THE IMPACT OF ARTIFICIAL INTELLIGENCE IN ENHANCING LEAN MANAGEMENT: AN EXPLORATORY STUDY IN THE GENERAL AUTOMOTIVE AND EQUIPMENT COMPANY

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ARTICLE INFO	ABSTRACT
	Objective: The aim of the study is limited to several points, the most important of which is to understand the new concepts related to artificial intelligence and their role in supporting and activating lean management and the extent of their contribution to the success and survival of modern industrial companies. **Theoretical Framework:** This topic presents the most important concepts and theories on which the research is based. [Artificial Intelligence and Lean] stands out, providing a solid foundation for understanding the context of the investigation. **Method:** The study population was represented by the factories affiliated with the General Company for Automotive and Equipment Manufacturing. The sample was selected randomly, based on the (simple random sampling) method, where 3 factories were selected (the car and specialized wheel production factory, the body and heavy equipment factory, and the battery factory) out of a total of 6, and the number was Study population (2736) The researcher decided to distribute (300) questionnaires to workers in the factories affiliated with the company, the study sample. (300) questionnaires were distributed to the research sample (10.96%) of them after reviewing previous studies and benefiting from them in the field of research. (289) were recovered at a rate of (96.3%), of which (9) were not suitable for analysis, so the net sample was 278 from the studied population, at a rate of (92.8%) from the research sample. **Results and Discussion:** The study showed a set of theoretical and field conclusions, the most important of which is that artificial intelligence has gained high acceptance among the staff of the automobile and equipment manufacturing company as a tool for improving administrative work and enhancing the characteristics of lean management. **Research Implications:** The practical and theoretical implications of this research are discussed, providing insight into how the findings can be applied or impact practices in the field of AI and lean management and these impacts may include companies affiliated with the Ministry of Industry and Minerals and the services they provide. **Originality/Value:** The importance of this study came from the scarcity of studies that attempted to identify and understand the nature of the relationship between variables (artificial intelligence and lean management), as well as the attempt of the current study to address a realistic problematic problem that directly affects the performance of workers in the general automotive and equipment industry. Doi: https://doi.org/10.26668/businessreview/2024.v9i9.4722

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O IMPACTO DA INTELIGÊNCIA ARTIFICIAL NO APRIMORAMENTO DA GESTÃO ENXUTA: UM ESTUDO EXPLORATÓRIO NA GENERAL AUTOMOTIVE AND EQUIPMENT COMPANY

RESUMO

Objetivo: O objetivo do estudo limita-se a vários pontos, sendo o mais importante deles entender os novos conceitos relacionados à inteligência artificial e seu papel no apoio e na ativação da gestão lean e a extensão de sua contribuição para o sucesso e a sobrevivência das empresas industriais modernas.

Estrutura Teórica: Este tópico apresenta os conceitos e as teorias mais importantes nos quais a pesquisa se baseia. Destaca-se a [Inteligência Artificial e Enxuta], que fornece uma base sólida para a compreensão do contexto da investigação

Método: A população do estudo foi representada pelas fábricas afiliadas à General Company for Automotive and Equipment Manufacturing. A amostra foi selecionada aleatoriamente, com base no método (amostragem aleatória simples), em que 3 fábricas foram selecionadas (a fábrica de produção de carros e rodas especializadas, a fábrica de carroceria e equipamentos pesados e a fábrica de baterias) de um total de 6, e o número foi População do estudo (2736) O pesquisador decidiu distribuir (300) questionários aos trabalhadores das fábricas afiliadas à empresa, a amostra do estudo. (300) questionários foram distribuídos para a amostra da pesquisa (10,96%) depois de revisar estudos anteriores e se beneficiar deles no campo da pesquisa. (289) foram recuperados a uma taxa de (96,3%), dos quais (9) não eram adequados para análise, de modo que a amostra líquida foi de 278 da população estudada, a uma taxa de (92,8%) da amostra da pesquisa.

Resultados e Discussão: O estudo mostrou um conjunto de conclusões teóricas e de campo, sendo que a mais importante delas é que a inteligência artificial ganhou grande aceitação entre a equipe da empresa de fabricação de automóveis e equipamentos como uma ferramenta para melhorar o trabalho administrativo e aprimorar as características da gestão enxuta.

Implicações da Pesquisa: As implicações práticas e teóricas desta pesquisa são discutidas, fornecendo uma visão de como as descobertas podem ser aplicadas ou impactar as práticas no campo da IA e da gestão enxuta, e esses impactos podem incluir empresas afiliadas ao Ministério da Indústria e Minerais e os serviços que prestam.

Originalidade/Valor: A importância deste estudo decorreu da escassez de estudos que tentaram identificar e compreender a natureza da relação entre as variáveis (inteligência artificial e gestão enxuta), bem como da tentativa do presente estudo de abordar um problema realista e problemático que afeta diretamente o desempenho dos trabalhadores da indústria automotiva e de equipamentos em geral.

Palavras-chave: Inteligência Artificial, Gestão Enxuta, General Automotive and Equipment Manufacturing Company, Dimensões da Gestão Enxuta.

