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Artificial Intelligence System for the Digitalization of Information Distribution

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Abstract: In the realm of manufacturing, creativity and innovation are pivotal for gaining competitive edges and ensuring long-term viability. With technology evolving rapidly and market demands escalating, manufacturing firms strive to optimize processes to stay competitive globally. Artificial Intelligence (AI) emerges as a vital tool in this transformation, heralding Industry 4.0's focus on integration and automation. AI integration promises enhanced product consistency, cost reduction, and operational efficiency. By fostering collaboration between humans and machines, connected systems can gather, analyze, and optimize production data. This synergy lays the groundwork for Industry 5.0, prioritizing human-centricity and sustainability. This paper examines AI's role in ushering in Industry 5.0 at local glassware company. By reviewing pertinent literature and addressing implementation challenges, it delineates strategies for market leadership through AI adoption. The implementation unfolds in four phases, focusing initially on digitizing information flow to streamline management. Additionally, it offers insights into leveraging AI to gain competitive advantages, illustrating its transformative potential in the dynamic manufacturing landscape.

Keywords: artificial intelligence; AI; digitalization; human-centric; Industry 4.0; Industry 5.0; information distribution; organizational communication

1 INTRODUCTION

In the context of accelerated technological development, manufacturing companies face the imperative of integrating artificial intelligence (AI) into their operations to remain competitive within Industry 4.0 or 5.0. In the last three years, AI systems have proven that they can meet, and surpass, human performance in image recognition, speech transcription, and direct translation, have learned to drive, identify relevant information in text to answer a question, recognize people's faces (even if are blurry images) and human emotions, create their schemes and detect malicious programs, etc. [1].

The industry is increasingly focusing on improving product consistency and reducing overall costs. This can only be achieved through successful collaboration between humans and robots. Using artificial intelligence systems, machines can collect and process various data to further improve the production process. Industry can use artificial intelligence to process information from connected machines and IoT devices that allow companies to monitor all activities and processes from start to finish [2].

The fourth industrial revolution, Industry 4.0, introduced the concepts of the Internet, artificial intelligence (AI), and machine learning (ML) to manufacturing. Therefore, there is a need to understand the capabilities of AI and ML and how to successfully implement them in manufacturing areas to achieve the best possible results [3]. A detailed study of the given correlation and its improvement to the level of the machine - artificial intelligence - human cooperation would make a significant step towards Industry 5.0, which is characterized by a combination of human intelligence and cognitive computing, which results in the development of production with an emphasis on speed and efficiency.

Understanding the motivations and benefits of introducing artificial intelligence (AI) into production operations is key to achieving a competitive advantage within Industry 5.0. The analysis of technological innovations in the production sector emphasizes that the introduction of AI enables an increase in the efficiency and consistency of production processes. Using AI systems, companies can optimize resources, reduce production time, and achieve a high level of consistency in product quality. Also, it is important to emphasize that the introduction of AI enables advanced data analytics and making informed decisions. AI systems analyze large amounts of data in real-time, providing deeper insight into production performance, market needs, and industry trends.

Analyzing the evolution of AI in industry, it highlights the benefits of adaptability and reactivity that AI systems bring to manufacturing companies. The ability to adapt to changes in real-time enables a faster response to dynamic market conditions and production challenges [4, 5]. Also, concrete examples of improving work processes through the introduction of AI are explored in detail, including autonomous vehicle driving, facial recognition, content generation, and product personalization. These elements directly contribute to innovation and modernization of production operations, which all leaders in their categories strive for in the current market.

1.2 The Impact of Industries 4.0 and 5.0 on the Operations of Manufacturing Companies

Industry 4.0 marks the introduction of new technologies and paradigms that have a profound and transformational impact on the way work is done. It analyzes the increased connectivity between different parts of the production chain using the Internet of Things (IoT), artificial intelligence (AI) and machine learning (ML). The connection of these technologies enables the complete integration of production, from raw materials to the final product [3]. The appearance of the term Industry 5.0 refers to the concept of cooperation between humans and robots and smart machines in an industrial context. The central element of this approach lies in the ability of robots to support human work through the optimal use of advanced technologies. Industry 5.0 [6] builds on the automation and efficiency pillars of Industry 4.0, adding a human element. In the manufacturing sector, robots have historically performed tasks that were dangerous, monotonous, or physically demanding, such as welding and painting in car factories and handling heavy materials in

