GENERAL FRAMEWORK OF INNOVATIVE BUSINESS MODEL IN INDUSTRY 4.0 FOR AUTOMOTIVE CLIENTS

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Abstract: The main objective of this paper is to establish the general framework for an innovative business model in the automotive industry, by using marketing tools to automatically promote a product. These tools today rise to the customer's need, but especially to his satisfaction, through the use of artificial intelligence. Creating a *customer profile* and *reporting sales*, structured by product typology, location and time are the indicators studied in the literature. The emphasis is on technologies, but especially on the technologies resulting from the implementation of Industry 4.0 in the business model. These technologies work automatically, they create profit, but they can also have some risks.

JEL classification: M21, M31, M41

Key words: Industry 4.0, Marketing, Innovative business model

1. INTRODUCTION

The general environment for implementing an innovative business model requires first an in-depth knowledge of what Industry 4.0 offers, when implementing certain technologies. Therefore, it is necessary to review these industries and what they can offer, today, in relation to the market demand, in the automotive industry.

Industry 1.0 was to become known in the 1780s when the usefulness of steam for industrial purposes was discovered, which led to increased productivity. All the requirements of modern business management, produced during the development of this industry led to the emergence of electricity, which generated a new revolution, giving birth to Industry 2.0. in the 1900s, characterized by electricity production and assembly lines.

Although at that time, it was a great utility, in a short time, with the advent of automation in the production sector, registering an amazing growth in all areas, it moved to Industry 3.0. in 1970 (Vinitha, 2020).

From the perspective of connected systems, communication, machine learning (with the implications of artificial intelligence) and the cloud, a new industrial revolution 4.0 was born in the 2000s, first used by Germany. Technological governance in industry 4.0 involves the transformation of data into Big Data, from discovery to implementation, in any field of activity and implicitly in the automotive industry (Ozdemir, 2018).

But in the age of technology and irresponsibly used natural resources, which are to the detriment of the planet, have led to the emergence of Industry 5.0. in 2020. This industrial revolution in full swing is based on the use of an unconventional series of non-polluting resources, achieves societal goals that can be easily integrated into every type of business and implicitly in the automotive industry, making production respect the limits of the planet our. In this sense, the hypothesis from which the authors started, Xun Xu, Yuqian Lu, Birgit Vogel-Heuser, Lihui Wang, says that "Industry 4.0 is based on technology, while Industry 5.0 is based on value." (Xun, 2021).

The implementation of an innovative business model based on Industry 4.0 or even 5.0 requires a very good knowledge of the customer's requirements and implicitly of his satisfaction. The fact that at the moment there is an emphasis on an in-depth knowledge of the business environment is in fact a knowledge of the technologies used, be they logical or mechanical. Both software robots and mechanical robots that use artificial intelligence can be built. In the following, we will focus on customer satisfaction in an innovative business environment.

2. LITERATURE REVIEW

Customers are becoming more and more demanding and eager to buy a car. However, the attention of consumers is reduced, and marketers need to arouse their interest at the right time, with the right message, and in the right environment to market effectively. As a result, marketers are increasingly relying on scheduled advertising, an online marketing technology that automates online shopping activities. (Sheehan, 2010, p. 14-15).

Advanced, future-oriented tools not only optimize marketing spending across a single distribution channel, but improve budget planning / allocation. Rather, it prescribes how marketing expenses should be distributed, such as display, search, or video presentations (MCKinsey&Company, 2019, p. 23-29).

In car sales, autonomous vehicles have other driving parameters than how a car is known today. Companies have developed autonomous vehicles, integrating information technologies such as Google, and the latter has reported that the development of autonomous vehicles is one of its most important business projects (Urmson 2014).

The activities directly related to the sale of cars that customers face are based on operational actions, which are carried out by the marketing and sales departments, but which bring profit. A sale starts with order management, up to the construction and delivery of a car, the scheduling of a service throughout the life of the vehicle, the inspection and evaluation of the vehicle, manual activities that connect the resources of marketing and sales teams, in particular (Brea, 2014).

