all the probably problems they can have during the entire life of the product. Sustainability is one of the goal for all those steps:

- **Design and Innovation:** with 4.3 billion Euro spent in research and development, FCA gives innovations on their product and process, vehicle fuel economy and emissions, vehicle material composition and end-of-life, environmental impact and natural resource consumption in production processes. The results of these operations generate a value of 8,478 patents.

FCA select materials enhanced with natural fibers and recycled aluminum alloys allow a reduction in both weight and environmental impacts of the vehicle. For example, for the Chrysler Pacifica's model, soy-based acoustical foam contributes to the weight reduction of over 100 kg. In addition, its lower density requires less foam to achieve the desired performance, while reducing costs.

- **Purchases:** On this side, the company set goals on indirect environmental impact and natural resource consumption and innovation of components and processes. A key point is the collaboration with sharing the technologies (industries and the regions).

FCA can count on 2500 suppliers in all the world, each one operate with this standards, for a total purchasing of 70 billion of euros.

- **Production:** this is the phase with the main impact regards as sustainability, environmental burden and natural resource consumption. Input needs for the production are around 48 Million GJ of energy and 24.1 million m³ of water. Results? 3.8 Million tons of CO₂ emissions, a decrease of 11.3% compared to 2010 and 2.1 billion m³ of water saved with a recycling index of 99%. This approach helps to improve the vehicle fuel efficiency and reduce vehicle CO₂ emissions.

- **During this step** the company uses waste as a resource. For example, the use of rainwater and new production technologies adopted at the Cassino plant in Italy makes it self-sufficient in terms of water usage for production. Through innovations such as dry scrubbing technology in the paint shop, zero water is withdrawn from local resources.

- **Use:** one of the major impact for the brand reputation and value, for a car company like FCA, is vehicle fuel consumption and emissions. With 111 billion of euros in revenue FCA guarantee mobility to 4.7 million of new FCA vehicles delivered to customers.

Promoting eco-friendly driving is a responsibility for FCA: an example is eco Drive, an FCA software system available on selected models that offers personalized tips on driving styles with the objective of contributing to a reduction in fuel consumption and emissions.

- **End of Life:** last step and strength point of the green value chain. Promoting reuse, recycling and recovery of vehicle materials is one FCA responsibility. So how, parts like battery and the vehicle are dismantling and remanufacturing. It is here where we have in addition saving costs. The old "linear economy" concept is replaced by the concept of the "circular economy" (Kalmykova et al, 2018).

These reuse parts, from an economic point of view, simultaneously reduce the cost of vehicle and decrease the volume of salvageable materials heading to landfills.

The remanufactured parts of the company are air compressors, starters and alternators, electronic control modules, engine and transmission product categories.

According to the line of FCA, "Jeep Wrangler" can be a good example for show the guideline of the company. A modern design, advanced technology and an integration of sustainability solutions to reduce weight and improve fuel efficiency. The wider use of smart technologies has contributed to an improved balance between performance and fuel economy. These technologies include smart charging, optimized engine cooling systems and cylinder deactivation.

For the material: aluminum closures (doors, hood, fender flares, and windshield frame) for help to reduce weight and boost fuel economy so consequently reduce emissions of CO₂. But not only this for reduce the CO₂ emissions: they developed electrification technologies: a mild hybrid system using belt starter generator technology which offers improvements in fuel economy and a reduction in CO₂ emissions. The line on reducing emissions is even on alternative fuels: natural gas, produce new products that can use the fuels aligned already on the market or bio methane (a Renewable Fuel Source).

As we said, the final step of end of life, have to be manage for a recycle or re use the product with the final goal of minimizing the waste. The methodology used to support transition to circular economy is the Life Cycle Assessment, which consider factors based on ISO standards (Motta, 2018).

Polish companies of FCA (Tychy and Bielsko Biala) and the World Class Manufacturing

FCA Poland is the biggest of the 17 companies of the Fiat Chrysler Automobiles Group (FCA) in Poland, and its plant in Tychy is one of the best plants of the FCA Group. In 2017 the car “FIAT 500” had an increase in demand compared to 2016. Tychy’s plant produced 263,424 units divided between Fiat, Abarth and Lancia (178,989 Fiat 500s, 62,085 Lancia Ypsilons and 22,350 Abarth 500s).

The Tychy factory is one of the few factories in the world to have won a gold medal in the World Class Manufacturing (an integrated business management methodology according to the highest world standards in terms of safety, environmental protection, maintenance, logistics and quality).

This way of production (the WCM) is an innovation program based on continuous improvement, is an integrated system derived from Japan, a new way of working that involves the elimination of all kinds of waste and loss (Muda). One of the step is the responsibility environmental management. An integral part of the management of its industrial processes is committed to implementing an Environmental Management System (EMS) based on standard methods and procedures, created to prevent and reduce the environmental impact of production activities at source, from the bottom to the end.

How the FCA Poland World Class Manufacturing works

After evaluating the results obtained by the plant, the auditors score between 0 and 100. Certified and qualified members of the World Class Manufacturing (WCM) Association carry out the audit work. High scores are ranging from bronze to silver, gold and World Class. This audit system enables a constructive exchange of experience and solutions between members of the WCM Association as well as between Group plants. At the end of 2012, 109 Fiat Group sites were involved in the WCM program: 19 of these achieved performance levels, eight were silver and the Bielsko Biala plant (Poland) was the first in Fiat Group history to reach gold level [FCA Poland, 2012].

Conclusions

The future development of Industry 4.0 and its effect on the automotive industry will require synergetic efforts from all ecosystem.

The companies and their stakeholders must take responsibility for the process of Industry 4.0 and steer it in a direction that simultaneously ensures economic, social and environmental sustainability.

Industry 4.0 forms the basis for cognitive CSR. FCA Poland World Class Manufacturing is a good examples of the CSR and initial Industry 4.0.

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