

Impact of innovation on sustainable development of organizations

Diana Baidoc¹⁺, and Professor PhD Laura Bacali²

¹ PhD student, Management and Economic Engineering Department, Faculty of Machine Building, Technical University of Cluj-Napoca, Romania

² Professor PhD, Technical University of Cluj-Napoca, Romania

Abstract. *The development of innovative products, services and technologies is a prerequisite for maintaining economic competitiveness in modern society. It is unlikely that only the long-term products remain on the free market, with the introduction of new or improved advanced technologies and services. In this context, we can speak of a strategic circle that must continually cover every department of a company. By focusing local and global efforts on companies, financial resources can be identified to support technological innovation and product innovation. As product development, technology development includes industrial research and experimental development, followed by technology transfer within the company to deliver high-performance products. New technologies are support for marketing, and marketing also plays a major role in selecting technology solutions and their recipients.*

Specialist literature offers many ideas on these issues: firstly, green marketing today has an important role to play in the economy, and the study of the dissemination of technological innovations in the field is in constant expansion. Renewable energy sources can be considered as radical innovations because each of them has changed the electricity production from the previous power. There are many statistical issues that explain this process of innovation.

Keywords: green marketing, innovation, renewable energy, new technologies, sustainability management.

JEL Codes: O31, Q20, O32, Q55, Q56.

1. Introduction

For this paper were used as bibliographic and information sources: specialized books published in the country and abroad by national and international authors, articles published in national and international databases, energy consumption of the analyzed company. The collected data was analyzed, using different modes of processing, to predict the evolution of the phenomenon and to draw conclusions.

The following research methods were used: documentation, by analyzing the literature, being studied books, studies, national and international articles; static methods such as classification, synthesis, graphical representation of events and phenomena investigated; the method of interdisciplinary research, based on knowledge from other fields, such as statistics, quality management; comparative analysis used to compare energy consumption for each month.

⁺ Corresponding author: E-mail address: Diana.Baidoc@tcm.utcluj.ro. Tel.: + (40-746/003716).

In this paper we focused on energy management, an aspect of everyday life that seeks solutions to choose inexhaustible energy sources for people, not to exclude future generations. In recent years, renewable sources have become increasingly prominent in the global energy scene.

The main objective of the paper is to analyze and elaborate an energy assessment in order to establish the real situation of the energy consumption, the energy efficiency level, as well as the measures for improving the energy regime and for preventing the effects of environmental pollution. The evaluation was carried out on a well-defined energy outline, impacting the operation of company A. We chose this company because it is in constant development and it is important to see how energy has increased since the factory was opened when equipment had to be tested and used more than now that production processes are stable. The variables used for the analysis are electricity, thermal energy and water consumption.

In the first part of the paper we explained the phenomenon of innovation, sustainability management and the supply chain. Combining this knowledge will lead to the identification of the best solutions. The launch of technologically innovative products is complex, expensive and risky. It is important to place on the market because of the risk of similar products being launched by competitors. The pace of innovation is becoming more alert and rapid innovation a crucial condition for business success.

In the last part we present general information about the company under review, named in the "Company A". An example of the sustainable development standards on which the organization operates is exemplified, focusing on ISO 5001 related to energy management. Due to the fact that the organization is constantly growing, it is looking for solutions to lower energy consumption and, implicitly, costs. In this respect, the subject of this chapter is to analyze the energy consumption of the organization and to identify possible actions to improve energy management within the organization.

2. Sustainability Management

Sustainable development has been defined in many different ways, but the most used and accepted definition goes back to 1987, when the World Commission on Environment and Development published "Our common future" (WCED,1987), also known as the Brundtland Report. In this document, sustainable development is defined as "development that meet the needs of the present without compromising the ability of future generation to meet their own needs". This definition departs from the classical concept of development, only related to economic growth, and promotes the idea that different aspects must be taken into account: social, environmental and economic progress are strictly connected if we want to achieve sustainable development.

We cannot solely focus on the economic growth of the society if we want a long-term and enduring development that aids to improve quality of life, because "money makes life more comfortable, but not more sustainable" (Stougie, L,2014). Talking about sustainability and sustainable development can be seen only as a temporary trend. Nevertheless it is undeniable that the last decades were characterized by a raising awareness of environmental problems and by an increasing number of consumers that want to understand what is behind the products they buy. People are concerned about global warming, ozone depletion, air and water pollution and are aware that the decisions made today will shape the future of our planet. But what is the real problem of our unsustainable society? It is a fact that present industrial management is based on overexploitation of fossil fuel, resource depletion and environmental destruction. This is the reason why industry could be seen partly as the problem as well as the solution for a sustainable development" (Wall, G.,2001). Every technological process and system should be chosen wisely, preferring that one that is more sustainable from the environmental, economic and social point of view. Companies should follow the "Triple Bottom Line" (TBL) way of doing business, in other words they should think about the impact their actions have under an environmental, economic and social point of view. This concept was introduced and explained for the first time by John Elkington in his

book "Cannibal with Forks: The Triple Bottom Line of 21st Century Business" (Elkington, J.,1997) and is a way of encouraging an integrated approach of life cycle sustainability assessment, taking into account the three pillars of the environment, economy and society when evaluating the impact of a company on both a local and a global scale. The TBL can be seen as a different way to express the 3P approach, that involves People, Planet and Product. While people and planet are related to the collective interest, product is a more self-interest concept, therefore it should be better to refer to "People, Planet and Prosperity", as introduced during the World Summit on Sustainable Development in Johannesburg (2002).