In this sense, artificial intelligence (AI) in marketing involves the use of customer data, machine learning and the type of calculation to predict the action or inaction with the customer. AI can take large amounts of data and help marketers easily segment it. Rule-based systems (expert systems) are useful for occasions when all decision-based situations are known in advance, but machine learning algorithms, implicitly artificial intelligence, can adjust the rules (Pradeep, Appel and Sthanunathan 2018, p. 9). As a result, sales incentives, such as the opportunity to offer new cars or additional services to customers who come to the dealer for an appointment, are usually well understood, but rarely performed consistently. This is critical because the number of visits to the showroom is currently minimal. In direct interaction with car buyers, sales are often just as complex (Andersson, Axelsson și Rosenqvist, 2018).
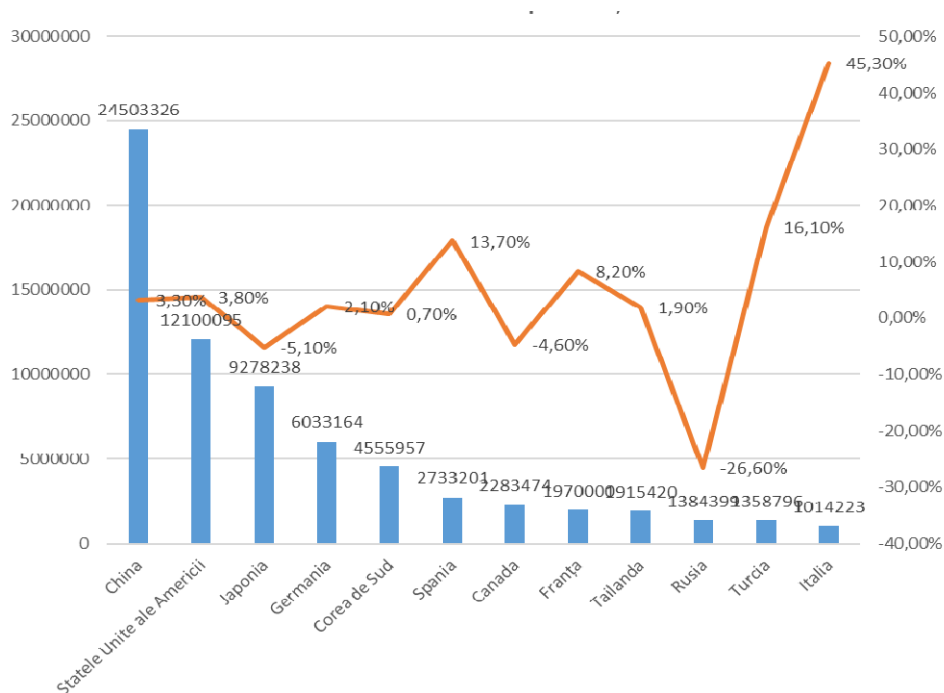

Figure no. 1 Car production ranking (number/ percentage of cars by countries)
(Data provided by: http://www.datacar.com/classement-des-pays-producteurs-dautomobiles-la-france-gagne-une-place-en-2015/, accessed April 14, 2020)

Artificial intelligence can be used to make the management process more consistent, can help generate individualized product recommendations (Mike, 2005).

Several companies have acquired the services of dozens of companies working to integrate artificial intelligence into the IoT. IoT platform vendors now offer AI capabilities that are integrated into IoT using machine learning-based analytics (Ahmet, 2018). New methods of customer approach will emerge after the transition to artificial intelligence in marketing, and these methods require a detailed predictive analysis, because the result will be customer satisfaction first, which will increase the company's profit (Schniederjans, Starkey, 2015, p. 63-137).

The general objective of the research will be to identify the impact of I4.0 on marketing policies and strategies (based on an analysis of the automotive market).

From the presentation of the scientific context, the research question arises: *do marketers need to integrate artificial intelligence into their marketing policies and strategies if they want to keep up with the competition?*

The secondary objective of this paper is how to use Industry 4.0 in the marketing of car sales, by choosing IT solutions that allow real-time viewing of sales. Artificial intelligence is common in both car construction and car sales marketing through the use of tools, either developed internally by a company with a recognized brand in the car sales market, or used online through IoT platforms.

3. METHODOLOGY

The research has as its first stage the identification of bibliographic resources and the analysis, selection and processing of information within companies, which support the integration of AI in sales marketing and implicitly the updating of existing marketing policies and strategies. By analyzing the integration of tools based on artificial intelligence, it is possible to draw up a generalized architectural model for the digital sale of vehicles. Sales data were collected from the financial statements of a sample of ten companies in the automotive industry. We structured the data and created with the help of the Power BI tool a dashboard model (Figure no. 2), which uses both the AI support on the machine it drives, but also the implementation of AI in digital marketing activities. Taking into account the descriptions of the cars and the customer profile, we also collected data on models and types of vehicles, which implemented artificial intelligence and we developed an automatic sales presentation system, depending on the parameters location, time, model, according to policies and marketing strategies adopted by any company.
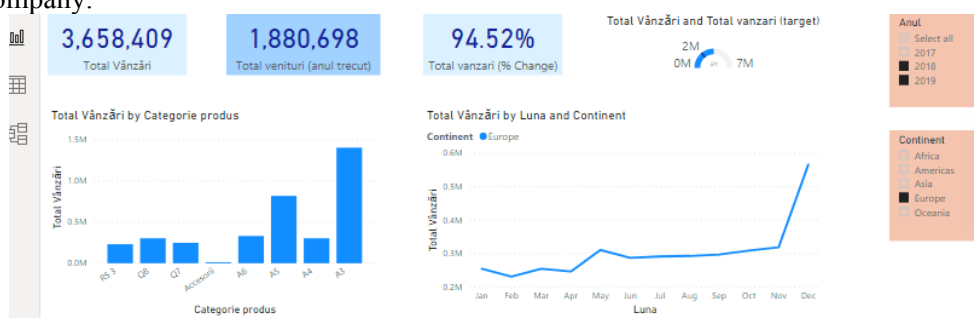
Figure no. 2 Car sales - template of a dashboard

Then I created a buyer profile. Therefore, a customer report can be drawn up that the sales model of some cars

When a person wants to change his personal car, it is an important moment in his life because the choice he will make must fulfill all his requirements and dreams. The appearance and design of the machine must be precise and the use of the engines must be of high capacity.

