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# Artificial Intelligence and Machine Learning as Business Tools: A Framework for Diagnosing Value Destruction Potential

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**Abstract**: Machine learning (ML) and artificial intelligence (AI) have the ability to save expenses and increase the efficacy of corporate operations. On the other hand, they also have the capacity to devalue a company's assets, which may sometimes have extremely catastrophic effects. It's possible that some managers won't accept new technologies because they can't fully understand and effectively manage the risks associated with doing so. This will prevent them from realising their maximum potential. The findings of this study provide a fresh paradigm for detecting and limiting the value-reducing potential of artificial intelligence and machine learning for businesses. In addition to outlining the components of an AI solution, this research also recommends this paradigm. The paradigm might be used to map the components of an artificial intelligence system. The concepts of value-generation process and content are then used to illustrate how the aforementioned dangers have the potential to obstruct the creation of value or even result in the loss of that value. In the interest of shedding some light on the topic of the commercial activation of artificial intelligence, this study does an in-depth and careful examination of the existing body of literature on the topic. In addition to that, a clear and succinct explanation of what constitutes artificial intelligence at the present time will be provided. The Implications, Applications, and Methods model (also known as the IAM model) has uncovered a total of six topics that are associated with these three primary topics of discussion. It is possible that academics and practitioners will find our study beneficial in that it provides an overview of the body of knowledge and research agenda. This will allow for artificial intelligence to be used as a strong facilitator in the process of producing business value.

***Keywords:*** *Artificial Intelligence, Machine Learning, Value Creation, Value Destruction, Business Innovation.*

## 1. Introduction

The phrase "artificial intelligence" (AI) has been riding a wave of popularity over the last several years. The relentless growth of its applications has had a significant and far-reaching effect, not just on businesses but also on private persons and communities. Companies have recognised important economic potential as a consequence of the use of AI in a variety of fields in order to boost their competitiveness, reengineer their products or services, or rethink their approach to business strategy. These objectives may be accomplished by using AI. It wasn't until the 1980s that the expert system paradigm reached extensive commercial success, clearing the way for the development of the first AI applications that were designed to generate a profit. Despite the fact that artificial intelligence (AI) was established as a field of study in the 1950s, it wasn't until the 1980s that the expert system paradigm achieved significant commercial success. Since then, the meteoric growth in computing power has contributed significantly to the company's success, helping to propel it to even greater heights. Because businesses seek to automate decision-making, enhance human performance, and raise human knowledge of complex systems, they are increasingly depending on artificial intelligence (AI) and the accompanying machine learning (ML) models to carry out their day-to-day operations. This is because AI and ML models can improve human understanding of complicated systems. It is projected that this pattern will maintain its prevalence in the not-too-distant future. Applications of artificial intelligence (AI) are having a considerable impact on both the corporate world and society as a whole as a direct result of large developments in computation, computing, and research, as well as the creation of approaches based on intelligent algorithmic development. Big Data, often defined as the availability of huge amounts of diversely

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organised information assets that are subject to rapid change, ensures that AI applications get a lot of attention. In addition to this, Big Data ensures that AI applications get a significant amount of attention. This is as a result of the fact that these sectors have made enormous development and that innovative algorithm-based approaches have an influence on both society and the economic world. In the research that will be covered in this article, an effort is made to construct a conceptual model of artificial intelligence in business activation by using technologies like as text mining and machine learning, in addition to carrying out an exhaustive examination of the relevant literature [1].

### ❖ Elements of a solution using AI

The term "artificial intelligence" (AI) refers to a set of technological components that, in a manner that is analogous to the way in which individuals make use of their intellect, can acquire data, analyse that data, and respond to it. AI programmes, much like humans, are able to apply rules, learn over time by taking in new information and acquiring new knowledge, and adapt to changes in their surrounding environment.