warehouses. Because of increasingly connected and intelligent machines, Industry 5.0 aims to integrate the cognitive abilities of computer systems with human intelligence within the framework of cooperation. Also, it is crucial to investigate how industries 4.0 and 5.0 encourage the development of ethical frameworks and sustainable practices. Companies are setting new standards in the responsible use of technologies, taking into account the ethical implications of introducing AI into production operations [5]. The dynamics of cooperation between humans and AI are studied within the framework of Industry 5.0. Also, it is considered how artificial intelligence systems become an integral part of work teams, harmonizing with human abilities and optimizing joint performance [7].

1.3 Technical Aspects of AI in the Manufacturing Industry

The technical aspect of AI, to improve its performance over time is given below through a simplified overview of key elements [8]:

- Data collection: The collection of high-quality data is critical to a successful AI system. Data can be structured (e.g., database tables) or unstructured (e.g., images, texts).
- Databases: Data is often stored in databases to facilitate management and quick access. Different types of databases can be used depending on the needs of the project.
- Data processing: Data processing involves cleaning, transforming, and normalizing data to make it suitable for analysis and learning. This is an important step because the quality of the data directly affects the quality of the model.
- Machine learning algorithms: Choosing the appropriate algorithm depends on the type of task. For supervised learning, where labeled data is available, algorithms such as linear regression or deep neural networks are often used.
- Model Training: Model training involves feeding an algorithm with data to learn connections and patterns. The model is adjusted to minimize the error between its predictions and actual results. Training can take from a few minutes to a few days depending on the complexity of the model and the amount of data.
- Validation and testing: After training, the model must be validated and tested on a separate data set to assess its accuracy and ability to generalize to new data.
- Implementation and integration: Once the model has been successfully trained and tested, it is integrated into the system to perform the tasks it was designed for. Integration may involve creating interfaces, APIs, or other methods of communication with other parts of the system.
- Maintenance and monitoring: An AI system requires continuous monitoring and maintenance. Updating the model with new data, optimizing performance, and solving problems that may arise over time are key elements of the long-term success of an AI system.
- It should be emphasized that the details may differ depending on the specific task and the type of AI system being developed.

2 RELATED WORK

Although AI solutions such as ChatGPT are being in everyday use and continuously developed, so far in the scientific literature there is only little evidence for its use in manufacturing, according to papers indexed in the Web of Science database and related to the manufacturing industry. After the literature screening and the analysis of the related papers the gaps will be recognized and AI system for business support will be formed.

Industry 5.0 can be understood as a virtual-real interactive system with great potential which is in need for "safe in physical spaces, secure in cyberspaces, sustainable in ecology, sensitive in individual privacy and rights, service for all, and smartness of all" [9]. AI and big data in the industry have found the way due to the need for economic, safe, and sustainable manufacturing in the market. The integration of AI technologies enables dealing with dynamic processes [10].

AI assistants such as Alexa, Bibxy or Siri are multi-purpose tools, while the manufacturing industry demands more unique solution for the specific needs. Understanding of benefits is needed to ensure the adequate functioning inside the manufacturing system. Some authors claim that yet the benefits need more evidence collected in natural manufacturing environment. Disadvantages, limitations, and risks concern reduced worker autonomy, constrained language understanding, increased dependency on software, and harmful exploitation [11]. Some of the tasks cannot be carried out under robotization or automation; therefore, novel human-work support tools are expected. Support tools such as augmented reality (AR) and AI can be used then which leads to job simplification enabling inexperienced, unskilled, or less skilled employees to perform the work in the selected manual production processes [12].

AI is expected to be able to act autonomously, "support people through assistance systems, use resources more effectively, make processes more environmentally friendly and enable new working models with direct participation and greater transparency". The influence of AI on employment is controversial with many benefits but also with raised concerns about job losses, growing autonomy and control mechanisms towards human behavior. The participative leadership of the future conducts flexibly within the framework of self-organizing networks and interdisciplinary, democratically formed teams. Executives see themselves as coaches and moderators [13].