EL IMPACTO DE LA INTELIGENCIA ARTIFICIAL EN LA MEJORA DE LA GESTIÓN ÁGIL: UN ESTUDIO EXPLORATORIO EN LA EMPRESA GENERAL DE AUTOMOCIÓN Y EQUIPOS

RESUMEN

Objetivo: El objetivo del estudio se limita a varios puntos, el más importante de los cuales es comprender los nuevos conceptos relacionados con la inteligencia artificial y su papel en el apoyo y activación de la gestión ágil y el alcance de su contribución al éxito y la supervivencia de las tecnologías modernas. empresas industriales.

Marco Teórico: Este tema presenta los conceptos y teorías más importantes en los que se basa la investigación. Destaca [Inteligencia Artificial y Ágil], proporcionando una base sólida para comprender el contexto de la investigación.

Método: La población de estudio estuvo representada por las fábricas afiliadas a la Empresa General de Fabricación de Equipos y Automotores. La muestra se seleccionó de forma aleatoria, con base en el método (muestreo aleatorio simple), donde se seleccionaron 3 fábricas (la fábrica de producción de automóviles y ruedas especializadas, la fábrica de carrocerías y equipo pesado, y la fábrica de baterías) de un total de 6, y el número fue Población de estudio (2736) El investigador decidió distribuir (300) cuestionarios a los trabajadores de las fábricas afiliadas a la empresa, la muestra del estudio. (300) cuestionarios fueron distribuidos a la muestra de investigación (10,96%) de ellos después de revisar estudios previos y beneficiarse de ellos en el campo de la investigación. (289) fueron recuperados a una tasa de (96,3%), de los cuales (9) no fueron aptos para el análisis, por lo que la muestra neta fue de 278 de la población estudiada, a una tasa de (92,8%) de la muestra de investigación.

Resultados y Discusión: El estudio arrojó un conjunto de conclusiones teóricas y de campo, la más importante de las cuales es que la inteligencia artificial ha ganado alta aceptación entre el personal de la empresa fabricante de automóviles y equipos como herramienta para mejorar el trabajo administrativo y potenciar las características de gestión ágil.

Implicaciones de la Investigación: Se discuten las implicaciones prácticas y teóricas de esta investigación, lo que brinda información sobre cómo los hallazgos se pueden aplicar o impactar las prácticas en el campo de la IA y la

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gestión ágil y estos impactos pueden incluir empresas afiliadas al Ministerio de Industria y Minerales y el servicios que brindan.

Originalidad/Valor: La importancia de este estudio surgió de la escasez de estudios que intentaran identificar y comprender la naturaleza de la relación entre variables (inteligencia artificial y gestión ágil), así como el intento del presente estudio de abordar una problemática realista. problema que afecta directamente el desempeño de los trabajadores de la industria automotriz y de equipos en general.

Palabras clave: Inteligencia Artificial, Gestión Ágil, Empresa General de Fabricación de Automotores y Equipos, Dimensiones de la Gestión Ágil.

1 INTRODUCTION

Despite the importance of artificial intelligence as a systematic approach that anticipates the future prospects of lean management and enhances its position compared to competitors, starting with diagnosing the available and expected capabilities, all the way to making decisions by officials and implementing them, perhaps this requires compatibility between information technology in the productive industries sector and the characteristics of the lean organization among manufacturers. The decision provides an analysis that leads to wiser decision-making by officials, ensuring a move towards adopting the characteristics of lean management in order to ensure success and excellence. Accordingly, a question is raised as follows: What is the impact of artificial intelligence on lean management in the General Company for the Automotive and Equipment Manufacturing Company?

With the aim of framing the problem of the study, and then searching for appropriate mechanisms that enhance the positive effects of the relationship between the variables studied on the one hand, and finding correct treatments for the negative aspects and mitigating their effects on the other hand, the study came to explore and analyze artificial intelligence in lean management:

- what is the level of interest in artificial intelligence in its dimensions (expert systems, knowledge representation and reasoning, automatic learning) among the companies under study?

- what is the level of interest in lean management in its dimensions (lean leadership, lean organizational culture, lean management communications) among the companies under study?

- does artificial intelligence have an impact on lean management?

Based on the importance of what was mentioned, the contribution of this study was to frame this perspective and discuss its role in developing the performance of the companies

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studied. The problem that the study focuses on is related to lean management and artificial intelligence, which includes all concepts related to the productive industries sector.

2 THEORETICAL FRAMEWORK

2.1 THE CONCEPT OF ARTIFICIAL INTELLIGENCE

There has become interest in applying artificial intelligence in contemporary institutions as a branch of information technology, which researches and develops smart technology, and through computer applications, enables intelligent behavior when performing tasks with the aim of reducing the administrative burden, providing better service and high quality in solving work problems, and facilitating business. By transforming management systems into electronic systems based on artificial intelligence. (Al-Masry & Al-Agha, 2021, p. 407). Artificial intelligence has become widespread in all academic fields, due to technological acceleration it is witnessing a wide spread (Al-Atl et al., 2012, p. 46). Artificial intelligence is considered one of the fields of computing science due to technological developments because it is linked to computing systems, algorithms, and technologies that aim to simulate the mental capabilities of humans and animals. The first beginnings of the concept of artificial intelligence were among neuroscientists and psychologists (Gunning, 2017). The principle upon which the science of artificial intelligence is based is the principle of processing information, regardless of its nature and size, in an automated manner or with human intervention in the processing to achieve specific goals (Wisskirchen et al., 2017), and artificial intelligence or machine intelligence can be considered a broad field for the intersection of many knowledge. Old and new sciences and technologies.