Despite the fact that AI applications are being implemented in an ever-increasing variety of distinct industries, the three components that make them up remain consistent at all times. The very first of these components is the information that is input into the system. A comparison has been made between artificial intelligence (AI) and mathematical fiction due to the fact that AI cannot function effectively without first receiving and evaluating input data. Due to its capability of analysing vast volumes of data, artificial intelligence is gaining growing significance in this new age of big data. This is because big data is becoming more important. Unstructured inputs such as sights, sounds, and conversations are now able to be taken into consideration by artificial intelligence systems in addition to structured inputs such as data from financial transactions. This signifies a significant change that has taken place in the region. The applications of artificial intelligence are used in a wide variety of company types, and these firms make use of historical data. A fraudster may, for instance, check through transaction data in order to find instances of payment fraud. In addition to the kind of IP connection that is currently being used, the billing and delivery addresses are included in this information as well. Artificial intelligence (AI) has the potential to make use of real-time data that has been collected either via the use of physical sensors or by watching the behaviour of internet users. If a consumer is using a retailer's Wi-Fi to read the website of a rival company, the retailer's artificial intelligence programme may employ beacons to follow the user while they are inside the shop as well as other information to assess whether or not to offer the customer a discount. AI may also go through the data of the organisation in order to establish whether or not previous product offerings were accepted by the same clientele or whether or not they were rejected [2].

The subfield of artificial intelligence (AI) known as machine learning (ML) is often regarded as the field's second-most essential component. When analysing the data inputs, the computational approach is what is employed to do the analysis. The three most common types of machine learning algorithms are supervised learning, unsupervised learning, and reinforcement learning. There are a number of other classifications for machine learning algorithms as well. Within the larger domain of machine learning, the subfield known as supervised machine learning (ML) is the one that is responsible for delegating human experts the duty of providing the computer with training data sets that include the appropriate inputs and outputs. As a consequence of this, the algorithm may recognise patterns and formulate rules that it will be able to apply in the future [3].