AI system supports internal business processes and workflows, it is addition to high degree of interactivity, transparency and reliability [14].

Intelligence assistance system enables helping employees and providing competence-related support which results in short- and long-term efficiency in problem-solving in companies [15].

AI systems assist workers in decision-making, resource coordination and task execution. Such models are iteratively optimized and verified through scenarios engineering and acquire new knowledge and refine its knowledge base, while security remains an issue because of which it is suggested to incorporate federated intelligence and smart contracts technologies in constructing and training such models. When

both humans and AI act as decision agents, there is a need to emphasize the management of the impact of technological involvement on human performance and vice-versa. Therefore the different strategies of human-machine collaboration should be discussed to identify the most suitable strategy for organizational decision making in Industry 5.0, enhanced by AI [16].

To increase manufacturing system productivity, reduce human effort and avoid the possibility of injury the maintenance activities should be predicted by assessing the health of the machine. Data-driven prognostics rely on statistical and AI methods, including machine learning and deep learning models. Prognostics and health management is one of the key fields in which AI will be very useful [17].

Control and supervision mechanisms can be AI-AR-VR based and characterized by a large degree of autonomy to optimize processes, quality and maintenance operations. Remote cooperation, assistance and maintenance is also part of the environment for having no man on floor increasing safety and putting the focus on control and human centrality [18].

When there is a need for repeated changes in the schedule, AI can come in use. The principles of the artificial neural networks and IF-THEN scheduling rules simulate flexible manufacturing [19].

Artificial intelligence should maximize output performance to boost firm demand and supply. On the other hand, business intelligence enables the company to make financial and business decisions in which big data analytics is a crucial assistance. To maintain production efficiency and worker comfort, the human variable performance must be included for the production schedule. It is first to be used as a targeting tool for a global firm plan and time buffer allotment system and later for the job scheduling by the human resource which can outperform traditional models of performance improvement in speed, accuracy and human error [20]. The traditional manufacturing activities can be renovated with adoption of AI technologies which can lead to supply chain resiliency and sustainability. Real-time tracking of supply chain activities is of high importance [21].

Digital twins are highly compatible with AI, but at the same time utilization of digital twins in warehouse management has been relatively neglected over the years. AI cna improve warehouse management, supply chain optimization and operational efficiency in various industries [22].

Artificial Intelligence of Things (AIoT)-based automated picking system has been development for online shop and services for automated shipping systems. The systems divert consumers who are moved by AIoT, while robotic manipulators replace human tasks to pick. It enabled the increase of evaluation efficiency, speed, and convenience of the processes [23].

The demand for personalization remains high, and the work environment should be safe, efficient and personalized collaborative workplace. Frameworks such as DeFACT enable the different enterprises and parallel workers to be organized, coordinated and scheduled based on decentralized autonomous organizations and operations to promote mutual benefits among members. This enables the provision of higher-quality personalized products and services with the safety of data and knowledge. The use of generative artificial intelligence is important here [24].

In the transport sector, AI is being used for autonomous delivery, and self-driving trucks, which is still just an idea that should be implemented with high economic efficiency. AI is also integrated in special technical assistance systems in trucks and the human-AI combination of systems has proven to be the most efficient [25]. AI can play a substantial role in digital transformation, especially in the servitization process which is related to the creation of new services based on existing products that are already in the company's offer. Companies improve their offer and instead of only products, they offer products and services or only services created on the product. Selling services require different business models than in selling products, and advanced solutions should be considered. AI can here be a very useful tool [26].

Rules and standards for the use of IoT and AI should be established to minimize the consequences of technology misuse [27].

AI can be used for cyber threat detection to protect modern digital ecosystems. ML-based classifiers and ensembles detect anomaly-based malware and network intrusion. Their integration in the overall system is important [28].

AI can be used as a chatbot as part of the MES with a prediction system as a MES layer. Chatbot is an assistance in production coordination for the workforce to learn from their inputs. This kind of system provides live updates in natural language which enables easy information extraction in comparison to the traditional search techniques [29].

AI controller is implemented in business support systems by machine learning. It can be used in thermal power plant and chemical product manufacturing plant [30].

In implementing robotic AI-based assistance systems and exploiting all the potential the design methodology Value Sensitive Design (VSD) is proposed as a starting point to align this technology with human values [31].