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Determined factors	Indicators	Customer data
Who is the customer?		
Demography	Sex	Male
	Age average	45 years
	Average income	8500 lei
	Location	Bucharest
Environment	Job	company CEO (owner of the company)
	Family	Maried, 2 children
Personality	Character	Organized
	attitudes	Communicative Perfectionist
What does the customer want?		
Objectives	Job	He wants to financially pleased all his employees
	Home	He wants the comfort of his family and therefore he wants to buy a new car
Why doesn't take an action to by the car?		
Check the offers	Check the company's revenue	The financial situation of the company does not allow to increase the salaries
	Choose the brand of the car	The usefulness of the car and the comfort do not allow it to choose any brand
Has objections from employees / family	Why not act immediately	He is afraid of the consequences and prefers to take precautions
How does it work?		
Promote new products / services	Why the product / service is the best solution	Integrates new technologies
Communicate with the marketing department	Description of requirements, mandatory equipment and optional packages of the car	Choose the car that meets the wishes of the whole family and therefore consult with them
Market investigation		
Customer perception	Attention to detail, safety, performance, features	Road compatibility
What do we recommend to clients and individuals?		
Individuals	Car with optional packages	Machine customization with optional standardized systems Customer loyalty campaigns
Legal entities	Custom fleets	Price negotiations Logistics negotiations

		Payment negotiations

Table no. 1 Customer profile template

4. DISCUSSIONS

In the data analysis, we also took into account the work steps for structuring them, namely:
- data collection, using tools to index and store them, for easy analysis;
- researching data that, although structured, does not fit into our innovative business model;
- performing simulations to show whether the data are sufficient and whether the result of implementation in our model will lead to the expected results related to profit;
- presenting these categories of data, in a user-friendly format, in order to assist in decision-making, by interpreting the data (Kenneth, Babinec, 2017, p. 205).

This data is used to create the platforms. The most important platforms are IoT platforms. The Internet of Things, also known as the Internet of Things, is bringing massive changes to information and communications technology by integrating wireless communications, sensors, and data collection and processing techniques. The Internet of Things defines information and communication technology in almost every segment of society and industry. It is expected that billions of Internet of Things devices will be connected to the Internet and will be able to interact with each other, thus generating a huge amount of data (Big Data). It is expected that the technologies that the Internet of Things has will lead to an improvement in the quality of life, create new business opportunities and improve the productivity of the manufacturer, buildings, public infrastructure and services (Vermeşan, Friess, 2013, p. 5).
Marketers will use this opportunity of IoT platforms. The availability and accuracy with which smart agents work will be of great use to marketers through new ways of interacting with customers. Building a brand closer to the customer will expand the mobile usage strategy, which includes new smart interfaces.

5. RESULTS

The analysis of the latest news in the field of marketing digitalization and the integration of artificial intelligence in the development of marketing policies and strategies, but also technologies for promoting products / services, lead to an increase in the company's profitability.

The results obtained from the research bring first of all to the management of the profile companies instant tools of profitability. The solution in this case would be augmented intelligence, which is an alternative to artificial intelligence, which helps human intelligence.

The dashboard representation model can be associated with the database that a company has, regarding the sales made. The management of the company can make decisions in real time, regarding the products it produces / sells, so that it can decide when and if a product is withdrawn from the market or a product is manufactured in larger series.

6. CONCLUSIONS

On the customer profile, we can calculate the costs of a car with artificial intelligence options. AI makes it more recent for brand promotions and implicitly for sales to be made directly on the internet, and manufacturers to participate in virtual car shows, 2D or even 3D, throughout a promotion season.

This paper can be an important support for the transition from classic marketing to AI-based marketing, such as the integration of Power BI into IT systems and the presentation of predictions for the future of branding. Moreover, the machine by implementing AI systems to be able to present itself and interact with the customer, automatically. The machine will also transmit the customer's wishes to another AI system. Here it will be possible to create the customer profile and implicitly it will be possible to recommend measures for implementation and decision-making for mass production.

The analysis will allow the extraction of information from the collected data and its use to configure the purchasing trends and behavior patterns of users.

A marketing software robot, which comes to the support of the customer unsure of the product, but determined on his requirements and needs, can work permanently, when the customer requests it, without the interaction of a consultant, to promote the car. The profit made from this activity is higher than the profit made in the classical system.

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