

Trends in Integrating Artificial Intelligence into Innovative Business Models in Automotive Sales

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Abstract. *Artificial intelligence integrated into the automotive sales business model brings a major transformation of the traditional model into an innovative one through the uniqueness of online customer experience. This paper presents exploratory trends in activities and processes based on artificial intelligence.*

It examines how the portfolio of potential customers, personalized configurations for each customer are formed, especially revolves around the loyalty of new customers.

The bibliometric analysis covers topics related to AI used in the business model, customer segmentation based on AI and virtual assistants.

The paper shows the role of artificial intelligence in relationships with customers through virtual assistants' actions. Also, the personalization of online customer experience is the second objective.

Customer segmentation is a main component in the business model with artificial intelligence in platforms with automotive sales, because companies' strategies are adapted to customer behavior. The evolution of artificial intelligence has made it possible to move from traditional segmentation based on demographic data to those based on data restricted to well-defined categories of customers with AI.

In this sense, the first result of the research will be the streamlining of operations to satisfy customer needs. Specialized literature presents the benefits during the transformation of the business model, but not the challenges that the automotive sales model has. The use of artificial intelligence highlights, as a primary result, innovation and especially competitiveness in the market, leading to continuous innovation, by adapting the sales to each customer.

Keywords: artificial intelligence, innovative business model, customer segmentation, innovation, virtual assistants.

Introduction

This paper is part of a larger paper, entitled *The Innovative Business Model in Automotive Sales with AI implemented*. Using artificial intelligence (AI) in information systems that support business processes is the main objective to study. The result of this study is how AI creates electronic value in the digital environment at automotive sales.

All business processes are currently updating, thanks to the implementation of AI. Digital transformation leads to the remodeling of traditional business and implicitly to the modification of business strategies. Being one of the industries that is updated by re-technologizing with AI, it is necessary to study the trends that the innovative business model may have, if AI is implemented (Reim et al., 2020a), in some sales processes.

While customers' needs change through the digitization of their actions, companies adapt their business processes to quickly respond to requirements. In customer relations, the use of AI is important because a customer experience can be repeated for another customer. This will lead to customer segmentation and the study of customer behavior, by demand categories.

In other sales-related processes, innovation brings the efficient operationalization of sales to customer online activities (Alijoyo et al., 2025; Wang, 2022), an innovation perceived as

unprecedented. In this context, AI will play an important role in making sales actions more efficiently. When automating customer interaction, virtual assistants will be used, returning information requested by the customer to promote a personalized automotive. In the automated environment, decisions will be made both by company employees and by AI, if allowed.

Recently, the integration of AI in automotive sales has led to the emergence of innovative business models, which are based on the creation of value (Perifanis & Kitsios, 2023). This value is obtained from the use of data arising from cost reduction, intelligent inventory management and, implicitly, the reduction of mass production. The smart factory brings to the fore a production strictly related to sales demand.

Machine learning, natural language and predictive analytics are tools that support the integration process of artificial intelligence (Perifanis & Kitsios, 2023; Ratten, 2024) that will anticipate market trends and provide personalized solutions for each customer. These trends are accepted by the management of small companies, which use artificial intelligence to sell larger stocks. In the case of large companies, the supplier will use the same communication channel with the customer, which is given by online sales platforms. Business processes that the customer sees in real time are brought to the fore, such as the sale of an automotive and the possibility of adding components to the already open process. This type of innovation leads to profit maximization.

The key trends identified in the use of AI in the automotive sales process are based on customer segmentation and personalized marketing (Lee et al., 2024; Ratten, 2024). Integrating business processes with AI brings the business model to the brink of innovation that knows no competitiveness.

Investigating the specialized literature on the trends that an innovative business model knows when implementing artificial intelligence in automotive sales leads to the research question: how AI is implemented transform the sales processes in the business model and what challenges it knows.

Literature review

The automotive industry uses artificial intelligence (AI) to innovate sales strategies automatically, but especially to improve customer experience and reshape key business processes.

The research aims to explore how these AI innovations improve customer satisfaction, achieve customer segmentation and ensure innovation performance.

The literature review examines recent research, theoretical frameworks and case studies on how AI technologies are integrated into the sales process. These technologies have been identified in the literature as: machine learning (ML), predictive analytics and customer segmentation (Jain & et al., 2023; Jung & Lee, 2024; Perifanis & Kitsios, 2023). Among the main implementations of artificial intelligence (AI) in the automotive industry are process redesign, improving customer experience when searching for an automotive on a platform and including automated sales strategies.

In general, a search on a website for details about an automotive depends on the customer's preference. A search can be carried out until the order is placed or can be abandoned for various reasons: lack of time, lack of details, or even involuntary abandonment. These types of searches can establish a conversion rate, which is given by the visits a customer makes to the sales platform.

Business models with integrated AI improve conversion rates and can offer customers personalized experiences for each one. They are calculated according to the formula number of visitors who have a complete request divided by the total number of visitors, and the result is

expressed as a percentage. Identifying conversion rates can show the customer what preferences others have had in their searches (Reim et al., 2020a; Xu & Zhang, 2024).

Automotive manufacturing companies, such as BMW and Hyundai, use AI to segment customers by tracking how they behave when searching for an automotive on their websites.