The researcher believes that artificial intelligence is a memory derived from the human mind, and uses modern technologies to simulate the human mind and analyze and understand the relationships between things. The machine acquires it after adding algorithms and programs that make it work with a mind that simulates human mental abilities with its various types and makes the machine behave like a rational human being. It relates to innovations and devices that help in performing certain functions. And in all fields that humans deal with, from biology, engineering, and the arts. It includes a number of computer-supported technologies, such as machine learning and scientific research, and indicates the possibility of creating intelligent

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mechanisms based on knowledge-based programs. Developing intelligent systems to solve specific problems and carry out tasks that humans can solve.

2.2 DIMENSIONS OF ARTIFICIAL INTELLIGENCE

Artificial intelligence is being applied in a more professional way in many systems that we use in our daily lives as well as business systems (Samuelson, 2020:4). Thus, understanding the basic dimensions and sub-domains of each variable is appropriate. To distinguish between them, which is a magical perception of the multi-purpose tool. Intelligence Artificial intelligence (AI) has come into being in the modern era where technological advances have enabled us to use more advanced systems to facilitate various tasks. The overall term artificial intelligence can be divided into many different methods and techniques each of which is considered theoretically related in order to obtain a compilable picture of the scope of the research, as well as being empirically relevant because of their connections to the interview participants and their responses in order to generate this appropriate understanding of each technology and their relationship to each other.

- expert system (EX): the expert system is considered one of the most comprehensive and important fields in artificial intelligence applications (Heizer, 2001: 291), as it relies on the use of human logic to solve problems. It is a group of artificial intelligence programs that were adopted in the 1980s and have reached the level that experts can do. . Replace human specialization in specific decision-making areas. Expert systems are easily and widely used in artificial intelligence technologies. It consists of a computer program that simulates the way of thinking of an expert in a particular field, through which the decision and the elements of the decision are recorded;
- machine learning (ML): the history of machine learning (ML) can be traced back to 1949 by Donald Hebb's Organization of Behavior book, in which he discussed the possibilities of replicating the neural system of the human brain using electronic systems. His idea and theory (Hebb's Theory) became known in machine learning research as "Hebbian learning." Machine learning, one of the branches of artificial intelligence, is a set of software techniques that allow machines to adapt behavior to their environment (Allen & Chan, 2017: 22) (without human intervention (unsupervised machine learning). In this case, the algorithm must discover the hidden data structure itself, 2016: Berk (292), or machine learning with human intervention (supervised

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machine learning) (the system learns classification according to a model provided by the user (Wisskirchen et al., 2017) or with partial human intervention (enhanced machine learning) an algorithm that learns behavior through observation and then adaptation. , receiving results from the environment and trying to improve in future steps (Thorndike, 2017, p. 63);

- knowledge representation and inference (KR): knowledge representation is one of the applications of artificial intelligence to represent information so that computers can use it to perform complex tasks such as conducting a conversation in natural language. It is the results from the psychology of how humans are able to represent knowledge and solve problems in order to design a method that turns the complexity of designing and building systems more easily (Robert, 1977), and the automation of different types of thinking. The results from automation logic include different types of thinking, such as applying rules or group relations (a method for solving mathematics and logic problems) and the group (nested, discrete, comprehensive, partial and equal) an assembly of tangible objects or ideas and groups. Sub-Johnson, 1972).

2.3 THE CONCEPT OF LEAN MANAGEMENT

The essence of lean management is the process of change towards improving company policy, especially in the company's assets and management styles. In addition, lean management focuses on professional training and team formation as well as maintaining positive public relations (Lichtarski, 1997, p. 224), this method pays vital attention to aspects related to human resource management in the company. Lean management is Toyota's production system, waste-free manufacturing. It is currently considered one of the most popular management systems in the world. Its effectiveness has been repeatedly proven and challenged by many scientists and researchers (Łukasz, 2012, p. 47). This method is concerned with aspects related to human resources management in the company. Walte (2017) sees a management method that includes the main principles of agility to organize and improve the efficiency and performance of business with the aim of removing waste through continuous improvement to improve customer service, build good relationships with suppliers, increase responsiveness to changes, and increase flexibility.

The researcher believes that lean management is a long-term approach to managing an organization that supports continuous improvement. It seeks to achieve improved efficiency

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and quality by making small and incremental changes in operations, and eliminating the loss of time, effort and money by dividing work into specific steps and excluding steps that do not create value.

2.4 ADVANTAGES OF LEAN MANAGEMENT

Investigation into the implications of lean leadership shows that there are several advantages that organizations can benefit from: (Kinsey, 2010, pp. 3-5; Ljungblom, 2012, pp. 56-59).