Making sustainable energy for the planet is not possible but necessary. It is the golden thread that constrains development, social inclusion and environmental protection. (Ki-moon, 2016).

Increased attention to environmental issues has led to the development of new economic theories that aim at creating more sustainable lives, a branch of which is green marketing. Technology plays a particular role in the evolution of marketing.

The road to recognizing the theories of sustainability by global institutions has been a long and difficult one. Below we have a comprehensive history of the efforts made in this respect:

- 1972, the United Nations Conference, Stockholm - is the world's first environmental event;
- 1973, following the UNEP Conference of the previous year, the United Nations Environment Program was created;
- 1980, UNEP together with IUCN (World Conservation Union) and WWF (World for Nature Foundation) publishes the document "The Global Conservation Strategy for Natural Resources for Sustainable Development" where, for the first time in history, the concept of sustainable development is quoted in an international document;
- 1987, Brundland Report, published by the WCM Commission set up by the WCED (World Commission on Environment and Development). The definition of sustainable development presented in this report is recognized today "It is intended to respond to the needs of the present without compromising the potential of future generations";
- 1991, Earth Care. A strategy for a sustainable life promoted by IUCN, UNEP and WWF. The document is the reference point for implementing the concept of sustainability;
- 1992, UN Environment and Development Conference in Rio de Janeiro. Ends with the Rio Declaration, signed by all participating countries where 27 principles are presented and Agenda 21 on environmental integration and development - an action program to achieve the objectives set in the declaration;
- 1997, the Kyoto Protocol. The participation of 154 industrialized countries with the intention to reduce global greenhouse gas emissions by 5.2%;
- 2001, the Gotemberg Protocol. European Directorate for the Determination of GHG Emission Levels to be attained in 2010 by meeting the Kyoto targets;
- 2002, World Summit on Sustainable Development in Johannesburg. Due to financial inability, the goals set ten years ago in Rio could not have been fully touched and now have been redefined on a much smaller scale for the next decade.
- 2005, the United Nations World Summit in New York, focusing on Monitoring the Millennium Goals, has resumed Agenda 21 with the planning of concrete actions to be implemented.

In conclusion, even if there are many definitions and interpretations of sustainability, they are all related to environmental, economic and social aspects, that have to be properly assessed and balanced before the development of new products or with the aim to improve an existing product.

3. The Advantages and Disadvantages of Innovation

Customers are no longer satisfied with product ownership. When purchasing, consumers are looking for the product to deliver value, utility and satisfaction, be designed and built in accordance with their expectations and requirements. This requires market diversification, a real challenge for companies that have to compete on multiple market segments at the same time. Intrusion into multiple markets can be achieved mainly by diversifying the product portfolio.

The current market is characterized by a high level of innovation and an orientation of R & D activities towards satisfying customer needs. Harsh competition on the market places new challenges on the entire product development process, such as machinery, equipment or equipment, in order to achieve the three major objectives of any company at the same time: shorter time for launch, manufacturing costs reduced and high quality products. Several factors and trends make the achievement of these goals more difficult than anticipated, here being remembered the great complexity of machine-type products, equipment or equipment, the explosion of variants due to the relatively excessive personalization and the high innovation rate due to the desire of customer satisfaction. Designing this type of product can influence a large part of their cost, so it is important to get cost estimates as early and as possible at the design stage and sometimes at the bidding stage.

Technology is globally a major changeover for both the markets and the structure of industries. It creates challenges and opportunities on the market. Much of long-term economic growth is due to technological change that increases productivity and leads to the emergence of new products, processes, or industries. Advanced technology involves scientific technology, and implementation of technologies involves a management that is characterized by flexibility and quick decision-making and factual. (Lakatos E. S., 2015)

The creation of ideas and the accumulation of knowledge are found in innovative products on the market. An innovation strategy in an organization leads to the success of all those involved in the organization's good functioning. A business organization that aims to develop a technologically innovative product can face two main risks of uncertainty: technological uncertainty and market uncertainty. Recognition of opportunity is necessary, but not enough to be successful. Many companies recognize the opportunities, but far less recognize the ways to take advantage of this knowledge.