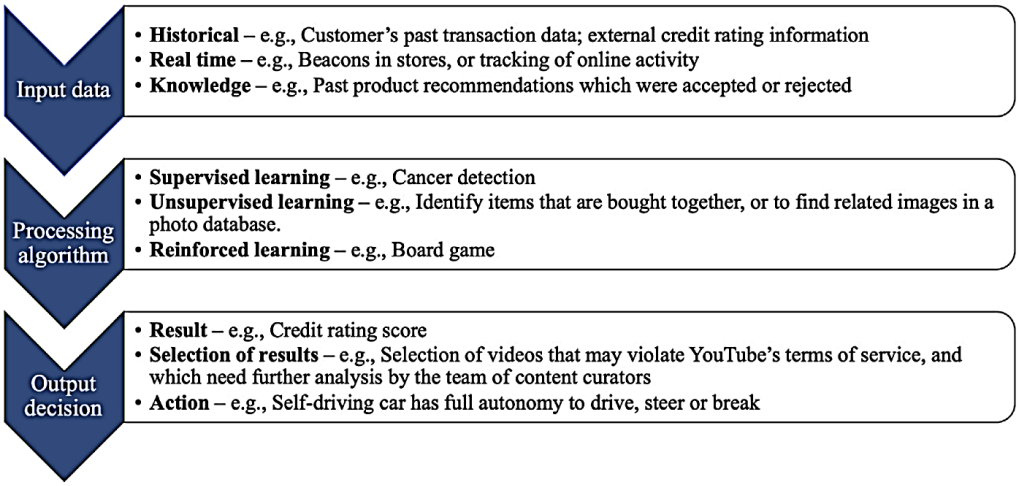


**FIG 1:** IMPORTANT ELEMENTS OF AN AI SOLUTION

occurrences of the same problem in its totality in a given context. For instance, artificial intelligence may be trained to spot minute cell changes in MRI data in order to detect the early stages of cancer. As a direct consequence of this, treatment and diagnosis may begin at an earlier stage. In contrast, the computer is provided with a training data set for unsupervised learning that consists of inputs but no labels in order to learn without being directed. The purpose of the algorithm is to identify the approach that will be most useful in classifying the data points and determining the possible linkages that exist between them. It is possible that marketing and sales efforts will be helped if this strategy is used, for instance, to discover products that are purchased in pairs and then to advertise those findings once they have been compiled. The process of machine learning concludes with the step known as reinforcement learning. In this situation, the algorithm is provided with a target and a set of data for training purposes; it is the algorithm's responsibility to decide the most effective sequence of operations to carry out in order to achieve the goal. In order for this to function well, there has to be a predetermined set of criteria for analysing the several approaches that may be taken to triumph in the game, as well as rewards for the activities that it carries out [3].

The last and critically significant component of AI is the output decision that is reached as a direct result of the ML process. At its most fundamental level, artificial intelligence is only capable of producing a single outcome, such as a "deception score." This is only one example among many. If the analyst does not decide to take any action based on this result, the result will have no performativity value linked to it. An additional possibility is that the algorithm may provide a list of discoveries that call for further investigation by human analysts. This might involve the labelling of items for review by the administration of the platform. Self-driving cars, for instance, are able to move, steer, and stop without the need for a human driver to intervene at any point in the process. According to the results of their research, certain AI systems have the potential to behave on their own without human intervention [4].

## 2. Review of Literature

The assumption that artificial intelligence (AI) is a technology that would disrupt business in a manner that is chaotic and disorganised has been generated by academic and professional publications. In the interest of shedding some light on the topic of the commercial activation of artificial intelligence, this study does an in-depth and careful examination of the existing body of literature on the topic. In addition to that, a clear and succinct explanation of what constitutes artificial intelligence at the present time will be provided. In this study, a corpus of 3780 submissions is evaluated using two well-known machine learning approaches: Latent Dirichlet Allocation, often known as LDA, and Hierarchical Clustering. Together, these methods make up machine learning. In addition, a list of potential new trends has been developed, and a comprehensive explanation of the many distinct types of research that are now being carried out has also been provided. The study offers light on a total of six unique topics, each of which may be placed into one of three separate categories: implications, applications, or techniques. It is possible that academics and practitioners will find our study beneficial in that it provides an overview of the body of knowledge and research agenda [5]. This will allow for AI to be used as a strong facilitator in the process of producing business value.

Machine learning (ML) and artificial intelligence (AI) have the ability to save expenses and increase the efficacy of corporate operations. On the other hand, they also have the capacity to devalue a company's assets, which may sometimes have extremely catastrophic effects. It's possible that some managers won't accept new technologies because they can't fully understand and effectively manage the risks associated with doing so. This will prevent them from realising their maximum potential. The findings of this study provide a fresh paradigm for detecting and limiting the value-reducing potential of artificial intelligence and machine learning for businesses. Not only does this paper define the components of an AI solution, but it also makes a suggestion on this paradigm. A mapping of the components of an artificial intelligence system might be accomplished using the paradigm. We explain how the distinctions between AI and ML have the potential to compromise the accuracy of an AI system's inputs, processes, and outputs, and we present examples of how this may take place. The concepts of value-generation process and content are then used to illustrate how the aforementioned dangers have the potential to obstruct the creation of value or even result in the loss of that value. In conclusion, we take a look at some alternative options and demonstrate how our framework may be used by using the example of a customer service Chabot that is driven by AI [6].

Because it simplifies processes, increases productivity, and offers a variety of strategies to speed up communication, artificial intelligence is currently employed in almost every aspect of business. This is because it was developed. A significant number of the tasks that were formerly completed by employees and workers are now being done out by machines that have artificial intelligence (AI) systems, software, or software applications installed on it. In the past, humans were responsible for doing these tasks. As a direct consequence of making the transition to an automated workplace, the organisation was able to reduce a large number of

expenses that were not required, save a significant amount of time, and progressively increase their earnings. The use of artificial intelligence (AI) to automate a variety of business processes has allowed for significant improvements to be achieved in the management and production of a great number of companies and organisations. This essay does a great job of outlining how businesses may stand to benefit from adopting cloud computing, artificial intelligence, and machine learning [7].