AI is a key enabler of the transition between static, hard-coded algorithms and flexible and innovative ones. The automotive sector can benefit from the usage of such techniques. The special focus can be put on measuring system, customer satisfaction analysis, and demand prediction. But AI can also be implemented in the product (Advanced Driver Assistance Systems, as an in-vehicle IoT system) [17].

Development and use of AI in the manufacturing industry does not only bring opportunities but also challenges, but many claim that AI will be innovative and revolutionary assistance to the industry [32].

3 IMPLEMENTATION OF AI IN THE MANUFACTURING SYSTEM – CASE STUDY

The framework of AI implementation in the manufacturing system was developed on case study of a Croatian company, which is of the leading glassware companies in the region.

The simplest description of this solution is obtained by dividing the implementation process into two key parts, which are further divided into four phases, with the first two

phases forming a virtual assistant, and the second two creating a virtual manager in business.

3.1 Phase I – Introduction (Kindergarten)

First phase consists of conceptualizing an idea and filling the database with existing information and documents and assigning the simplest tasks to artificial intelligence and monitoring their execution to solve problems that may arise during use and improving the overall functioning of the AI system. With the successful implementation of this phase, the project can safely be continued, this phase is almost completed and is currently in the process of adjusting the last small elements in order to successfully continue with phase.

3.2 Phase II – Product (High School Student)

It is currently the most important and probably the most complex phase of development - defining the more complicated tasks that artificial intelligence must perform. The goal is to reach the desired level and achieve that the result of this phase is a finished product that can be offered to the market. The main idea is to enable a maximally universal solution that can be successfully implemented in various industries without any problems, and that the finished product after the second phase be maximally automated with the main goal of enabling the company's management to monitor the situation in the company more simply and efficiently and to be able to, quickly and efficiently, without the need for the help of the engineer who developed the system and without knowledge of the code, assign tasks to the artificial intelligence that it should perform depending on the driver. The simplest way is to describe with an example what AI should look like in this phase: for example, if the AI assesses that an email or feedback from a client is written in an angry or dissatisfied tone, it will automatically react and forward that email to the management, who will then be able to investigate it more easily with its help. the background of the problem, i.e., through a simple conversation with the AI, they will be able to get all the necessary information related to the problem and its solution. Also, at this stage, it is crucial not to demand impossible tasks from artificial intelligence, but to be realistic and offer a product that meets all needs, and not to lose its value by expecting unachievable results.

3.3 Phase III – Almost Genius

It is almost the final stage, the main goal of which is the full implementation of AI in the entire business with an emphasis on production. In more detail, the ultimate goal of this phase of AI implementation is, after collecting a sufficient amount of information, to implement it in the production plant by acquiring sensor devices that record the working environment (with a precision of up to mm^2 within 2 minutes) and "empty" robots that they come unprogrammed intending to be connected to a system in which there is already an artificial intelligence that will program them together with the already mentioned sensors and determine their paths, tasks, time, speed and a large number of other factors key to successful production.

3.4 Phase IV – Complete Genius

This is the last stage of implementation where the artificial intelligence becomes so aware of its situation that it can do most of the work on its own and has acquired a huge amount of data from years of operation that it can give advice to the company's management. This phase is still quite far from being feasible, but it is developing day by day with new thoughts and attitudes of the company's management.

In this paper, emphasis will be placed on the implementation of the first two phases of this project. Namely, the already implemented first phase will be analyzed in detail, and the main part will be focused on the implementation of the second phase, the result of which is a finished product that can be offered to the market regardless of the industry.

3.5 A Snapshot of the Current State

This is a company that for the last 10 years has allocated a significant amount of funds to acquire the most modern technologies, with which it could produce and supply the highest quality glass products in an environmentally friendly manner. Multi-year investments indicate the long-term vision of the company, in which the company wants to be the leading Croatian brand in the glass industry, which will provide its consumers, employees, community, and business partners with a bright future through glass products.

Analysis of the company's past business activities with a clear focus on export activities indicates their key contribution to further growth and development. Through the systematic implementation of export strategies, the company would successfully expand its market, diversify revenues, and achieve competitive advantages on a global level.