Innovation is a process that enables companies to be more efficient, to create products or services with distinct features, to improve, giving them the chance to gain a competitive advantage. There are several advantages and disadvantages in the innovation process, which we have summarized below:

Benefits

Today, both the product market and the resource market can be represented as fast-moving business environments characterized by increasing competition intensity and dynamics. Creating a sustainable edge is essential for a company to face the turbulence increasing occurring every day. Within this framework, the company has to develop a knowledge-based business philosophy in which the ability to generate knowledge plays an essential role in substantiating the competitiveness and formulation of company strategy. (Lakatos, E.S., 2016)

Specialized knowledge can not be fully mastered by a firm because it is in individuals and even if protected by patents, copyrights and commercial secrets, they fluctuate outside the organization when people leave the company. The technological capacities used to give birth, learn and share knowledge, research and development (the ability to create the "new"), are authentic critical sources that allow businesses to compete in dynamic competitive conditions. (Grant R., 1996)

So, when the company has the tools to find solutions and develop new ways to exploit the stock of accumulated information and the flow of knowledge of people entering the organization, it is enriched by a process that ends

with the creation of an innovative product or which allows the enterprise to meet market needs even when demand changes are unforeseen. (Kamariah I., 2014)

Another advantageous feature of R & D is the ability to contribute to the firm's ability to absorb, "the ability of a firm to recognize the value of new, external information, to assimilate it and to apply it for commercial purposes." (Cohen W. M.,2006) In this perspective, the exploitation of external findings is a core component of innovation capabilities, so that the spill - caused by interaction with the endogenous absorption capacity of the firm - is no longer considered a complete deterrent to R & D activity, as "negative stimulus relatedness with spreading is offset by a positive incentive to increase absorption capacity " (Cohen W. M.,2006). Due to this R & D capacity to generate basic knowledge in the company, the company can exploit the dissemination of competitors and thus the company is more stimulated to invest in research and development.

In order to conclude the list of main reasons for investing in research and development, we quote Juan V. García-Manjón's point of view. According to the authors, firms invest in R & D as they represent a growth mechanism for the company due to its positive impact on sales. In addition, they believe that the preoccupation to promote business growth is central because it leads to economies of scale, being the starting point for technological change and therefore supporting a better market position, guaranteeing the company's survival. (Garcia-Manjon J.V., 2012).

Disadvantages

In the literature, the so-called management risk aversion is assumed (Monks R., 2011) that occurs when we analyze the inequality of interests between managers and shareholders. The former can not easily diversify their investment, represented by time spent at work, because they need a certain amount of time to find a replacement job with a high prestige and a reasonable salary.

While the latter can buy and sell shares fairly easily, diversifying the investment made. Usually, cautious managers are more concerned about current earnings than about favoring investments that positively contribute to future performance so that they "bear no long-term risk, but can take advantage of short-term rewards [...] to the detriment of the institution, its shareholders [...], the problem known as moral hazard "(Monks R., 2011). Thus, given this framework, there are several reasons why managers prefer to avoid spending on research and development, and Lantz and Sahut (2005) clearly emphasize them. First, research and development in the quality of intangible assets is a risky investment because "the decisional choices resulting from the process of acquiring knowledge and rights are irreversible and firms structuring, sometimes putting them at risk" (Lantz J.S, 2005).

Moreover, the authors emphasize the uncertainty and long-term orientation of such a non-material asset, the benefits that lead to cost recovery only after a certain period of time: what is known as "time innovation". This intangible increases asymmetry from shareholders and managers, contributing to the above mentioned problem, typical of the principal-agent situation: moral hazard. The principals (shareholders and, to a certain extent, the market) do not have control (without excessive costs) on management behavior. Thus, the latter deals with an investment whose content and prospects of current profit are dubious, would prefer to avoid it. From their perspective, firms have to bear large costs (due to high development and control costs) for an asset with an uncertain future value and so uncertainty.

The probability of failure of R & D projects is low, as the risk of innovation is both technologically - "a technological breakthrough makes brutal and competitive discovery," its discovery may not become a market standard". Researchers, exemplifying a firm stops a research and development project, underlines the impossibility for the enterprise to recover the entire amount invested in innovative activities: the specific ability of firms to spend intangibles (most of the time) make research and development an irreversible investment that can not be sold at the cost of acquisition..

Another disadvantage of investing in innovation is that related issues R & D obliges firms to protect inventions to prevent competitors from copying knowledge discovered without permission. This requires a detailed

disclosure of the invention, which in turn allows competitors to use discovery as a starting point for further research in order to improve them, avoiding the significant costs incurred by the original inventor in the research phase.

Literature review proves a positive correlation between R & D expenditure and the firm's market value. (Ehie K.I., 2010). In view of the performance gained from a market-based perspective, we take into account market expectations for future earnings - included in the share price, which also focuses on investments with forward-looking returns such as research and development.

However, mixed or even conflicting results are presented in studies investigating the influence of R & D on company performance, appreciated in terms of sales growth, revenue and profitability. (Zhu Z., 2012). The earliest evidence indicating a positive effect of R & D on sales growth dates back to the 1960s, especially with regard to Mansfield's work (1962).

(Lamperti F., 2015) The former author's paper, studying the refining industry in steel and petroleum, revealed a significant difference between firms that made significant innovations in the selected periods (between 1916 and 1945) and others that were not involved in the innovation process. Conclusion confirmed by Scherer (1965), which took into account data on the top 500 American Fortune companies, has shown the reward effect of R & D investment on company profits by increasing sales. Since then, many further studies supported the positive impact on sales growth such as: Hall, 1987; Geroski 1996; Del Monte and Pagani, 2003; García-Manjón and Romero-Merino, 2012.