Customers select the configuration of automobiles that have been purchased in the past or that fit the requirements of other customers. The search considers the financial preference and the way the automotive is used. Segmentation algorithms will be used in this situation to provide customers with recommendations associated with each one's needs, at any time of the automotive purchase (Alijoyo et al., 2025; Jung & Lee, 2024; Perifanis & Kitsios, 2023).

AI is an essential element in the business model, especially when used in sales forecasting. The accuracy with which it will correlate data sets from historical sales, in conjunction with market trends and factors that may intervene in the business model, can predict future customer demands, without wasting time with long searches (Wang et al., 2023; Y. Zhou & et al., 2023).

AI will optimize fleets of automobiles on hold and availability on demand (Xu & Zhang, 2024). AI is used to predict customer preferences and usage patterns, optimizing the allocation of automobiles in shared fleets or subscription-based services (Xu & Zhang, 2024). Both customers and employees are resistant to change, either due to lack of information or misunderstanding of how AI is used. Implementing AI requires substantial investments in technology and infrastructure for data flow within the company. In addition, there are concerns about data privacy and security, especially because AI systems rely on large amounts of customer data (Mikalef & et al., 2020).

The first research question is related to the number of published research papers that present the concept of artificial intelligence (AI) in sales.

In the post-sale maintenance process of an automotive, machine learning algorithms predict maintenance and reduce failures during operation (Wang et al., 2023). In other words, servicing the automotive at the right time leads to long-term customer satisfaction. Such predictive maintenance programs were launched by General Motors through which future problems of the automotive are announced in real time. They lead to cost efficiency, reducing unforeseen repair expenses and implicitly customer satisfaction (Lee et al., 2024). Reducing operational costs in sales and maintenance lead to forecasting the management of service time, but also the inventory of parts needed for repairs (J. Zhou et al., 2024). Through this process, customer loyalty will be identified.

AI systems do not discriminate against certain customer groups (Kim et al., 2024). This involves improving the transparency of algorithms and ensuring that the customer preference data sets used to train the AI are diverse and representative.

The second research question is related to the implementation of AI in the processes of the innovative business model, the links to other concepts in the model and the number of articles in which the model is presented.

AI used in the personalization of customer experience, but also their segmentation leads to the analysis of databases about customers, from different descriptions of them. Thus, automotive sales can lead to the creation of accurate customer profiles and can provide personalized experiences. Recent research shows that AI automotive recommendation algorithms and predictive models help personalize automotive configurations. They are based on customer requests and can provide personalized financial facilities (Jain et al., 2023).

Automotive recommendation engines with integrated artificial intelligence provide personalized suggestions for building automobiles based on a customer's historical purchase data, customer service, browsing behavior, and customer preferences. Customer segmentation is an

important process performed by AI when it repeats the experience of other previously identified customers (Park & et al., 2024; Reim et al., 2020a).

The third research question brings to the fore the published works on customer segmentation and the connection with other concepts that develop personalized customer categories with AI, but also the activation of customer segmentation in automotive sales, customer experience, and customer behavior on platforms containing AI.

Business model innovations are strictly related to customer personalization, sales forecasting, predictive analytics, and dynamic pricing, in an environment using AI (Jung & Lee, 2024; Park & et al., 2024; J. Zhou & et al., 2024).

Dynamic pricing of an automotive, realized with AI, leads to a dynamic business model. Maximizing sales according to production and updating prices in real time can respond to customer demands through non-competitive prices and a low inventory level (J. Zhou & et al., 2024).

The fourth research question is associated with identifying the links between innovation and other concepts used in business with AI implemented, as well as identifying these concepts.

Some automotive manufacturing companies, such as Mercedes-Benz and Porsche, have integrated AI into the customer segmentation process. Marketing campaigns have been directed at personalized experience for each customer, at searches on automotive presentation platforms (websites). These sites contain virtual assistants that support the customer's activity throughout the search and request, regarding the details of the desired automotive (Y. Zhou & et al., 2023). In this case, the AI-implemented virtual assistant plays an essential role in guiding the customer, through the conversation it has with them and the answers it provides.

Request management, but also real-time search support through virtual assistants, is based on AI technologies that respond 24/7 to customers who have activated an online search for an automotive and which can lead to a firm order.

The fifth question is strictly related to virtual assistants, which help companies promote the automotive in a virtual manner and at the customer's special request, on detailed components.

Methodology

This research was based on the analysis of the specialized literature of the concepts from innovative business models with artificial intelligence implemented. Also, concepts tangential to sales, regarding customers and the study of their behavior on websites were identified. Articles searched on the Web of Science were selected according to the concepts: artificial intelligence, innovative business model, customer segmentation, innovation, virtual assistants.

The searches on the Web of Science were carried out in February and March 2025. The returned results were exported from the Web of Science and imported into VOSviewer, an environment for analyzing previous research from international databases and visualizing bibliometric networks.

As can be seen from Table 1, a total of 28.671 articles was identified for concepts that are also keywords, from which it was identified that the main concept is an artificial intelligence in different situations from the innovative business model, that was implemented in the automotive sales.

The trends that the innovative business model takes place in the automotive industry, when artificial intelligence is implemented, are also given by the way in which AI has impact in the innovative business model.