Both artificial intelligence (AI) and machine learning (ML) have the potential to save costs while simultaneously improving the efficiency of business processes. However, the value of firms might be significantly reduced as a result of these technologies. Certain managers make the choice to delay the adoption of new technologies, which prevents them from fully using the potential benefits that these technologies give as instruments for doing business. This decision limits the managers in question from employing these technologies to their maximum potential. This is due to the fact that they are unable to understand how AI and ML may lead to a decline in value for enterprises and how to effectively manage the risk that this may bring. This article proposes a unique paradigm for recognising and regulating the value destruction potential of AI and ML for businesses, as well as for mapping the components of an AI solution. This paradigm may also be used to map the components of an AI solution. The study attempts to make progress towards both of these objectives. A mapping of the components of an artificial intelligence system might be accomplished using the paradigm. We show that the distinctions between AI and ML, and how these distinctions manifest themselves, pose a threat to the correctness of an AI system's inputs, processes, and outputs by illustrating how these distinctions influence each of these characteristics. Using the concepts of value creation content and value creation process, we were then able to conceptualise how these risks may impede the process of value creation and actually contribute to the destruction of value. This was accomplished by focusing on the value creation content. In the last part of this discussion, we will discuss how to fix the problems that were discovered when conducting a case study on the implementation of an AI-powered chatbot in customer care. This is an example of how our design may be used [8].

## 3. Identifying Artificial Intelligence's Value Destruction Potential

The concept of value serves as the driving force behind all good business writing. Many people who came before them had the belief that the primary objective of an organisation was to produce value. This may be accomplished either directly via the activities of the company itself or indirectly through the production of the goods and services that customers wish to purchase. On the other side, the destruction of value is always a possibility and may sometimes even bring about the downfall of organisations that were once market leaders in their respective sectors. This is because value can be destroyed in a number of ways. Taking into consideration the processes that are involved in both the creation and destruction of value [9].

### ❖ What are value erasure and erasure of value?

The addition of anything that improves the performance of the individual for whom the value is intended is an example of value creation. This is the most fundamental definition of value creation. It occurs when the positive aspects of a business choice, such as the introduction of a new product, are greater than the negative aspects of the same activity. The concept of value is one that is not only relative to the person but also to the circumstances. It is specific in the sense that it relies not only on how well it suits the work at hand, but also on how much better and more costly it is in contrast to the alternative that is otherwise the most comparable in all other respects. This makes it a unique circumstance. It is not objective since the person who will be utilising it makes the decision on how it should be used. Because the value depends on the specifics of the situation, we need to evaluate AI and ML not only in the context of the ongoing business activities, but also in relation to any possible expenditures that may be considered alternatives. The opposite of value creation is value destruction, which occurs when the person for whom the product or service was designed recognises a decline in its usefulness. It is possible for diverse stakeholders to have contrasting opinions on the success or failure of a project's outcomes, as well as the criteria that need to be used in order to arrive at a conclusion regarding which of these two categories applies.

There is the potential for value to be created with solutions that are innovative, effective, or complementary. When something new is generated, it does so by either combining components that already exist in unconventional ways or by adding new elements to combinations of elements that already exist. Complementarity may be increased by the incorporation of resources that have network effects, while efficiency can be improved through the simplification of operations. When evaluating the usefulness of artificial intelligence and machine learning in a business setting, one of the most important things to do is work out how much it will cost to use these technologies. Artificial intelligence (AI) solutions are considered to be more effective, more inexpensive, and error-free than their human counterparts, particularly when they are utilised for mechanical and analytical processes. Self-driving cars, for instance, could

be able to avoid collisions with other vehicles on the roadside more successfully than people. On the other hand, it is also highly prized when AI, and specifically ML, can deliver unique results. This may include the finding of previously uncovered patterns in existing data sets or the construction of innovative solutions to existing problems. Both of these are considered to be unique outcomes. Because of the networking capabilities of AI and ML, for instance, a fleet of self-driving autos may consist of a range of vehicles that are designed to operate in conjunction with one another to achieve optimal results. Because both AI and ML have the capability to network, this is now something that can be done.