Other recent contributions have shown the essential role of innovation to enhance the company's performance. Van Auken et al. (2008), analyzed 1,091 Spanish enterprises producing small and medium-sized enterprises, dividing them between low and high-tech industries. The work confirmed the positive relationship between innovation (measured, among other things, as R & D expenditure) and firm performance, regardless of the technological intensity of the sector. In terms of authors, performance improvement is related to the impact of three dimensions. Novelty products allow the company to adapt to changes in the market and, to meet the needs of customers, strengthen their relationship with them.

The innovation process contributes to economic efficiency, lower fixed costs and thus increases profits and productivity. Managerial and systemic innovation improves the quality and coordination of tasks. Bogliacino and Pianta (2010) have tested for 38 production and service sectors in eight European countries over two time periods from 1994 to 2006, a model based on three perspectives analyze. They considered investing in R & D as the main contributor to developing successful innovation. They confirmed innovation-based entrepreneurial profits and investigated the extent to which profits, the result of innovative efforts, are the engine of future technological efforts (Van Auken H., 2008).

An interesting point that strives to balance the positive and negative effects of research and development on performance is that of Chao-Hung Wang (2009) who "explored the performance problem as a result of both optimal effects and of the thresholds" (Chao-Hung W., 2011). On the one hand, investment up to (and not beyond) a specific amount is necessary to establish an optimal balance to maximize performance. On the other hand, taking into account the final stage of the lifecycle innovation process, in order for research and development to affect positively and efficiently performance, a minimum investment threshold is required. If these conditions are not met, the effects the negative costs of making the investment are higher than the positive ones, so it is possible to emphasize the presence of a compromise when investing in R & D: on the one hand in the long run, it generates additional profits but also, increase the company's total costs.

4. Innovation and sustainable development

The main purpose of companies is to reduce the costs and use of harmful substances throughout the supply chain. This can be achieved by providing incentives for suppliers who are able to reduce the use of harmful materials or develop sustainable practices. It is estimated not only the quantity of sold material but also the quality of the additional services it offers. (Cioca L.I, 2007)

The following is a supply chain along with its activities: purchasing raw material, manufacturing, distribution, and product use by the final consumer.

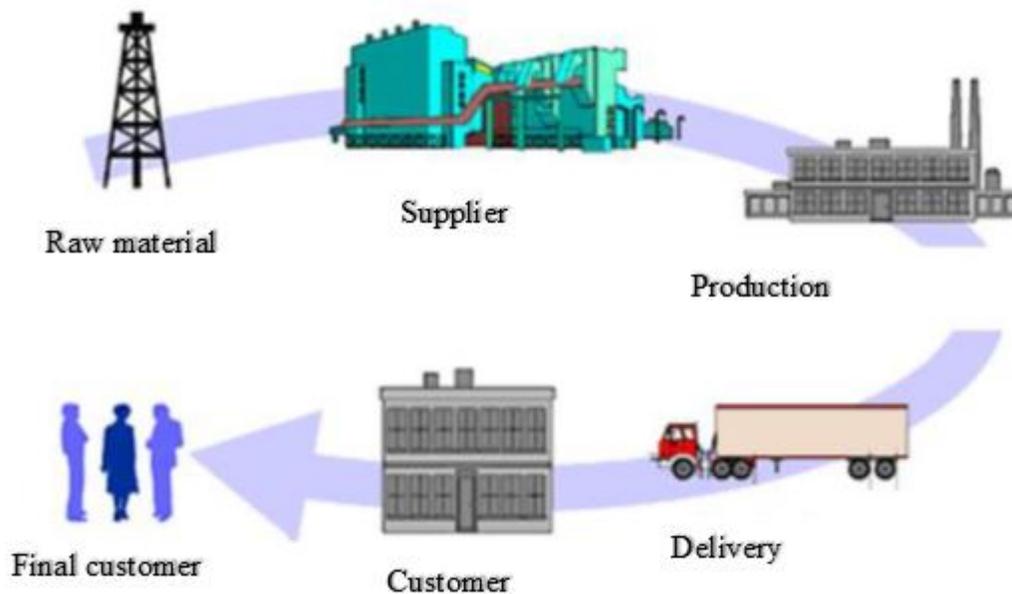


Fig. 1 Supply Chain (*Corporate Business Model Innovation, 2017*)

In this cycle, the following practices must be taken into account in order for a product to be completely green:

- Reduction of raw material by a new design designed to minimize the amount of waste material.
- With the goal of reducing overall size and weight, using feedstock from suppliers using organic techniques.
- Use of recycled materials. Governments encourage and provide incentives for those using this type of material.
- Designing for transport, creating a package that best suits the mode of transport, but also to reduce its weight and the use of recyclable packaging.