When integrating AI into business models, a series of changes are highlighted in the business model, and AI acts controlled in business processes to the responsibility of how to fulfill

business requirements. Thus, customizations of customer platforms are necessary, including the addition of virtual assistants to guide the customer. Therefore, it comes to segmenting customers into well-defined categories. Whether existing customer relationship models is used, or AI creates other models, the answers lead to the transformation of the business model into a new innovative one. The importance of this customization and the fact that AI uses it will ultimately lead to reducing expenses and optimizing customer activity, but also the company's response to customer needs.

Table 1. Total number of articles to extract concepts for integrating artificial intelligence into innovative business models in automotive sales

No.	Concepts	Number of articles	Percentage of total number of articles
1	artificial intelligence	10.480	36.55 %
2	innovative business model with AI	10.815	37.72 %
3	customer segmentation	4.166	14.53 %
4	Innovation with AI	22	0.08 %
5	virtual assistants	3.188	11.12 %
Total		28.671	100%

Source: Author owns research in Web of Science.

In most cases, AI for customer segmentation leads to a series of previously implemented business requirements. AI should know how to access and implement correctly the requirements. A better understanding of the request formulated by the customer is necessary and sometimes a request from the AI to detail the customer's needs. From this aspect, dynamic customer segmentation is also born, but also the personalization of customer requests and different segmentations.

The introduction of customer segmentation based on artificial intelligence primarily considers data collection and data processing, which can only be achieved in a long-term process and through AI training, which will lead to training the entire innovative business model.

Anticipating a customer's behavior, his requirements could give rise to the forecast of customer behavior with the following processes: purchase frequency, preferences associated with a product (an automotive with a certain brand) or spending patterns.

The most important scientific research existing in specialized literature has been identified by topic, in the following works:

- AI in business (Lee et al., 2024);
- Innovative business model with AI (Reim et al., 2020a);
- Customer segmentation (Wang et al., 2023);
- Innovation (Kim et al., 2024);
- Virtual assistants (Wang et al., 2023).

Results and discussions

From Table 1 the largest share, 37.72%, is the innovative business model developed by AI, while innovation with AI represents only 0.08%. From these observations it can be concluded that it is very important to study the entire innovative business model when implementing AI.

When searching for the expression artificial intelligence in automotive sales, the results led to a total number of 10,480 articles returned by the Web of Science search engine. Importing the data into VOSviewer led to the result in Figure 1, where 4 clusters were identified, with 106 items linked with AI, 4360 links and total link strength of 13,205. Among the identified elements, the concepts: new business model, value creation, innovation process, cost, business model innovation and a series of other concepts in the same cluster or in different clusters, as shown in the figure below.