It is imperative that businesses take every precaution to avoid underestimating the expenses associated with artificial intelligence and machine learning, particularly the risk that their brand may be damaged. For instance, the public's worry about the ethical dilemmas highlighted by the algorithms employed in self-driving cars, such as whether or not to prioritise the safety of passengers above the protection of observers, "risks marginalising the entire field." The cost estimate may fail to take into account possible trade-offs between aspects such as the speed of calculation and confidence, or the correctness of the technique and its interpretability. The terms of these concessions may be revised at a later date. For example, a corporation may use this strategy in order to improve the algorithm's accuracy over the long run while preserving some of its flexibility with regard to the near term. It's possible that the company's goal is to improve the algorithm's accuracy over the long run while still allowing for some flaws over the short term. In order to cut down on these mistakes, the company may invest money to train the algorithm using quality inspectors. The starting of the firm is also something that has to be taken into consideration as a component. Adopting AI and ML will confront a number of different companies with their own specific challenges. This is because of the wide range of capabilities that are now available in regard to the management and analysis of vast amounts of data.

❖ **How value is created and destroyed**

The creation of value is accomplished by a series of sequential actions that, when carried out simultaneously, result in an overall betterment of the circumstance. On the other hand, getting rid of anything of worth has a negative impact on the outcome of the situation. In the body of research that has been done on the topic of value creation, the factors that contribute to value destruction, often known as antecedents, have not garnered a significant amount of attention. However, managers are obligated to have an understanding of the factors that lead to a decrease in value in connection to the specific phases at which these problems manifest themselves. When managers have this information at their disposal, they have a better chance of identifying future problems and deciding whether to take preventive or remedial action. The normative literature provides recommended procedures and authoritative guidelines to follow in order to ensure that one is successful in achieving their goals. According to this point of view, value might be lost if a business breaks the norms that govern how it interacts with its customers and clients, particularly if the attempt to complete the process is unsuccessful. On the other hand, one may make the case that traditional strategic frameworks are insufficient when it comes to defining how value can be derived from big data and the digital environment, in particular for AI solutions.

In the event that the participants do not have access to necessary resources, there is a possibility that value will be destroyed. When it comes to the development of artificial intelligence (AI) solutions, issues such as a lack of access to important data, inadequate information interchange, and a lack of resources in information technology (IT) are especially pertinent. It has been shown that an insufficient amount of information technology resources "destroys value in a firm rather than simply fails to add any." Even further, Goldstein and Bearish go so far as to suggest that a company's value-creation activities might be delayed more by an insufficient IT infrastructure than by a data security catastrophe. This is a bold claim, but Goldstein and Bearish back it up with evidence. Despite the fact that this is a bold assertion to make, Goldstein and Bearish make it anyhow. In order to produce value, businesses must also be willing to adjust to shifting circumstances and make necessary adjustments to their operations. Utilisation of digital technology, in particular, mandates that organisations modify the manner in which they communicate with their stakeholders as well as the behavioural models that they use. However, research has shown that many firms find it difficult to adjust the processes and procedures that they use for strategic decision-making in order to account for the changes that have been brought about by big data, artificial intelligence, and other technologies. Numerous businesses are forced to deal with this issue on a daily basis [10].