In the literature, there are few approaches to identifying the interference between technology diffusion and marketing management. On the market of technologically innovative products, for consumers to acquire a new product, they need to adopt the new technology. The adoption rate of new technology is even greater as consumers are more open to new technologies. This opening is given by the way the product is promoted, but above all by the way of promoting technology. Under these conditions, the diffusion of technology interferes with strategic marketing to bring technology as close as possible to the consumer. In addressing the type of adopter of new technologies, there is not much research on consumer income as a factor influencing the adoption

of technology. The consumer adopts the new technology but can not resort to the product purchase due to the income / price ratio. To be innovative, as a type of adopter in terms of technology diffusion, that is, to be among the first to buy that product, the consumer must have a level of income so that the price is not a hindrance to the purchase.

One of the issues related supply chain is the cost of purchasing refined materials that are derived from specialized suppliers. Here are some of the features that a green product has to meet unlike competing products: to pollute the environment less, or not at all, against competing products, to lead to conservation of resources and energy, to make sustainable use of natural resources, have a long-term use, be reusable, be recyclable, contain recyclable compounds or materials, be easy to remove.

The first step through which waste can be reduced in the production process is by using green packaging. This is one of the most visible elements in the green supply chain because it is what the consumer feels and sees before coming into direct contact with the product.

In recent years, besides the role of protecting products, packaging has become a way to attract consumers as well. This is precisely why there is much greater control over packaging, since excessive use involves more waste, additional costs, waste of resources and, in particular, environmental degradation.

For many companies, packaging transformation is an easy and fast technique to reduce costs and environmental impact. The points to be achieved in converting packages to some green are: discount, consumers think there is a disproportionate use of packaging, to reduce it to a minimum, companies have to send this message to have a low impact on the environment, reuse, this is probably one of the best ways to use a packaging, companies have to take the responsibility to take back packaging from consumers and reuse them. Unfortunately, this can not be true in retail trade where the current health and hygiene rules do not allow this, recycling, if can not be reused, it should be possible to dispose of the packaging in the most environmentally friendly way possible. Companies should promote their premises where packaging is recycled, reforming, this is probably the most difficult thing, because all the packaging aspects of the production materials for which it is used must be tested. (Zhang G., 2012).

The CSP (Sustainable Packaging Coalition) has the role of creating a world where packaging is a responsibility of environmental companies, being created safely throughout the lifecycle. They can meet market performance and cost criteria if they are made entirely from renewable resources and easy to recycle. Besides this, another role of the packaging is to communicate creative information to the consumer in a creative way, resulting from the nature of marketing techniques and green design.

There are laws that packaging manufacturers have to put forward: Directive 94/62 / EC on packaging and packaging waste, the guidelines of the Federal Commerce Commission (US) Guidelines for Environmental Marketing, ISO 14021 and EN 13427 are European requirements for packaging and packaging waste. One of the main reasons that led to the creation of these regulations is that about one-third of the ten tons of waste each year is made up of packaging. (Blue S., 2006)

As mentioned above, in order to reduce the amount of packaging, several laws have been created, the problem now faced by suppliers is to ensure the correct amount of packaging to prevent product damage and compliance with laws in terms of quantity and quality. The cost of packaging of toxic material is getting bigger, as well as the purchase of materials that can be reused or recycled is a difficult process.

The best solution in this regard would be to reduce the size of the packaging weight and increase packaging efficiency. In Africa, one of the biggest problems is the lack of efficiency of food containers.

This is a problem highlighted by the Organization World Health, talking about 30-50% of food that has been damaged due to non-conforming packaging. In Europe, this is only 3%.

5. Eco innovation in the company A

The company under review, Company A, is a multinational company headquartered in Germany. It is the world's largest supplier of components for the automotive industry, with about 375,000 employees worldwide. Its operations are structured in four sectors of activity: mobility solutions, industrial technology, consumer goods and construction and energy technologies. The organization has nearly 440 branch offices and regional companies from around 60 countries.

42,700 researchers and developers work for this organization in 93 locations around the world on a single network, so there are on average 20 patents on each working day, which puts the company first in Germany. This is not possible without an investment, so over the last 5 years it invested over 20 trillion Euros for research and development

Company A's philosophy of circular economy is that it has a positive impact on the world. Contrary to the rhetoric often used in the sustainability discourse, the circular economy does not aim to reduce the negative fingerprints mankind has on the environment but to create a positive impression. The ultimate goal of reducing the negative impact is to leave no impact (for example, to become "carbon neutral"). Company A offers an alternative view: people have the ability to be a healthy part of the environment because we are smart enough to develop products and services that meet both human and environmental needs.

The key issues that Company A guides with respect to the circular economy are:

- Compliance with customer laws and requirements
- Compliance with customer laws and requirements
- Use of substances that interfere with the minimum
- Improve the environmental footprint and the efficiency of materials and energy.
- Research and development: 53% of the budget is allocated to the research and development of sustainable products
- New business models: product as a service, digitally powered circular economy
- Supply Chain: The performance of suppliers' durability, critical materials purchased, and a strategy for this is known. Suppliers are also involved in these issues just before conceiving a product.