Export activities proved to be an indispensable factor in achieving long-term business sustainability, contributing to strengthening financial stability and increasing market share. In addition, the increased global presence of the company would result in the establishment of strategic partner relationships, which would further expand the network of business opportunities.

The company concluded that the current level of information distribution within the company is not at a satisfactory level and that it needs to be significantly increased so that the company can deal equally with other multinational companies that have been operating on planned export markets for many years.

Namely, it is crucial to emphasize that the main problem with the distribution of information within the company, as well as the information that goes outside it, is precisely the insufficient amount of control over it. That is why the key idea of implementing an AI system is to increase control and at the same time make it as easy as possible for the company's management to access all the required information in the fastest possible time frame.

With the current way of distributing information outside the company, the management cannot react in time to the emergence of a potential problem because it does not have insight into every e-mail that is sent to existing or potential clients. This way of "control" is unacceptable for the company because it learns about a possible problem much too late, i.e., it only finds out about a possible problem now when it has arisen without the possibility of eliminating the possibility of its occurrence.

To successfully solve the mentioned problem, the company implemented the first part of the project, the so-called "virtual assistant", which plans to significantly increase the level of control and enable the possibility of eliminating potential problems before it is too late, i.e. before the problem even arises.

3.5.1 Virtual Assistant

As already stated earlier, the project of introducing AI into the entire business takes place in two key parts, each part of which consists of two phases. This paper plans to provide a detailed insight into the processes that took place in the first part and what the final product will look like, the so-called Virtual Assistant, after completing the first two phases of implementation.

The key goal is to create an independent system that is more advanced than all the "ready-made" solutions that have been offered multiple times on the market recently, and to respect the main role of the system itself: Monitoring the distribution of information within the company.

3.5.1.1 Phase I

The main role of the AI-assisted system "Virtual Assistant (VA)" is an assistant in business. The primary tasks of the VA, which were emphasized in the first part of the development, are the management of business email communication and an AI-based chatbot application through which authorized employees have insight into the business and can manage the data used when redirecting emails. Development began in May 2023 through two initial phases. Phase I was crucial in the long run for the successful implementation of the entire project. Namely, in the first phase, the most important thing was to define the master data that will be used to fill the AI and lay the foundations for the further development of the agents that are the main part of phase II. The master data that was a key part of AI development was as follows:

- Downloading data about customers, references and offers from company's existing systems (Microsoft Exchange Server, custom ERP system)
- Connecting clients (customers) with their mail contacts and mail domains
- Determining the primary and secondary references of company’s by customers according to the criteria of the most frequent communication, i.e. according to the initially defined contacts in the ERP.

Also, it was crucial for AI to start learning how to manage business email messages, because the entire development of phase II is based on communication via emails, both incoming and outgoing.

The key items identified as the most important for development in this phase were:

- Interception of incoming external mails
- Forwarding of e-mails to the officers in charge
- Preparation for approval or stopping of outgoing emails (e.g., with complex offers)
- Support for multiple internal domains
- Processing of e-mails sent to a group, nested e-mails, invitations to meetings, junk e-mails, confidential e-mails.

As the second phase plans to establish control over employees within the company, it was necessary to develop the following aspects of AI as preparation for further implementation:

- Notification of employee absence - employees report absence from work via e-mail (annual vacation, sick leave, maternity leave, day off, etc.)
- Management reports the absence of employees via chat.

The final step in the development of phase I was the creation of the Chatbot application VA, with which the company's management could test the current progress of AI and, through work with it, see what improvements are still needed to make the system complete after phase II. The key items that were checked and required from the VA Chatbot application were:

- Inquiries into structured data - about customers, references, received and sent emails
- Rating of the response of the Virtual Assistant
- Employee absence record
- Change primary or secondary referrer via chat
- Placing standing orders for users
- Access to the application is limited to the Administration.

3.5.1.2 Phase II

Distribution of information, which is very difficult to specify exactly what is meant by this term, but to successfully implement the implementation of AI, the company currently emphasizes the distribution of information via email addresses, both those entering the company and those that are moving within it and eventually also those that go outside the company.