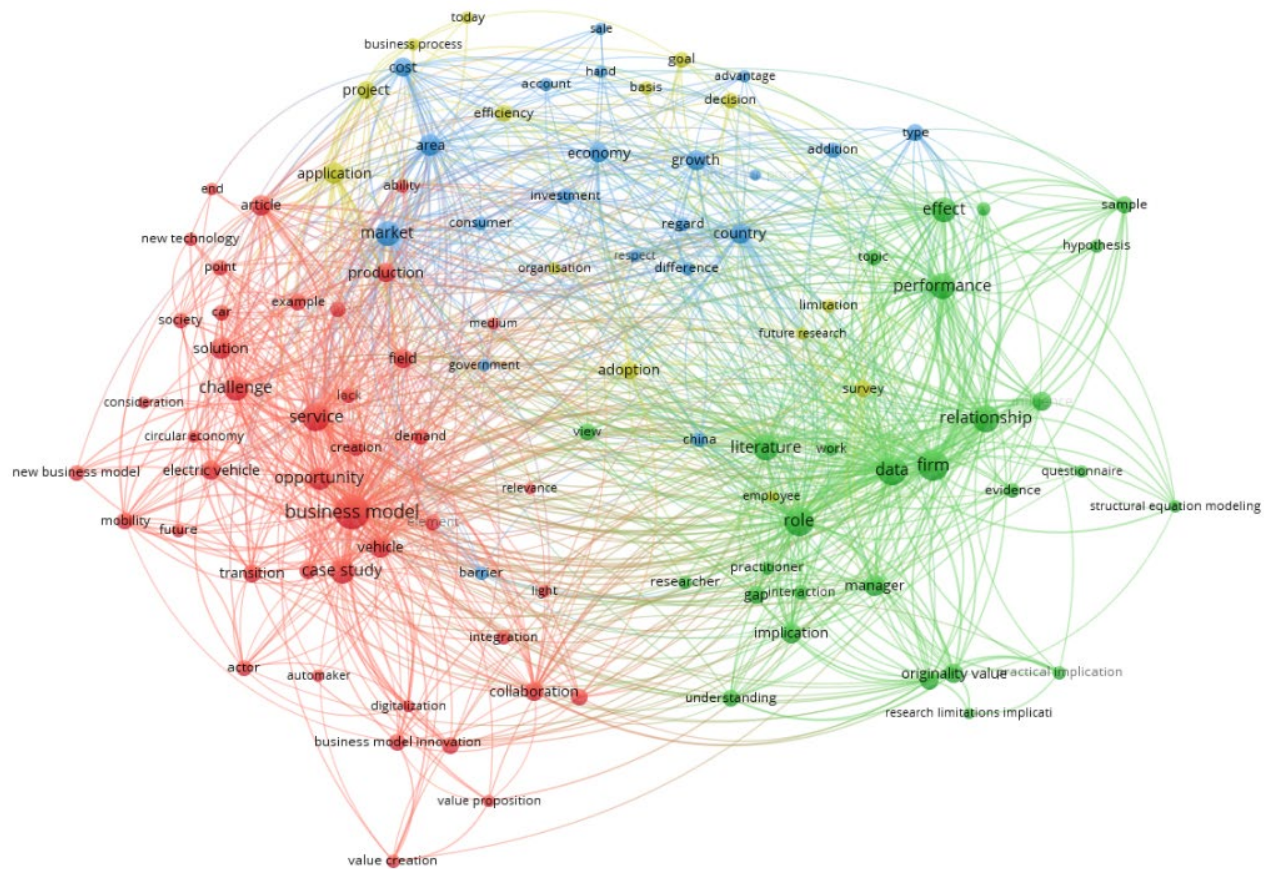


Figure 1. Artificial intelligence in automotive sales

Source: Author owns research in Web of Science.

Artificial intelligence used in business models in the automotive industry reduces company expenses and optimizes processes. This is due to key performance indicators (KPIs) in different processes.

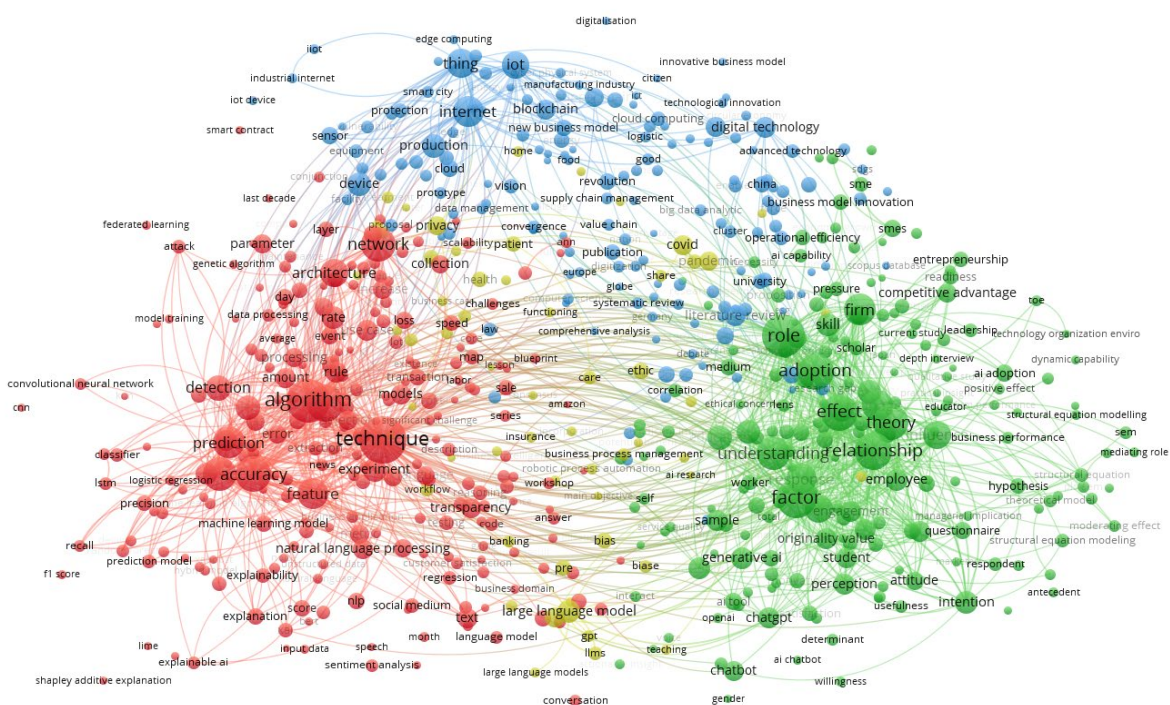
The results of artificial intelligence could be extracted from both quantitative data (e.g. cost savings, efficiency improvements) and qualitative perspectives (e.g. customer satisfaction, business model transformation through a new or innovative business model).

The transformation of business models is based on the shift to subscription-based models, mobility as a service and direct-to-consumer sales, all driven by AI. Model development and innovation are brought about especially by innovative passenger automotives, where customers are looking for performance (Kim et al., 2024).

Operational cost reductions are expressed in reduced downtime, predictive maintenance, automated customer support and simplified supply chains. The contribution of customers is

An important element highlighted in this analysis is the value proposition. In an innovative business model, in which AI is identified as a value creator, the idea of identifying the digital value that AI has developed by using the data provided by both the customer and the company is emerging (Kim et al., 2024).

The second research question led to the search for the expression *innovative business model with AI*, the results having a total of 10,815 articles returned by the Web of Science search engine. Importing the data into VOSviewer led to the result in figure 2, where 4 clusters were identified, with 650 items that enter the business processes of the automotive industry, when modifying the model with AI. Several 65,917 links and total link strength of 12,986 are connections that connect the concepts: AI implementation, business process management, business case, human resource management, managerial implication and others.



Source: Author owns research in Web of Science.

AI is a good support in the business models from the automotive industry. It has as many consequences as possible like cost reduction and optimization of business processes. The transformation of business models into innovation is based on customer activities. These results demonstrate that AI is a key factor for changing in the automotive sector (Perifanis & Kitsios, 2023).