By limiting the scope of businesses facing the implementation of directives and the possibilities of developing sustainable and environmentally sensitive concepts, it is appropriate to talk about the operational certifications to demonstrate their commitment and efforts in this sense. Company A is certified ISO 14001, a voluntary international standard that applies to all types of business and defines how an effective environmental management system should be developed. The ISO 14001 certification does not provide outstanding environmental performance but verifies that the organization has an appropriate management system to monitor the impact of its activities on the environment and to seek systematic improvement in a coherent and effective way and durable. What distinguishes this certification from one in the quality domain is the number of certification transferability on products derived from the production process: the company is to be certified, not the products it puts on the market. Also, as far as energy management is concerned, it has the ISO 50001: 2011 certification. The purpose of this international standard is to enable organizations to establish the systems and processes needed to improve energy performance, including energy efficiency and energy use. (SR EN ISO 50001:2011).

Company A is aware of environmental responsibility and actively contributes to avoiding CO₂ emissions. The implemented energy policy ensures the sustainable development of energy resources. In this respect, the company:

- Ensure energy savings by continually improving energy efficiency within the limits of technical and economic possibilities. In this context, it aims to achieve the set energy targets

- Record and systematically assess the relevant energy consumption in accordance with DIN EN ISO 5001
- Monitor the implementation of energy saving measures, taking into account the latest findings and requirements. Therefore the necessary resources are provided
- Take into account the relevant and internal requirements relevant to the implementation of the energy management system
- Continuously reduces energy consumption, which is an important condition for reducing production costs. Therefore, it tries to implement energy efficiency in all processes, including planning and acquisition
- Involves employees in achieving energy efficiency goals. They are asked to avoid unnecessary energy consumption. To this end, employees can come up with suggestions for improvement

Company A also believes that by continuously reducing energy consumption, we all contribute to the economical use of energy resources and to the protection of the environment

We conducted Company A energy consumption analysis based on historical records, drawing diagrams of variation of the power and thermal energy parameters relevant to the operation of the receivers. The activity of the company had started in 2014, and the analysis was made for years 2014 and 2015.

The activity within the analyzed company takes place mainly in three organized exchanges of 8 hours / shift, for 7 days a week. It is estimated 350 days of work. Thus, a total of 8400 hours in which energy was consumed per year is known at the company's global level.

The flow of energy flowing into Company A's outline is represented by: active / reactive electrical energy and methane gas, consumed well in the form of losses, to produce.

The industrial / drinking water required for domestic hot water preparation, heat preparation for winter heating and for preparing cold water for various cooling processes is also considered as a contrived resource. Active electrical energy consumption in the company is achieved in the main processes of obtaining finished products: electronic control units for the automotive industry. Also, a significant amount of electricity is consumed for a number of auxiliary processes: production of compressed air, production and distribution of cold water 6/12 ° C and 26/36 ° C respectively, distribution of heat from the boiler, distribution thermal agent through CTAs, indoor and outdoor lighting, exhaust, ventilation, pumping.

The trend of monthly electricity consumption is increasing. It is also noted that in 2015, in the first months of the year, the energy consumption increased by about 32% compared to the same period last year. In 2014, in the beginning, the most significant share of electricity consumption was for climate conditioning of the building.

The seasonality of methane gas consumption is high, with high temperatures in low-temperature and low-summer months. In the summer months, gas consumption is produced to produce predominantly domestic hot water.

Water consumption is higher in summer, correlated with the consumption of domestic hot water and evaporation from cooling-air conditioning systems.

From the analysis of specific electricity consumption, it is clear that the rate at which the factory entered the normal production regime. If at the beginning of 2014 the average specific consumption was around 52 kWh / thousand Lei, this happened due to the carrying out of tests, tests, accommodation and initiation activities with the technological processes to be carried out.

During this period, the energy consumption was made mainly for microclimatic conditioning in the areas of: production, storage, technical, office. As the development process reached its set quotas, the level of production began to increase, specific consumption began to diminish, so stabilization was observed from July 2014 until April 2015.

It is noticed that the specific consumption values are even lower as the production level is higher, the minimum values being at the highest productivity.

Specific electrical consumption has two representative peaks: summer (due to microclimate insurance) and winter (due to microclimate and productivity decline). Specific consumption of electricity correlates with the heat demand for winter heating (December - February), due to the increase in the heat pump load and, implicitly, the electricity consumption due to the fact that winter increases the consumption of the hot air distribution fans, as well and other equipment (electric receivers) that contribute to conditioning the winter microclimate. In December 2014, specific electricity consumption is more prominent due to low productivity. Specific consumption of methane gas correlates much better with heating needs during the assessment period, with even a series of improvements worth checking out and replicating (from February to March 2015).

The close correlation of the specific consumption of methane gas with the heat demand is closely related to the fact that methane gas is consumed only to ensure microclimate. It is noteworthy that since October 2014, the specific methane gas consumption trend has been improving, which has increased from January 2015 to March 2015. These improvements can be considered as good practice guidelines. Since March 2015, specific methane gas consumption has suffered a slight depreciation.