## 4. Research Methodology

A mixed-methods approach is utilised as part of the research methodology for the paper titled "Artificial Intelligence and Machine Learning as Business Tools: A Framework for Diagnosing Value Destruction Potential." This is done in order to carry out an in-depth investigation into the effects that AI and ML have within the context of business environments. This tactic was chosen because it paves the way for a more in-depth understanding of the situation than any other alternative. The data collection process makes use of primary sources, such as questionnaires and interviews conducted with

professionals in the business world. On the other hand, secondary sources include activities such as doing an exhaustive literature research and reading company reports. Developing and analysing a conceptual framework is the objective of the exploratory research technique, which aims to determine how much of a threat to value is presented by the use of artificial intelligence and machine learning. The information that was acquired is analysed statistically, which may include regression and content analysis, and the findings are presented in a structured manner. By taking into consideration concerns such as informed permission and data protection, the method guarantees that the procedure for conducting research is carried out in a manner that is both ethically sound and open. In conclusion, the implementation of this form of research allows the methodical and exhaustive examination of the subtle relationships between AI/ML and economic value, therefore supplying the industry with knowledge that is beneficial.

**TABLE 1:** IMPACT METRICS IN MULTIPLE DIMENSIONS

| Years | Impact on business | Human implications | Industry-specific applications | the use of social media | predictive strategies | Recognition procedures | Total |
|---|---|---|---|---|---|---|---|
| 2013 | 27 | 8 | 12 | 15 | 16 | 14 | 15.33 |
| 2014 | 42 | 17 | 15 | 23 | 18 | 7 | 20.33 |
| 2015 | 32 | 12 | 8 | 18 | 23 | 14 | 17.83 |
| 2016 | 34 | 4 | 32 | 23 | 28 | 15 | 22.67 |
| 2017 | 57 | 5 | 16 | 34 | 25 | 14 | 25.17 |
| 2018 | 45 | 24 | 23 | 45 | 45 | 32 | 35.67 |
| 2019 | 76 | 26 | 35 | 39 | 58 | 35 | 44.83 |
| 2020 | 87 | 45 | 78 | 68 | 67 | 46 | 65.17 |
| 2021 | 156 | 112 | 167 | 118 | 108 | 109 | 128.33 |
| 2022 | 209 | 178 | 359 | 223 | 178 | 145 | 215.33 |
| 2023 | 37 | 39 | 87 | 54 | 43 | 49 | 51.5 |
| Grand Total | 802 | 470 | 832 | 660 | 609 | 480 | 642.17 |
| Total | 133.67 | 78.33 | 138.67 | 110 | 101.5 | 80 | 107.03 |

A comprehensive record of multiple metrics obtained over the course of eleven years is shown in Table 1 as evidence of the implementation of artificial intelligence (AI) and machine learning (ML) technologies in a variety of contexts. This evidence is presented in the form of a table. These indications reflect how the technology is being used and how it is having an affect. The table provides information on a variety of topics, including the use of methods for prediction and recognition, the ramifications for both businesses and individuals, and the social and commercial applications of the findings. The range of potential applications and significance of AI and ML in each interconnected field is shown by the values included inside each column for the years 2013 through 2023. On the timeline, each individual row denotes a specific year. Below the row in the table labelled "Total" that displays the total amount, the row that follows it displays the average values for each dimension. This offers a general perspective on the impact as a whole. The "Grand Total" row includes a summary that provides an overview of the accumulated effects of AI and ML across all dimensions and over all of time. This row displays the aggregate effect in its entirety, including all of its individual components. It is possible to utilise the data shown in this table to get an understanding of how artificial intelligence and machine learning technologies have progressed over the course of the last eleven years and how they have impacted several aspects of business, society, and daily life.

- **Text mining to Find Literature Reviews**

Through the development of a literature review, it is possible to determine the most significant contributions to the expansion of scientific knowledge. This is made possible by the fact that it is simple to identify both the gaps in knowledge that researchers and experts are still required to complete as well as the ones that prompted the need for more research to be carried out. Since our review of the relevant literature covers the whole decade, we will need an in-depth analytical strategy that is centred on the identification of important patterns. As a result of recent developments, such as the proliferation of the Internet and the accessibility of a large number of journals and scientific papers in electronic format, it is now possible to conduct a thorough review of all the published information related to a topic while simultaneously reducing the likelihood of overlooking important sources. This is made possible by the fact that recent developments have made it possible to do so. Text mining techniques were used in order to conduct an in-depth investigation of the previously published research on the text strings that were directly obtained from the articles themselves. A collection of N clusters of texts has been formed by various research approaches, and this collection was occasionally produced using traditional clustering algorithms. In accordance with the purpose of Milligan and Cooper's research, each cluster denotes a distinct topic that has been investigated as part of the ongoing investigation.