- A - lean leadership achieves a better understanding of the roles they are assigned to, and better implementation of agility applications within the organization, creating a culture that fulfills the requirements of lean behaviors through the exchange of information and feedback;
- B - lean leadership thought includes a belief that individuals in the organization constitute the intellectual capital and the most important part of the organization's structure, and therefore their role must be clear and effective in making decisions and participating in developing solutions to problems, as well as providing constructive suggestions;
- T - the availability of high levels of lean leadership behaviors creates relational ties between the leader and employees based on love and mutual respect;
- D - one of the most important advantages of lean leadership is control and control of time by achieving better use of time and reducing its waste, thus reducing the waste of energy.

2.5 THE RELATIONSHIP BETWEEN ARTIFICIAL INTELLIGENCE (AI) AND LEAN MANAGEMENT (ML)

Adopting AI technology in manufacturing processes requires cultural adaptation, in which lean management plays a crucial role. Integrating lean management into company culture has caused major cultural changes. Practical AI is often narrowly broadened, helping human professionals who use AI analysis to enhance decision-making procedures. There are many useful applications of AI in manufacturing sectors. AI-based programs will become autonomous and able to make judgments on their own. So when it becomes independent, everything about how the organization operates will change. Where lean management concepts can maintain the utility of artificial intelligence, advanced software support and artificial intelligence applications, the connection between management support systems and the

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technologies provided by artificial intelligence for machines and computers, as well as the various system-level procedures used to support lean management, including the introduction, processing and production Accurate information at a high rate that benefits the user. (Sun, 2019, p. 3322), Intelligence-powered software, which can answer all general inquiries that software without intelligence may not be able to answer, is one example of how AI-powered software can help provide facilities that cannot Traditional software is provided for IT infrastructure. The intelligent program absorbs all inputs or modifications without changing its structure, and does so more quickly, accurately, and easily than when modifying the program (Nadimpalli, 2017, p. 4). Artificial intelligence provides intelligent management software that helps employees in terms of performance accuracy, speed and reasoning ability, which has been able to develop the web, support its technologies, and give them its basic characteristics. As previously noted, artificial intelligence (AI) is the term used to describe the knowledge and skills that humans have acquired over time and implemented into computer programs that can complete jobs more quickly and correctly than humans. As a result, by improving IT capabilities, AI supports lean governance. (Kharshi & Al-Zawawi, 2021, p. 167). The application of lean management has become possible thanks to the assistance provided by AI) in providing highly advanced software, artificial intelligence applications, and linking the management support techniques provided by artificial intelligence to machines and computers, as well as various procedures used at the system level to support lean management, starting from the introduction, and production. Accurate information at a rapid rate that benefits the user (Ma & Siau, 2018, p. 18). Using artificial intelligence with lean methods and combining the efforts of employees, leaders, data teams, and workers to produce consistent and rapid results (Manasriya, 2004, p. 68). AI-driven companies often use the technology to generate economic value, and employees focus on tasks essential to the company's success. When Artificial Intelligence (AI) is implemented in the form of "interoperability", which refers to the efficient exchange of data between different systems and participants and the use of (AI) in an effective and meaningful way, it will provide superior competitive elements of human intelligence, which generate tangible action. More quickly than using only one type of intelligence. Collaboration with stakeholders, measurable return on investment, and cheap R&D expenses. Al. (2015, p. 201) Boutilier), and its connection to lean management has become possible thanks to the assistance provided by highly sophisticated software, artificial intelligence applications, and the linking of management support techniques provided by artificial intelligence to machines and computers, as well as various procedures used at the system level

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to support lean management. Starting from the introduction, producing accurate information at a rapid rate that benefits the user. (Ma & Siau, 2018, p. 18). Artificial intelligence also provides smart programs and the ability to infer that have been able to develop the web, support its technologies, and give it extremely important features for developing administrative programs that support workers in terms of accuracy and speed in performance. A study by Raqiq (2015) demonstrated that there is An interconnected relationship between programs and technology that used artificial intelligence for machines, computers, and various processes at a level related to information systems. It begins with entering and processing data before extracting it as information to be used. Which helps management use highly advanced equipment and software. An organized and coordinated environment, management operations depend on. Advanced technological development is already made possible through applications of artificial intelligence. (Raqiq, 2015, p. 120), and programs supported by artificial intelligence also help provide facilities that regular programs cannot provide (Kuo & Huang, 2018, p. 819). The use of artificial intelligence applications in management helps various activities, as these applications differ from one organization to another according to the type of activity through:

- facilitates the processes of managing organizations' activities due to the assistance and contribution it provides to the management and decision-making processes in difficult situations facing the organization;
- artificial intelligence applications provide great assistance to workers in completing their tasks due to their superior ability to carry out the most difficult tasks that are somewhat difficult for the worker;
- organizations today, especially those of an economic nature, need such advanced applications to carry out their tasks to the fullest extent;
- with the presence of these technologies, the organization can achieve the best results and provide the best services, which contributes to the development and prosperity of organizations and enhances their competitiveness in an economic world characterized by modernity and development;
- artificial intelligence applications help reduce time due to their superior speed and accuracy in completing the required tasks;
- these modern applications have made it possible to reduce the effort on workers through their ability to perform difficult tasks that require great effort;
- expert systems are used as one of the widespread applications of artificial intelligence in managing activities through their use in all areas of work to a large extent.