The services offered to customers and due to the implementation of AI in an innovative business model have led to dynamic pricing, predictive maintenance and optimal inventory management. From these services, subscriptions for automotive maintenance and mobility sharing were born in case the automotive is in maintenance for a long period of time. From the point of view of automotive production, special importance was given to residues, production being more

sustainable with predictive analysis performed with AI (Kim et al., 2024; Perifanis & Kitsios, 2023; Reim et al., 2020a; Xu & Zhang, 2024).

This is where innovation comes in, whereby leveraging predictive analytics for product development and R&D, automakers have achieved unprecedented sales performance. The launch of electric vehicle models was based on the integration of AI-based functions that anticipate customer demand.

Business models with AI implementation allow for detailed forecasts about customers, as well as services and sales. This requires AI to adapt to customer behavior by improving response messages in the shortest possible time. Personalized offering is based on customer loyalty and product value in the market. Forecasting in this case will lead to subscription-based services. AI's ability to forecast customer behavior is transforming the automotive industry (Lee et al., 2024; Reim et al., 2020a).

AI will help automotive companies' business models optimize their supply chain, inventory, and sales processes based on more accurate forecasts of customer demand. This will help reduce waste and improve operational efficiency.

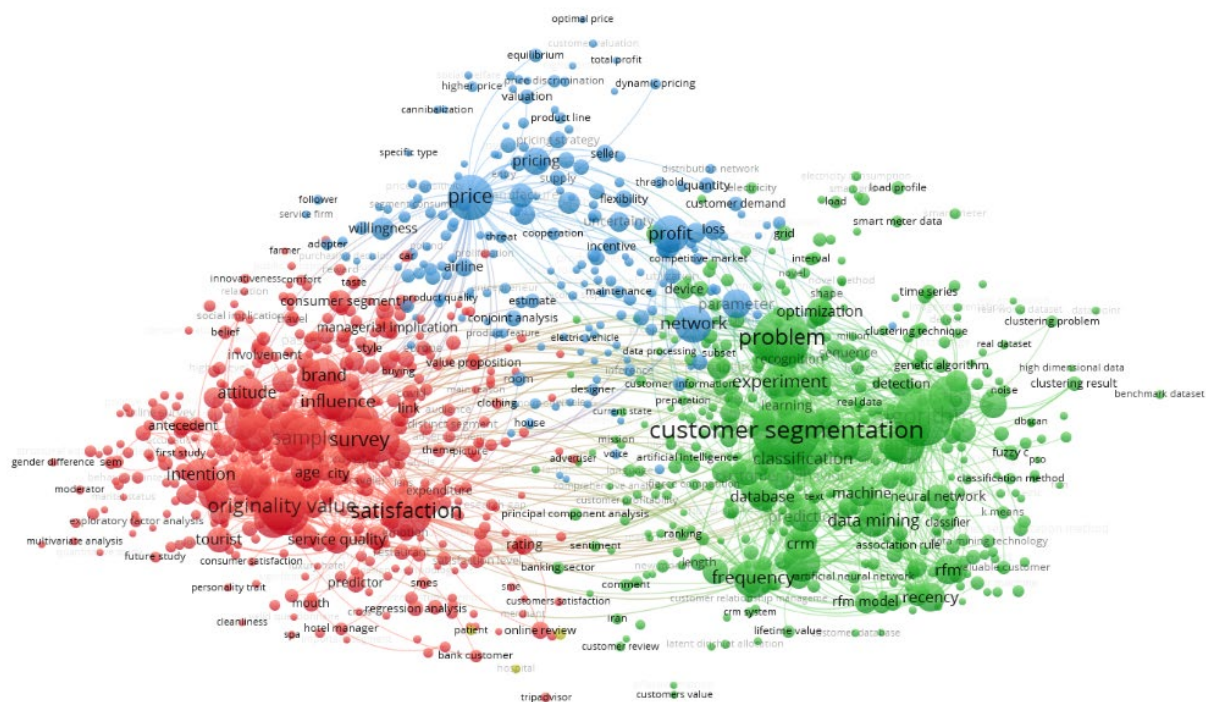


Figure 3. Customer segmentation with AI

Source: Author owns research in Web of Science.

The third research question is answered by the synthesis of published works on *customer segmentation*, and we identified that segmentation can also be achieved when AI is implemented. In figure 3, 4 clusters, with 1076 items, were identified that enter the business processes in the automotive industry, when modifying the model with AI. Several 105,612 links and total link strength of 20694 are connections that identify the concepts: customer valuation, price competition, benchmark dataset, differentiated products, optimal pricing, dynamic customer segmentation and others.

Customer segmentation based on artificial intelligence has changed the way of working in the sales of products in the automotive industry, allowing companies to identify and more precisely target different customer groups based on different attributes, such as preferences, behaviors, demographics and purchasing patterns. Thus, business processes are adopted by customer segments. When used effectively, AI can boost customer acquisition, increase retention, and optimize marketing efforts (Perifanis & Kitsios, 2023; Wang, 2022; J. Zhou & et al., 2024).

Conversion rates have been improved because of customer segmentation. Customizing automotive display and sales configurations has yielded better results in customer segments. Thus, spending on automotive product promotion and customer retention has been substantially reduced, thanks to loyalty programs. The use of dedicated platforms has not only increased customer loyalty for online sales but also formed a customer portfolio with AI. This represents a challenge for the company, firstly through the investment made and secondly through the maintenance of the platform (Lee et al., 2024; Park & et al., 2024).