Due to the complexity of the subject matter as well as the inherent interdisciplinarity of the corpus articles, we have decided to use hybrid membership models. This decision was made for a number of reasons. Because they enable individual units to concurrently and to variable degrees belong to many groups, these models are superior to other available possibilities. As a consequence of this, whenever an element is considered, the membership percentage, which is also known as a vector of positive variables that sum to 1, offers information on the degree to which the element belongs to the group that is being considered. Using mixed membership techniques rather than the usual clustering methodology is one way to possibly disprove the hypothesis that all of the units are a part of the same cluster. The LDA model, also known as the Latent Dirichlet Allocation model, is now considered to be one of the most well-liked mixed membership models available today. In the past, it was used in the process of evaluating both the definitions of numerous terminologies associated with a certain area of research and the contents of a variety of written works.

- **Latent Dirichlet Allocation (LDA)**

It is common practise to use a generative probabilistic model known as LDA in order to ascertain the way in which a body of information is organised in terms of its respective topics. The text that is inputted may be regarded of as a collection of discoveries that are the product of a random generation process and also includes components that were not known in the past. This is one way of thinking about the text. These criteria could be able to indicate how the topical structuring of the documents is reflected in the frequency of a phrase in connection to a subject that is being addressed in the text. In addition, a comparison of the two articles may be made using such criteria. In its most basic form, each topic may be seen as a probability distribution across vocabulary phrases that are constructed using each and every word in the corpus. Because of the massive number of words included in the corpus, any piece of writing that is a part of the collection will be linked to a diverse assortment of K topics. If the requirements that are listed below are satisfied, it is possible to use a tuple with the values "x" i=1 i=Kof integers to indicate the relative frequency of K topics in a text. This can be done if the tuple is constructed correctly. In order to accomplish this goal, a tuple that contains the values "x" i=1 i=Kof numbers may be used.

$$\sum_{i=1}^{K} x_i = 1 \text{ and } x_i \geq 0 \; \forall i \in [1,K]$$

It describes how a Dirichlet distribution may be supported if it were implemented. The use of LDA will result in three different outcomes. The first thing that has to be done is to calculate the percentage of each document that pertains to the subject. A matrix with the dimensions N K will be constructed as a result of this, where N stands for the total number of documents in the corpus and K stands for the total number of subjects. The second component, which is also known as the per-word topic assignment, is what determines the possibility of any particular word occurring inside a certain subject. This probability is based on the word's topic assignment. This probability is based on the second component. It shouldn't come as a surprise that generating a list of the most important phrases might serve as an easy alternative to producing such output. These are the words that illustrate the highest degree of probability associated with each issue and point a human reader in the direction of the particulars that are most relevant to the description of the subject. Third, we may also extract the per-corpus topic distribution, which demonstrates the frequency of each subject over the whole of the articles that make up the body of the research project. By reading both the list of topic keywords and the articles in the corpus that demonstrate each topic to be very prevalent, a human evaluator could be able to detect and classify a subject's conceptual content. This would include reviewing both the list of topic keywords and the articles in the corpus. This would include looking at the articles in the corpus as well as the list of keywords related to the issue at hand. Accomplish this goal more easily if you read the articles included in the corpus as well as the list of topic keywords.