To successfully implement AI in each of these three processes, it was necessary to teach artificial intelligence about data that is key to identifying potential opportunities and threats. Although most of this process took place, as stated earlier, in the first phase, it is easiest to describe this part of learning as a final embellishment. Namely, the company does not want to rush through the stages of the entire process and in the end deliver a product that is 80% completed in each stage but wants to bring each stage to perfection so that the result is 100% correct and efficient.

Also, it was necessary to list the key parts of this phase, and the same was done by creating the so-called "AI agents", each of which is in charge of implementing one of the key items for the successful implementation of the second phase and the first part.

Within the project, five key agents are listed specifically:

Agent Block **–** this is an agent whose role is the most demanding, but also the most important for the successful control of information distribution. Namely, its role is to monitor all outgoing e-mails to potential or future partners and to stop those e-mails that contain unprofessional elements (rude tone, inappropriate words, simple words, violent tone, threats, etc.). After the sending of a specific email is blocked, the information about this is forwarded to the company's management, as well as to the person responsible for controlling a specific employee. Also, along with the information about the inappropriate e-mail, the entire e-mail is delivered, as well as information on why the AI made such an assessment and decided to block the output of the e-mail.

The graphical scheme of the functioning of the Block agent is shown in Fig. 1.

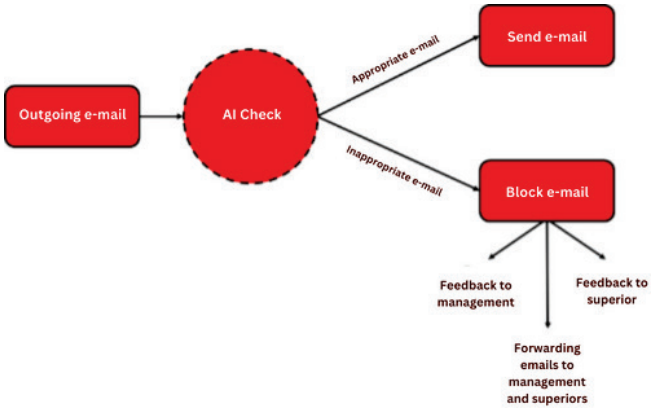

Figure 1 Agent Block functioning scheme

Agent Distribution - the main role of this agent, also called Agent Right, is the correct delivery of all incoming mail in the company. In more detail, every email that comes to the company's server is first accepted by AI, which studies the content of the email, and, depending on the content of the email, either delivers it to the written email address or changes the address to which the email should arrive. For example, if an e-mail related to a complaint about a certain product or delivery comes to the general contact e-mail address (which is available on the company's website), AI will receive it, study it, and not send it to the requested address, but will send it to a person in the company who is the representative of the company that sent the complaint. Likewise, if it is a matter of repeated complaints, that email will be sent to the management of the company, in addition to the person who is the representative, so that they can respond to the situation successfully and promptly. Also, as with the previous agent, he will be able to answer very simply why this information had to be found with a certain person.

The graphical scheme of the functioning of the Agent Distribution is shown in Fig. 2.

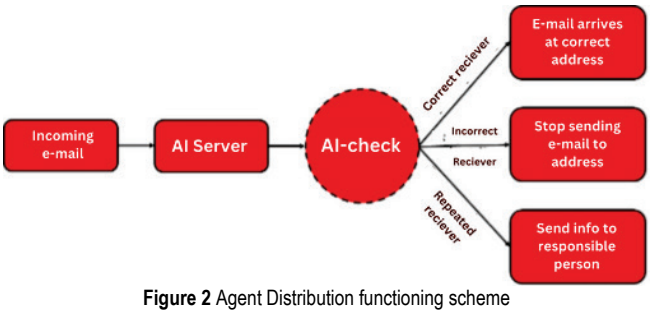

Figure 2 Agent Distribution functioning scheme

Agent E-mail – with, of course, a marketing goal in the form of information about the use of AI, this agent must facilitate communication in moments of increased demand. Namely, this agent can send an email from its personal email address. Of course, the e-mail is sent on request with a previous presentation of the planned for verification, but it makes it as easy as possible to respond to unnecessary e-mails that waste time unnecessarily. It functions as a "virtual secretary" that is a shield from the outside world and unsolicited emails.

The graphic scheme of the functioning of the E-mail agent is shown in Fig. 3.