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From the above, we find that the use of artificial intelligence is not limited to improving technical and mechanical processes, but provides a set of skills necessary to enhance understanding and control of human functions, and save a lot of time and effort wasted in monitoring the system. It places all web data, application data, database performance, user experience, and log data. In a single cloud-based data platform, it automatically monitors obstacles and detects anomalies. Enhancing AI while maintaining the need for human interaction is a challenging process, especially in large organizations with a number of stakeholders across several departments. The lean management approach to deploying artificial intelligence requires the combined efforts of all the talents of workers, leaders, data teams, and factory workers, and focusing their efforts on the core tasks of operating the company, which leads to fast and accurate results to deliver business value. Artificial intelligence used to improve employee resiliency, increases human potential, and creates long-term benefit. It contributes to increasing productivity. Therefore, when artificial intelligence is implemented, it makes it easier for workers and machines to communicate and exchange information, which helps in manufacturing products and enhances the efficiency of the process. From the above, the third hypothesis can be formulated as follows:

Ha: There is a statistically significant impact of artificial intelligence on lean management in the investigated organizations.

3 RESEARCH PROCEDURES AND METHOD

3.1 METHODOLOGY

The researcher followed the descriptive analytical method due to its suitability to the subject and objectives of the study, which "deals with the study of existing events, phenomena, and practices that are available for study and measurement as they are; without the researcher's interference in their course of action, and the researcher can interact with them directly" (Al-Agha, 2000, p. 43).

3.2 RESEARCH POPULATION AND SAMPLE

The study population was represented by the factories affiliated with the General Company for Automotive and Equipment Manufacturing. The sample was selected randomly,

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based on the (simple random sampling) method, where 3 factories were selected (the car and specialized wheel production factory, the body and heavy equipment factory, and the battery factory) out of a total of 6, and the number was Study population (2736) The researcher decided to distribute (300) questionnaires to workers in the factories affiliated with the company, the study sample. (300) questionnaires were distributed to the research sample (10.96%) of them after reviewing previous studies and benefiting from them in the field of research. (289) were recovered at a rate of (96.3%), of which (9) were not suitable for analysis, so the net sample was 278 from the studied population, at a rate of (92.8%) from the research sample.

Table 1

Characteristics of the study sample

percentage	number	variable	
60.4	168	male	**Gender**
39.6	110	feminine	
100	278	total	
15.5	43	diploma	**Qualification**
53.2	148	Bachelor's	
31.3	87	Master's	
100	278	total	
23.4	65	25-29	**Age**
16.2	45	30-39	
43.5	121	40-49	
16.9	47	50 and above	
100	278	total	
9.4	26	Less than 10 years	**Experienc e year**
61.2	170	10 -20	
32.7	91	20 or more	
100	278	total	

Source: Prepared by the researcher.

Table 1 shows the personal characteristics of the study sample, which includes a number of department heads and a number of individuals working in the surveyed companies, and they are the ones whose opinions are relied upon. We find that the number of males due to the gender variable exceeds the number of females, as their number reached (168), equivalent to (60.4%) of the sample members. This result indicates that the company's factories focus on attracting males to work in their jobs more than they focus on females, due to the nature of the work, which requires performing tasks for a long time and high effort to meet the work requirements. The academic achievement variable was the highest percentage of those holding a bachelor's degree (148), equivalent to (53.2%). This confirms that workers in the factories studied mostly hold academic qualifications, and their opinions can be relied upon in the results of the research.

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The largest percentage was the research sample for the age variable in the age group (40-49) with a percentage of (43.5%) are from the middle age groups who have gained experience in their work, and the largest percentage of the research sample for the variable years of service was in the group (10-20) years, as their number reached (170). (Equivalent to a percentage of (61.2) of the research sample members, who have strong knowledge and ability in their field of work. They have skills and abilities to discover and attract opportunities effectively that help the researcher benefit from this experience in receiving comprehensive answers that support the field of research, build conclusions, and cover all the elements he needs to know about Target work environment. This experience enables him to understand the main objectives and set them based on a clear vision and renew the broad lines of work policies and professional methods of communication with partners and subordinates.

3.3 STUDY INSTRUMENT (QUESTIONNAIRE)

Questionnaires are widely used in social research, especially business administration research, especially descriptive ones. As the questionnaire seeks to obtain specific information and facts about the specific problem (Al-Agha, 2000), and to achieve the objectives of the study and to collect more data, information and facts related to the subject of his study, the researcher built the study tool, a questionnaire, to be applied to the study sample.

3.4 TESTING THE STUDY HYPOTHESES

Testing hypotheses about the relationship between two study variables. There are two types of hypotheses

- null hypothesis: there is no statistically significant relationship between two variables of the study;
- alternative hypothesis: there is a statistically significant relationship between two variables of the study.

If the Sig.(P-value) is greater than the significance level of 0.05 a, then the null hypothesis cannot be rejected and therefore there is no statistically significant relationship between two variables of the study. However, if the Sig. (P-value is less than the significance level of 0.05, then Reject the null hypothesis and accept the alternative hypothesis that there is a statistically significant relationship between two variables of the study.

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Ha: There is a statistically significant impact of artificial intelligence on lean management in the investigated organizations.