Specific electrical consumption correlates with the need for cold in the summer, with an increase in value, due to the more intense use of chillers and related receivers that have a significant share in total energy consumption. The energy intensity represents the percentage of the annual energy cost (electricity + methane gas) in the annual production cost.

Share of the cost of Electricity in the cost of production: 0.8%;

Share of cost with Methane Gas in the cost of production: 0.2%;

Share of total cost to Energy in production cost: 1%.

In order to improve the energy consumption process, the following solutions are proposed, with the impact on sustainable energy reduction of carbon footprint following the optimization of electricity consumption by 858 tons of CO₂ per year.

The following organizational improvement solutions are proposed:

Company A should:

- Initiate a bonus system for employees proposing / applying energy efficiency measures
- Initiate a bonus system for the proposals / implementations in which the factory manager of the plant is engaged
- Perform periodic revisions of transformers. Regularly check them by measuring insulation resistance
- Label and keep up-to-date the labels of equipment and dispatches in electrical distribution boards
- Keep the skylights / windows clean by periodically cleaning them
- Renegotiate periodically the electricity / gas price
- Carry out a set of periodic maintenance reviews such as: electrical equipment heating, ultrasonic inspection for compressed air loss detection, lighting assessment of the operator's work plan
- Perform regular correlations of energy consumption with influence factors (indoor and outdoor temperatures, humidity) and set reference levels as optimized consumption targets. Additionally, it is recommended to apply some corrections when overtaking target values, ie replicating behaviors that lead to energy consumption within the required limits
- Follow daily energy consumption at cost center and overall outline and link these consumption to production levels
- Identify the downstream consumption of the plant when production is not achieved and intervene in such consumption by switching off lighting when not required, reducing temperatures outside production hours to a minimum acceptable level of maintenance, lowering the level air conditioning - refreshment of air in unused spaces, identification and shutdown of other consumers whose operation is not required outside the hours of the program

- Make a comparison between trade-related consumption, correlated with the level of production achieved and identify the factors that influence specific and global energy consumption. For example: ambient temperature, temperature in production areas, number of operators involved in production output, number of machines / equipment with which production takes place, quality of raw material used, quantity of production programmed

Renewable Energy Solutions:

Photovoltaic panels: The energy stored in solar rays is transformed into electricity through photovoltaic panels. These panels are made up of three main layers: a transparent protector, a photovoltaic cell layer and a support layer. The layer that actually converts is the photovoltaic cell layer. Photovoltaic cells are made of semiconductor materials. Such a cell consists of a support plate, iron, copper, aluminum, on which is placed a layer of semiconductor material coated with a thin film of gold or silver. The cell is covered with hygroscopic lacquer to protect against atmospheric or mechanical effects. They have a photocathode which, when interacting with a beam of light, turns the light energy into electricity. Specifically, photons from solar rays bombard the atoms of the material from which the photovoltaic cell is made. Under this action, they tend to free themselves, and so electricity is formed

This form of energy conversion is virtually inexhaustible, dispersible, which ensures conversion to the place of use, eliminating the disadvantage of remote energy transport. The recommendation to install photovoltaic panels is to make sure that energy is needed by non-polluting means and capable of ensuring total energy independence. The benefits are visible after the investment is dampened, when the required electricity is virtually free of charge.

Green Roof: Buildings whose roofs are wholly or partly covered with naturally growing land and vegetation, over special membranes with non-root water and water and root and a filtration and drainage system that drives the water to the drainage of the building, which also maintains water in places formed to hydrate the soil. The drainage layer of the water can be 2-6 cm high and is in the form of egg formwork, successfully replacing the gravel used so far.

Conclusions

In the literature, there are few approaches to identifying the interference between technology diffusion and marketing management. On the market of technologically innovative products, for consumers to acquire a new product, they need to adopt the new technology. The adoption rate of new technology is even greater as consumers are more open to new technologies. This opening is given by the way the product is promoted, but above all by the way of promoting technology. Under these conditions, the diffusion of technology interferes with strategic marketing to bring technology as close as possible to the consumer. In addressing the type of adopter of new technologies, there is not much research on consumer income as a factor influencing the adoption of technology.

The consumer adopts the new technology but can not resort to the purchase of the product due to the revenue / price ratio. To be innovative, as a type of adopter in terms of technology diffusion, that is, to be among the first to buy that product, the consumer must have a level of income so that the price is not a hindrance to the purchase.

In organizing production processes, reducing costs is the first objective organizations are pursuing. This is about optimizing the use of productive resources, starting from the most general way possible: reducing energy consumption, reducing waste, re-using residual products, reducing greenhouse gas emissions. In this paper, we focused on the energy consumption of company A, analyzing all the energy-consuming areas of the company.

This analysis shows that there is the highest energy consumption in the production area, but the company's goal is to reduce these costs over time, implementing intelligent energy management solutions.

Based on the analysis of energy consumption and the number of pieces produced in that time frame, we have made the graphs of variation in consumption with output.