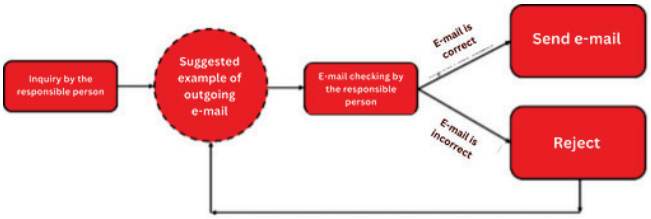

Figure 3 Agent E-mail functioning scheme

Agent Information – this agent must always be able to provide the company's management with information related to employees. More specifically, its main task is to store information and create a knowledge base about employees, adopt their work habits, and monitor their work. As employees are also expected to cooperate and communicate with AI and immediate feedback is more than satisfactory, AI must be able to report information about employees even when they have not reported it themselves. For example, an employee who forgot to report information about a sick leave did not even have to do the same because the AI collected enough information and was able to inform the management about the absence of a certain employee. This agent will also store personal data about employees, and one of the examples of its use will be congratulating on birthdays or other important moments.

The graphic scheme of the functioning of the Information agent is shown in Fig. 4.

Agent Help – this is very similar to the previous agent, but this agent has access to all information within the company, not only about employees. Everyone in the company, depending on their position within it, has access to a certain amount of information through conversation with

AI. The management of the company can in a very short period, or rather in a few sentences, get the exact information that interests them at that moment. In more detail, if an insufficiently high-quality result is noticed by a certain representative, a daily, weekly, or monthly analysis of the same can be reached in several queries to see where the problem arose and how to solve it most effectively.

The graphic scheme of the functioning of the Distribution agent is shown in Fig. 5.

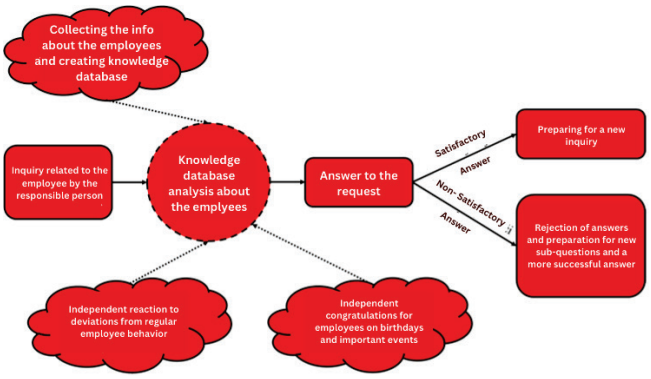

Figure 4 Agent Information functioning scheme

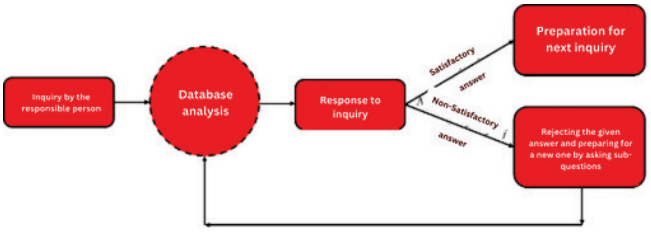

Figure 5 Agent Help functioning scheme

3.5.1.3 Virtual Host

After the successful implementation of the first part of the project, the plan is to further improve all acquired AI knowledge and implement it in other processes within the company. The emphasis of the virtual leader would naturally be on even better and more independent control of information, but also on its involvement in processes that it had only learned about until now. Of course, entering the process of production, processing, packaging, ordering, selling, etc. is not an easy task, but with the large amount of information that artificial intelligence should possess by then, this step is not too worrying.

Of course, it is important to note again that the company does not want to rush the entire project, and from this, it can be concluded that the second part is, for now, only an idea on paper, but taking into account the current speed of successful implementation and expectations related to the completion of the second phase by end of 2023, the beginning of the realization of the second part is no longer in such a distant future.