To test this hypothesis, the researcher used structural equation modeling, and the figure below shows this:

Figure 1: There is an influence relationship between artificial intelligence and lean management in the organization under study. We note that the model conformity indicators were within the acceptance rule assigned to it. The estimate value of the standard parameter (standard influence factor) was about (0.78). This means that Lean management affects artificial intelligence by (78%) at the level of the researched organization. This means that artificial intelligence will increase by (78%) if attention is given to lean management with a single regression unit. We also note that the value of the impact factor is a significant value because the value of the critical ratio Shown in Table 2 is a significant value at the significance level (0.05) shown in the same table.

Figure 1

The impact relationship between information technology capabilities on artificial intelligence
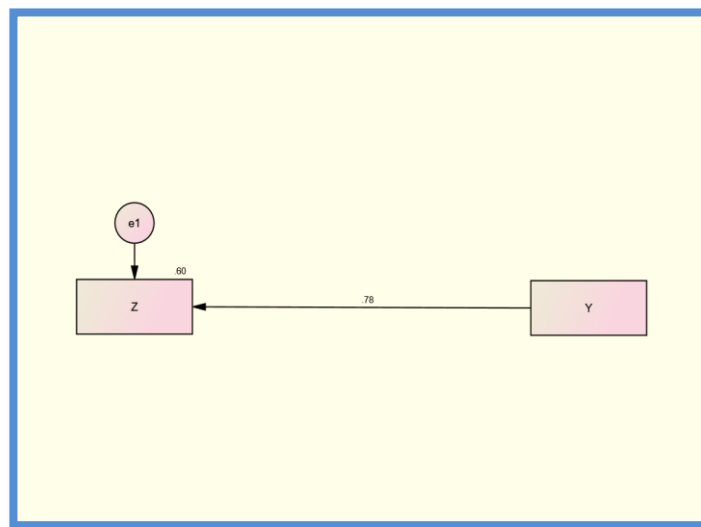
Source: AMOS-26 program analysis results.

Table 2

The impact relationship between artificial intelligence and lean management.

			Estimate	Estimate	S.E.	C.R.	P
Z	<---	Y	.776	.724	.053	13.692	***

Source: AMOS-26 program analysis results.

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As is clear from Figure 1: The value of the interpretation coefficient (R^2) reached (0.60). This means that the changes that occur in the artificial intelligence variable (60%) are due to lean management, and the remaining percentage (60%) is due to variables. Others not included in the research model.

The researcher believes that lean management can help organizations implement artificial intelligence effectively by providing a framework for experimentation, iteration, and feedback. By adopting an lean mindset, organizations can more effectively address the challenges and opportunities presented by AI.

This is consistent with the study (Raafat Al-Awadi & Dima Abu Latifa, 2020), which addressed the impact of artificial intelligence on strategic flexibility and the mediating role of digital functional competencies in human resources. The results showed that lean management practices can significantly enhance the development of artificial intelligence, especially with regard to strategic agility and digital functional competencies. This study highlights the importance of lean management in promoting the effective development and integration of artificial intelligence technologies in organizations.

The study (Sajid Obaid, 2021) addressed lean management techniques to achieve effective integration of artificial intelligence. The study showed, through realistic examples and statistical evidence, how lean practices can enable organizations to successfully integrate artificial intelligence into their operations. The study emphasized the crucial role played by agility and flexibility. As a cornerstone of AI adoption, by adopting lean management practices, organizations can better overcome challenges associated with AI integration, such as data management, privacy concerns, and ethical considerations.

In the study (Ajeelat & Abdel-Al, 2013), which addressed the impact of lean management on the success of an artificial intelligence project, the study analyzed the relationship between lean management practices and the success of artificial intelligence projects. The results showed that lean management practices, such as iterative development, continuous feedback, and collaboration, can significantly increase the success rate of AI projects.

In order to give greater credibility and reliability to the results, the researcher tested the effect of the dimensions of lean management on the artificial intelligence variable, as follows:

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Figure 2

The impact relationship between the dimensions of artificial intelligence on lean management
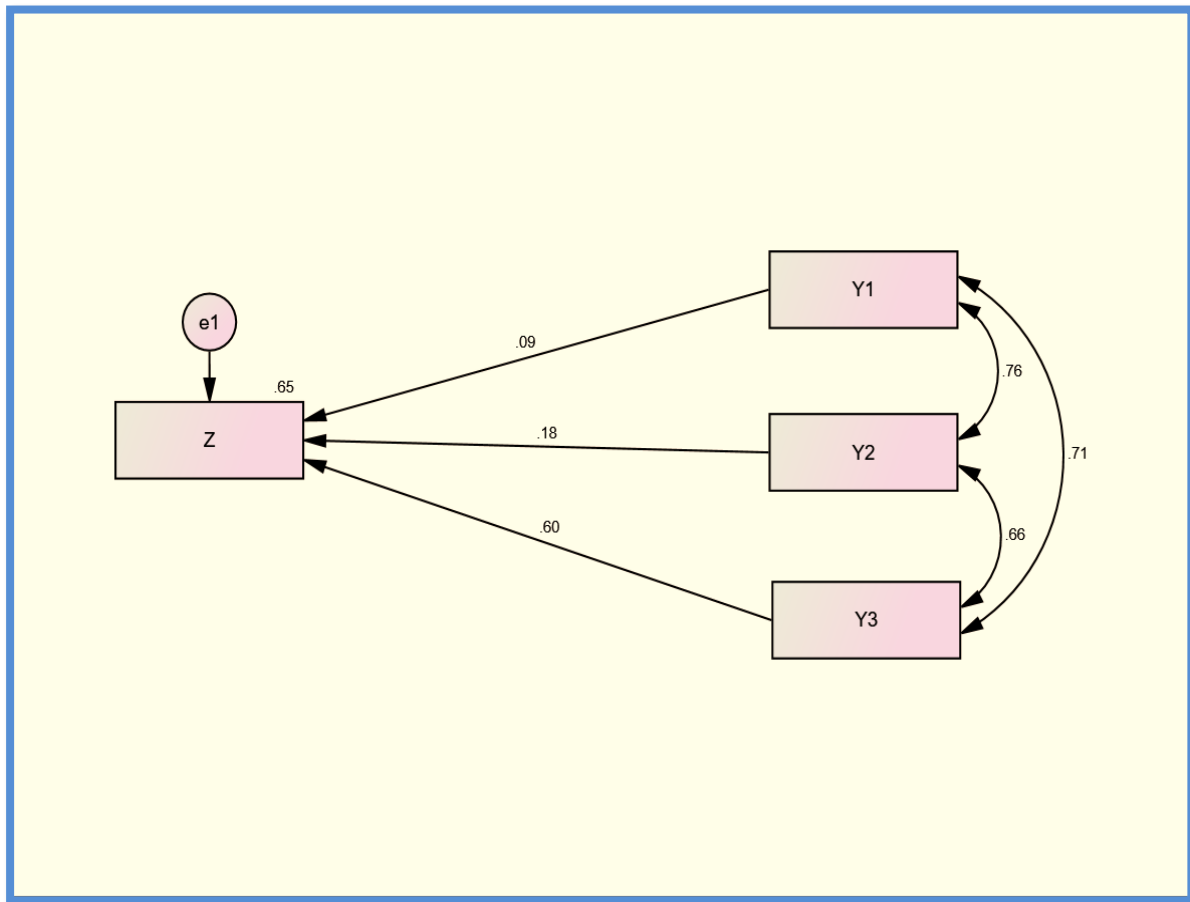
Source: AMOS-26 program analysis results.

Table 3

Regression analysis parameters for the impact of lean management dimensions on artificial intelligence.

			Estimate	Estimate	S.E.	C.R.	P
Z	<---	Y1	.094	.206	.197	1.043	.297
Z	<---	Y2	.177	.527	.253	2.087	.037
Z	<---	Y3	.605	1.515	.194	7.797	***

Source: AMOS-26 program analysis results.
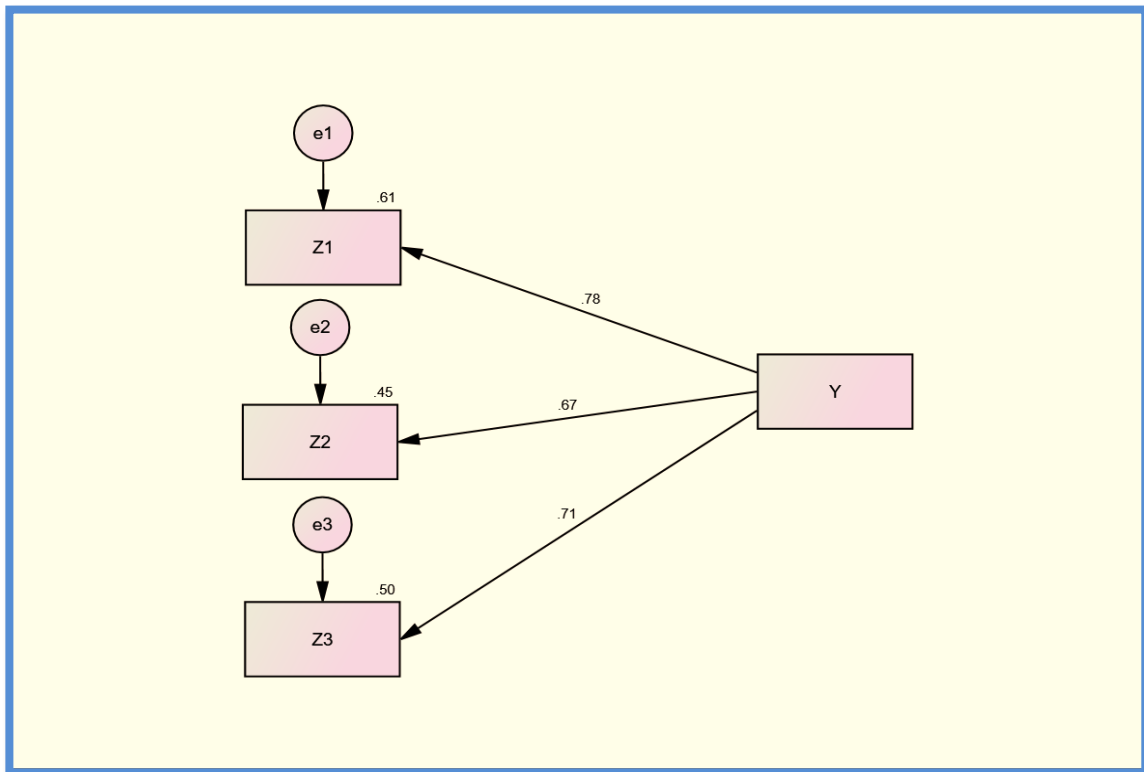
It is noted from the table above:

1. there is no effect of lean leadership on artificial intelligence in the researched organization;

2. there is an impact of lean organizational culture on artificial intelligence in the researched organization;

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3. there is an impact of lean administrative communications on artificial intelligence in the researched organization.