By identifying and accurately addressing the needs of specific customer segments, automotive sellers have provided customers with concrete and advantageous offers for each segment. These are personalized and relevant only within the segment for which they were created, which translates into significant business benefits.

The accuracy of customer segmentation will improve with the evolution of AI, which will lead to continuous innovation in the business model of companies in the automotive industry.

Customer behavior is an important element studied when implementing AI, to be able to segment them later. Automotive manufacturing companies can use databases of customers and their preferences, remodeling them with the help of artificial intelligence by forecasting the short and long-term behavior of customers. This can influence everything from marketing and sales strategies to the development of products and services for customers. The efficiency of customer service operations is the result of customer segmentation with AI. Strategies are adapted to fulfill customer request and to study their behavior (Mikalef & et al., 2020; Ratten, 2024).

AI will continue to improve the accuracy of data related to customer behavior. Well-targeted marketing has customer segmentation with AI at the first level of the business model, with personalization for each customer, higher conversion rates and implicitly increased sales, as well as customer loyalty.

Innovation is another concept used in the innovative business model and represents a trend. Several 5 clusters, with 2998 items, were identified that enter the sales innovation processes in the automotive industry, when modifying the innovative business model with AI. Several 408,533 links and total link strength of 713,635 are connections that identify the concepts: innovative business model, new product development, human creativity, AI knowledge, AI ethics and others.

As shown in Figure 4, innovation involves the integration of new business components, the revision of existing business processes and their updating, data accuracy, and for the first time, the emergence of ChatGPT in the educational environment. This concept brings to the fore the educational preparation of the customer, but also the way in which AI responds to the customer's requirements to discover details about the automotive. In this case, training artificial intelligence is important in obtaining results regarding the formulation of the request (Xu & Zhang, 2024).

Innovation can occur both in the product and in the business processes and implicit in the innovative business model, as shown by the connections obtained on the concepts in articles published on the Web of Science. Continuously ensuring competitiveness will lead to continuous innovation and a loyal customer, with the satisfaction of their needs.

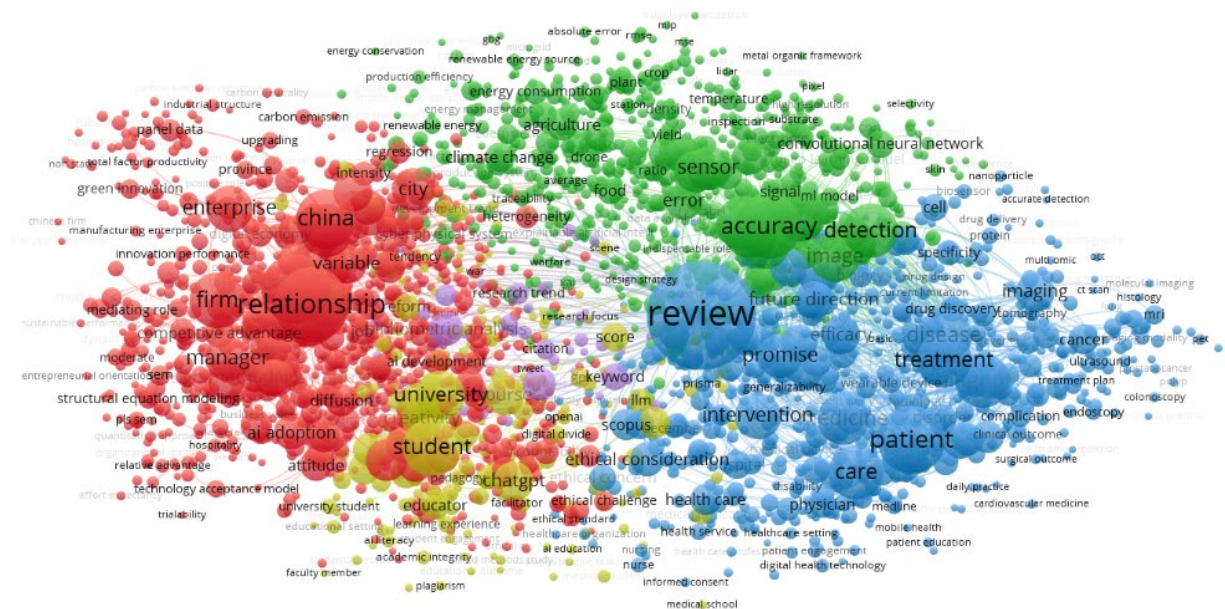


Figure 4. Innovation with AI

Source: Author owns research in Web of Science.

Virtual assistants help companies promote the automotive in a virtual manner. This statement is in correlation with the artificial intelligence in the virtual assistant, which customizes the customer experience, according to demand segments, price offered for an automotive and the way in which the customer experience was repeated (Alijoyo et al., 2025; Ratten, 2024; Reim et al., 2020a; Wang et al., 2023).