There have been some ideas for improvement that the organization might consider in the future to reduce consumption and implicitly to have the least impact on the environment.

Reference

- [1] Blue, S. (2006). Packaging Guidelines, Sustainable Packaging & Green Coalition
- [2] Cioca, L.-I., Cioca, M. (2007) Using distributed programming in production system management. *WSEAS Transactions on Information Science and Applications*
- [3] Chao-Hung, W., (2011). Clarifying the Effects of R&D on Performance: *Evidence from the High Technology Industries. Asia Pacific Management Review*, 16(1), 51-64.
- [4] Cohen, W.M., Levinthal, D.A. (2006). Innovation and Learning: Two Faces of R&D. *The Economic Journal*, 99(397), 569-596.
- [5] Corporate Business Model Innovation (C/BM) (2017). Retrieved from *Company A Global Network*.
- [6] Hanas, J. (2007). *A World gone Green*. Retrieved from <http://adage.com/article/special-report-ecomarketing/a-world-green/117113/>
- [7] Garcia-Manjon, J.V. (2012). Research, development, and firm growth. Empirical evidence from European Top R&D spending firms. *Research policy on Science Direct*, 41, 1084-1092.
- [8] Grant, R. (1996). Prospering in Dynamically-Competitive Environments: *Organizational Capability as Knowledge Integration. Organization Science*, 7(4), 375-387
- [9] Ehie, K, Olibe, I. (2010). The effect of R&D investment on firm values: An examination of US manufacturing and service industries. *International Journal of Production Economies*, 127-135
- [10] Elkington, J., (1997) *Cannibal with Forks: The Triple Bottom Line of 21st Century Business*, New Society Publishers.
- [11] Kamariah, I., Wan Zaidi Wan O., Khairiah S., Aslan A.S., (2014). Role of Innovation in SMEs Performance: A Case of Malaysian SMEs. In: *Mathematical Methods in Engineering and Economics. European Society for Applied Science and Development Ed.*, 145-149
- [12] Ki-Moon, B. (2016). General Secretary of the United Nations. Retrieved from Wikipedia: https://en.wikipedia.org/wiki/Secretary-General_of_the_United_Nations
- [13] Kuczmarki, T. D. (2003). What is innovation? And why aren't companies doing more of it? *Journal of Consumer Marketing*, Vol. 20 (6) , 536-540
- [14] Kwasnicki, W. (1996). Innovation regimes and market structure. *Journal of evolutionary economics*,6, 379-409.
- [15] Lakatos, E. S., Dan, V., Cioca, L. I., Bacali, L., & Ciobanu, A. M. (2016). How supportive are Romanian consumers of the circular economy concept: A survey. *Sustainability*, 8(8), 789.
- [16] Lakatos, E.S., et al. "The benefits of IT tools in innovation process for SME sustainability." International Conference in Advances in Management, Economics and Social Sciences. 2015.
- [17] Lamperti F., M. R. (2015). The role of Science Parks: a puzzle of growth, innovation and R&D investments. *The Journal of Technology Transfer*
- [18] Lantz, J.S., Sahut, M. (2005). R&D Investment and Financial Performance of Technological Firms. *International Journal of Business*, 10 (3), 255-270.
- [19] Melissa, J., Markley, L.D. (2007). Exploring future competitive advantage trough sustainable supply chains. *International Journal of Physical Distribution & Logistics Management Vol 37 nr. 9*, pp. 763-774.
- [20] Monks, R., Minow, N. (2011). Great Britain: John Wiley & Sons. *Corporate governance. Fifth edition*, 133.
- [21] Peattie, K. e Charter, M. (2003). Green Marketing. In M. Baker, *The Marketing Book* (pp. 726-756). Oxford: Butterworth-Heinemann.
- [22] SR EN ISO 50001:2011, Romania, Bucharest.

- Stougie, L., (2014). Exergy and Sustainability: *Insights into the Value of Exergy Analysis in Sustainability Assessment of Technological Systems*, PhD thesis, Delft University of Technology.
- [23] Van Auken H., Madrid-Guijarro A., Garcia-Perez-De-Lema, D., (2008). Innovation and SME Performance in Spanish Manufacturing Firms. *International Journal of Entrepreneurship and Innovation Management*.
- [24] Wall, G.,(2001) On exergy and sustainable development-Part I: Conditions and Concepts, *Exergy an International Journal*.
- WCED,(1987) Our Common Future, *Report of the World Commission on Environment and Development*, Oxford University Press.
- [25] Welford, R., Gouldson A. (1993). Environmental management and business. *Business Strategy and the Environment*, 3(3).
- [26] Zhang, G., Zhaob, Z.. (2012). International Conference on Applied Physics and Industrial Engineering-Green Packaging Management of Logistics Enterprises. *Physics Procedia*.
- [27] Zhu Z., Huang F. (2012). The Effect of R&D Investment on Firms' Financial Performance: Evidence from the Chinese Listed IT Firms. *Journal of Scientific Research Publishing*, 3 (1), 915-919.