3.5.1.4 Phase III

Further development in phase III is based on the achieved results from phase II, for which additional improvement is planned. Most of the planned activities are based on the establishment of artificial intelligence communication and the existing ERP system. As in the previous cases, phase III consists of several key components that the desire is to realize, namely:

Communication with clients - in this step of implementation, the goal is to create an agent that checks the content of each order or offer, compares it with the request, and performs supervision in the form of a check written within the offer with the customer's price list located within the ERP system. Namely, the main task of this agent is to stop an improperly made offer and to let the management know that a mistake has been made with feedback. In this way, the possibility of human error will be minimized as much as possible, which will increase the efficiency and quality of the service.

Production - after AI is already connected to the existing ERP system in the company, the initial idea is to enable the implementation of AI in the production process using barcodes and readers. Namely, each order will have its own barcode, which, after reading it on the machine with a barcode reader, will give the machine insight into the order, and the machine, with the help of artificial intelligence, will perform the requested action by itself and thus further reduce the possibility of human error in the production process. The goal of this part is to enable artificial intelligence, with the help of unprogrammed robots and microsensors that record the entire plant at the highest level, to program robots and run the entire production plant with minimal to no human input. In more detail, the human role will mostly be monitoring the robot's work from a safe distance and final control of the finished products. As this is an industry where injuries at work are a very dangerous item because it is a raw material that breaks very easily during processing and can cause serious injuries, this step would minimize, if not eliminate, the danger to humans in this part of the production process.

Defective orders – the glass industry used to rely on selling glass that was not good enough to deliver to the customer, i.e. it had a defect. As time goes by, the trends in this industry change and there are no longer small trades that generate serious income by buying, processing and reselling defective used glass. In order to eliminate this cost, artificial intelligence will be taught to recognize the possibility of an incorrect order and will be able to react to it earlier than a human has done so far. Of course, there will still be defective glasses, but their time spent in the production process will be reduced and they will be separated from it with the desire to deliver finished products as quickly and efficiently as possible. Defective glasses will not be thrown away, but artificial intelligence will redirect these glasses to remelting.

3.5.1.5 Phase IV

It is about the last phase, but also about the phase that is currently the most complete. Namely, it is about the moment when artificial intelligence advances to the extent that it fully controls all the material it owns related to the company, but also all data related to current market trends and predictions of future trends. More precisely, artificial intelligence becomes so aware of the situation in which it finds itself that

it can perform most tasks by itself, from the distribution of communications within the company to the process of procurement, production, packaging, sales, delivery, etc., and has acquired a huge amount of data from years of business that it able to advise the management of the company.

It is not necessary to emphasize too much that this phase is still really far away and will develop simultaneously with the increasingly rapid development of artificial intelligence. However, it should be emphasized that the development of elements from this field has always been rather rapid - more precisely, new innovative solutions have ensured immediate jumps that, after reaching their peak, would stagnate for a long time and wait for a new jump with the development of some new innovative solution.

4 CONCLUSION

Through a clear overview of its history and development, it is clear to conclude that AI represents a key factor in the transformation of traditional business models. Modern business requires innovative approaches, and the implementation of AI brings numerous advantages that can significantly improve the efficiency and competitiveness of the organization. It should be emphasized that not every company is ready to embark on a venture that many consider a step of the future, but those that decide to do so can develop a competitive advantage over less flexible companies.

Through the analysis of exact data and information, it has been shown that the application of AI in the distribution of information brings significant improvements in speed, accuracy and personalization of the process and enables easier control of communication processes for the company's management. Automating routine tasks frees up a significant amount of time that can be used more efficiently for more creative work and making strategic decisions. Also, the implementation of advanced analytical algorithms enables a deeper understanding of user needs, which results in better customization of products or services.

It is important to point out that the success of AI implementation depends on the cooperation of all relevant employees within the organization. Educating employees about the benefits and applications of artificial intelligence is essential to ensure a smooth transition to a digitized environment. Also, constant monitoring of ethical standards in the use of data and algorithms is necessary to avoid potential problems and preserve user trust.

Most importantly, this paper emphasizes the importance of timely integration of artificial intelligence into business processes to optimize the distribution of information. Accelerating digital transformation is not only a technological imperative but also a key strategy for long-term sustainability and creating a competitive advantage. By managing this transformation wisely, organizations can expect to improve operational efficiency, increase customer satisfaction, and open new opportunities for innovation. The implementation of AI is not only a step towards the future, but also a response to the requirements of the modern business environment, which requires agility, adaptability, and high-quality distribution of information.

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