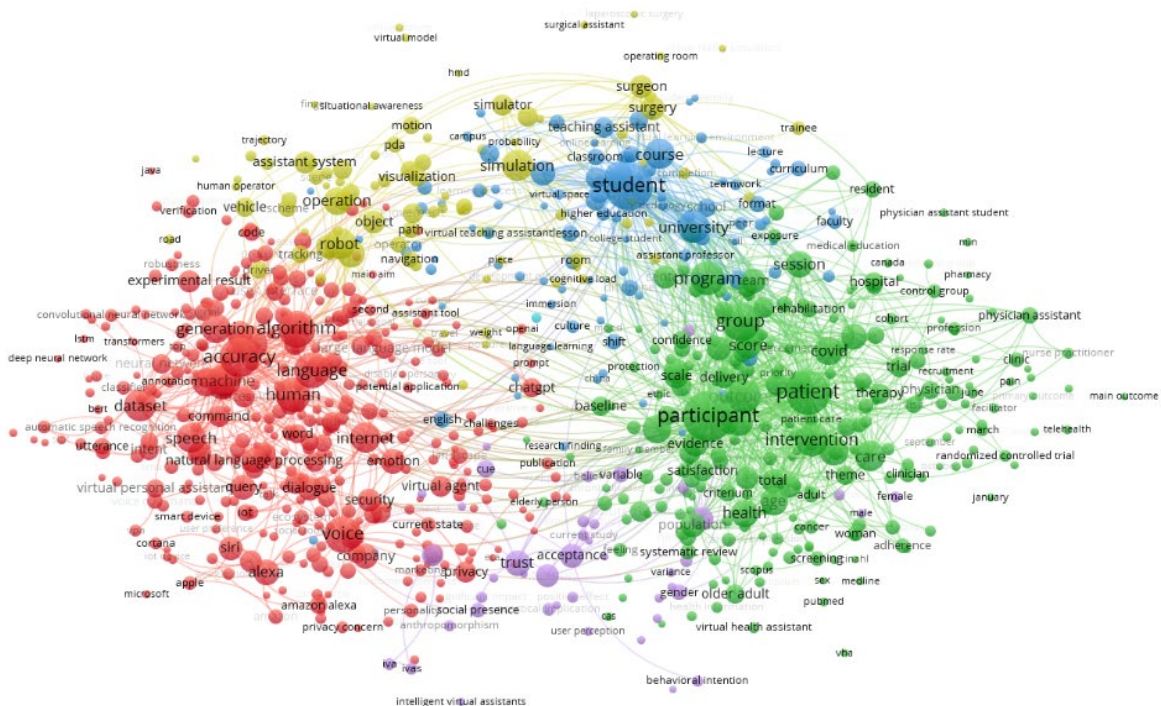


Figure 5. Virtual assistants

Source: Author owns research in Web of Science.

A total of 6 clusters, with 862 items, was identified that enter the innovation processes in the sale of automobiles with AI. A total of 93,342 links and total link strength of 18,991 are connections that identify the concepts: investigator, advanced driver assistant system, brand, virtual machine, natural language, robotic assistant, autonomous vehicle and others.

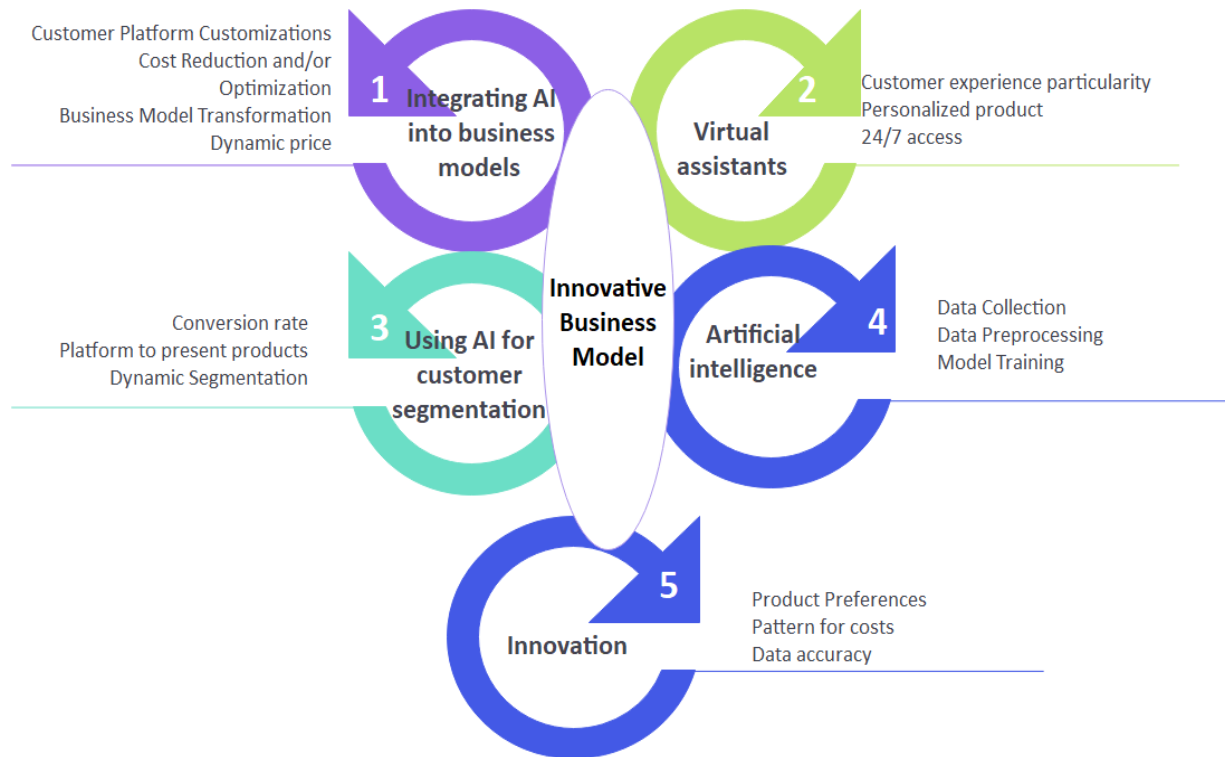


Figure 6. AI implementation in automotive sales with innovative business model

Source: Author owns research.