The researcher tested the impact of lean management on the dimensions of artificial intelligence, as shown in the figure below:

Figure 3

The impact relationship between lean management on the dimensions of artificial intelligence

Source: AMOS-26 program analysis results.

Table 4

Regression analysis parameters for the effect of lean management on the dimensions of artificial intelligence.

			Estimate	Estimate	S.E.	C.R.	P
Z1	<---	Y	.779	.217	.016	13.838	***
Z2	<---	Y	.668	.242	.024	9.997	***
Z3	<---	Y	.708	.264	.024	11.177	***

Source: AMOS-26 program analysis results.

It is noted from the table above:

1. there is an impact of lean management on the expert systems in the researched organization;

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2. there is an impact of lean management on knowledge representation and reasoning in the researched organization;

3. there is an impact of lean management on automatic machine learning in the researched organization.

4 RESULTS

1. artificial intelligence has gained high acceptance among the staff in the factories of the General Company for Automotive and Equipment Manufacturing as a tool for improving administrative work, increasing employee satisfaction and raising their level of performance;

2. the theoretical results indicated the importance of lean management and artificial intelligence for both production and industrial companies, as they are considered a reason for raising companies' ability to continuously develop on the basis of superior products to competitors, and to quickly adapt to meet the challenges imposed by the surrounding environment;

3. the theoretical results demonstrated the extent of the role played by the concept of artificial intelligence in enhancing lean management through the influence of information technology capabilities on the characteristics of lean management and an attempt to strive to keep pace with the reality of development witnessed by the production factories sector in the world;

4. the necessity of striving to enhance the characteristics, contents and indicators of artificial intelligence because they are the key to its success and the safety valve for its survival and maintaining its competitive position in the productive labor market.

5 RECOMMENDATIONS AND PROPOSALS

1. the first recommendation: Companies use artificial intelligence in all work functions and tasks so that it is one of the most important priorities. To achieve this recommendation, the following mechanisms can be followed:
   - creating modern technologies aimed at communicating between employees and management in exchanging information, reports, and tasks;
   - providing all the programs and technological tools necessary for workflow;

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- providing modern means of communication inside and outside the Automotive and Equipment Factories Company;
- training workers to use technology, especially advanced ones.

2. the second recommendation: Develop a mechanism or strategic plan for applying artificial intelligence in the company and work to support it by following the following mechanisms:

- accurately identifying the obstacles that contribute to the lack of use of information and communications technology within the company;
- allocating appropriate budgets to provide all modern programs and means of communication in the company;
- developing working cadres by involving them in training courses, by providing continuous and appropriate training opportunities, to achieve the principle of putting the right person in the right place;
- linking the incentive system to outstanding performance, and continuing to provide thanks and appreciation for the exceptional efforts and value provided by the employees of the Automotive and Equipment Factories Company.

6 CONCLUSION

Artificial intelligence represents an important and decisive stage towards moving to smart digital services and eliminating all forms of traditional management work that were based on writing using paper. This technology is based on the use of modern and advanced means and devices to eliminate bureaucratic problems in addition to raising the efficiency of the overall performance of companies and rationalizing communication. General and shortening the routine procedures that employees or workers suffer from, in addition to providing information and data in a simple way to benefit from the technological and digital progress taking place in the world.

The experience of the General Company for the Automotive and Equipment Manufacturing Company in the equipment and automobile manufacturing sector has been directed to represent an important turning point in the functions of these companies by facilitating the provision of products of any type, according to what information technology provides through a digital network of means and techniques, and this has saved workers the trouble of working. Routine and reducing distances during the artificial process.

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Despite the reforms undertaken by public companies for manufacturing equipment and automobiles, such as facilitating the acquisition of computers at reasonable prices, providing electronic outlets through machines that operate with artificial intelligence, changing the prevailing culture, and creating a good relationship between employees and senior management, based on prevailing trust and constructive participation, in a way that ensures achieving the required interaction with the products that... Provided by companies, they also open channels that allow employees to participate and express their opinion on the decisions taken by the Ministry of Industry and Minerals in general and the decisions of senior management in particular by recording employees' observations on the companies' work sites. However, this development remains relative compared to advanced companies and what they have achieved in the field. Information and communication technology, artificial intelligence, and lean management. The General Company for the Automotive and Equipment Manufacturing Company faces a kind of digital weakness that has hindered the general use of this technology. The reason for this is the lack of digital culture. The company, on the other hand, has great potential and chances to move forward to developing the use of information and communication technology and achieving an environment Powerful information.

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