AI enables automotive salespeople to deliver more personalized, timely, and relevant experiences by predicting when customers will buy, what features they prefer, how they will respond to marketing, and even when they need maintenance. This leads to higher conversion rates, better customer retention, and ultimately more efficient operations. The structure of the innovative business model with AI implemented, resulting from the research, can be represented as shown in Figure 6.

AI will create a personalized offer based on the features the customer requests for an automotive, as well as their behavior. This type of personalization will result in a higher conversion rate, better customer loyalty, and efficient operations for the company.

A strategic framework for evaluating trends in integrating AI into innovative business models in automotive sales was defined through the analysis from table 2. Assessing the internal and external factors for companies leads to understanding how AI adoption affects their operations, market competitiveness, and customer experience.

Table 2. SWOT analysis of trends in automotive sales

Strengths	Weaknesses
1. personalized customer interactions (Jain & et al., 2023); 2. customer segmentation (Wang, 2022); 3. customer behavior and market trends (Wang et al., 2023).	1. substantial investments in technology, infrastructure and training (Ratten, 2024; Reim et al., 2020b); 2. data for analysis and raw decision-making (Ratten, 2024); 3. changes introduced by artificial intelligence (Jain & et al., 2023).
Opportunities	Threats
1. expanding digital sales channels with showrooms on virtual platforms (Kim et al., 2024; Park & et al., 2024; Wang et al., 2023); 2. digital native customers who prefer online shopping (Wang, 2022; Wang et al., 2023); 3. after-sales services, predictive maintenance, customer support; 4. forecasting automotive market trends; 5. marketing strategies; 4. minimizing waste.	1. risk of data breaches and privacy violations; 2. difficulties in keeping up with technological advancements; 3. human interaction requirements from customers; 4. ethics in innovative business model - legal challenges in automotive sales.

Source: Author owns research.

Integrating artificial intelligence into innovative business models in auto sales brings substantial benefits, including improved customer experience, personalized marketing, and operational efficiency. However, companies also face challenges, such as high implementation costs, data privacy concerns, and the need for skilled employees to manage AI systems.

A series of business concepts, AI-based, are already used and validated in the automotive industry, such as DRUID AI (develop virtual assistants) or D-Wave (quantum computing):

- on June 11, 2024, CEO of DRUID Liviu Drăgan said *“We are immensely proud to collaborate with Dacia Romania and the Renault Group. This project not only highlights our technological capabilities but also our dedication to enhancing customer experiences through AI-driven solutions.”*
- on June 21, 2021, data scientist at Ford Otosan, Ziya Dalkılıç, said *“Working with D-Wave’s technology, we’ve built and now deployed a quantum optimization application that goes beyond what we were able to achieve with a purely classical computing approach.”*

Conclusion

This paper only refers to sales in the automotive industry, in an innovative business model, in which AI is implemented. Sales forecasting, which can lead to the personalization of a category of customers, can be improved by integrating AI into companies that sell automotives. Predictive after-sales services, as well as customer mobility, are just two of the important processes that AI uses in the innovative business model. This leads to unprecedented customer experience, but also optimizations in the business model.

The customer is the one being involved in the requests he makes. Thus, the trends lead to AI integration. In the case of automotive manufacturers, customers can have new experience in the production of the automotive with options that they can update during production, being able to have personalized promotions.

The business model can align with personalized solutions, by using AI, when customer segmentation is done through predictive analysis and forecasting of a customer's behavior. AI-

based customer segmentation has led to timely marketing strategies, with targeted messages per customer.

Operationalizing automotive sales with AI is one of the most important processes due to inventory management and services tailored to customer needs. AI will transmit automotive production information in the quantities requested by the customer, without remaining in stock. Another important process in the AI business model is the one in which the price is optimized in real time, which will lead to reduced inventory costs and to the efficiency of the sales process, having an agile response to market dynamics.

The purpose of this paper was to identify the connections between concepts and especially what are the tangential concepts that develop the innovative business model with AI.

The challenges highlighted in implementing AI are those related to reducing company expenses and optimizing business processes, technological complexity and the need for specialized expertise. Basically, a customer will prefer an automotive, which places it in a certain segment.

The customer experience of buying online, using AI, is achieved through virtual assistants, as well as recommendation engines. Customers will have the opportunity to choose the desired automotive without having to pay the dealer. These trends demonstrate that AI is focused on the customer's activity, but also on achieving the highest possible profit for the company.

In further research, the impact on production can be shown how to optimize sales and update the innovative business model with AI. The issue that will need to be studied is related to the risks of AI usage, but also how AI will be able to maintain the relationship with customers, without the intervention of the human factor.

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