❖ **Implementation of the methodology**

➢ ***Data collection and preparation***

The Elsevier In line with the method that was provided, Scopus was used in order to obtain a list of the input documents. We searched Scopus for publications that dealt with both Artificial Intelligence and Business activations. In order to do this, we ensured that the keywords for the paper's title, abstract, and body included the phrases "Artificial Intelligence," "Machine Learning," and Business Studies. On March 28, 2020, our staff sent an export of a list including 6,031 conference and journal papers. there has been an increase in the amount of research carried out on Big Data and AI in recent years, particularly around the years 2013 and 2014. After preprocessing the data, we conducted a secondary analysis in which we concentrated on the 3,780 articles that were still available. Before using the LDA in this study, we first looked at publications whose titles included the full phrases "Big Data" or "Artificial Intelligence." This was done before we choose to use the LDA. After removing all punctuation and white space, we were left with tokens that were single words. The only exception to this rule were compound words that had dashes inside themselves. After all of the uppercase letters had been transformed to lowercase, the corpus was stemmed using Porter's method, which produced the root of each word and removed its suffix. In addition, we got rid of conventional English stop words such as articles and conjunctions, along with other things that were unnecessary, such as years and copyright information.

➢ ***Latent Dirichlet Allocation (LDA)***

The number of themes that are denoted by the letter k was determined by the authors by selecting the model whose output they believed to be the easiest for the reader to comprehend. After running LDA with each and every integer number that could be used for k, we found that setting k to 6 created the model that was the clearest and most straightforward to comprehend. As a direct consequence of this, we arrived to the realisation. Studying the words that were most significant to the definition of each issue, which was done afterwards to demonstrate the robustness of the finding, led us to the conclusion that these phrases were generally connected to the conceptual domain that was being taken into consideration in the research. This was the case when we examined the words that were most important to the definition of each problem.

## 5. Analysis And Interpretation

In terms of the intellectual substance, the following is a list that contains the names of each of the six themes, grouped according to the central concept that each theme represents: Tables T01 through T06 provide an in-depth look at the commercial implications, the human implications, the industrial applications, the social applications, the prediction procedures, and the recognition methods, respectively. In order to do this, we carried out a more in-depth investigation of the material that lies underneath the themes, taking into consideration a total of 3,853 contributions made during the course of the research (2013-2023), as shown in Table 2.

**TABLE 2:** APPRECIATED CONTRIBUTIONS ORGANISED IN ACCORDANCE WITH THE SIX DISCOVERED THEMES

| Year | Business implication | Human implications | Industries applications | Social applications | Predictive methods | Recognition methods | Grand Total |
|---|---|---|---|---|---|---|---|
| 2013 | 27 | 8 | 12 | 15 | 16 | 14 | 92 |
| 2014 | 42 | 17 | 15 | 23 | 18 | 7 | 122 |
| 2015 | 32 | 12 | 8 | 18 | 23 | 14 | 107 |
| 2016 | 34 | 4 | 32 | 23 | 28 | 15 | 136 |
| 2017 | 57 | 5 | 16 | 34 | 25 | 14 | 151 |
| 2018 | 45 | 24 | 23 | 45 | 45 | 32 | 214 |
| 2019 | 76 | 26 | 35 | 39 | 58 | 35 | 269 |
| 2020 | 87 | 45 | 78 | 68 | 67 | 46 | 391 |
| 2021 | 156 | 112 | 167 | 118 | 108 | 109 | 770 |
| 2022 | 209 | 178 | 359 | 223 | 178 | 145 | 1292 |
| 2023 | 37 | 39 | 87 | 54 | 43 | 49 | 309 |
| **Grand Total** | **802** | **470** | **832** | **660** | **609** | **480** | **3853** |

In order to investigate the manner in which the corpus under research is organized thematically, we developed a network model that was based on the findings of the LDA. The degree of distance separating the various subjects was represented by the network's edges, and each individual topic received a node of its own in the network. When determining the importance of the inter-topic distance, the degree of topic present correlation that was found throughout the whole of the corpus of texts is taken into consideration. We produced a correlation matrix denoted by the letter R by doing the calculation of the pairwise Pearson correlation for each subject area. The results of our analysis of this matrix are shown in Table 3, which may be seen below. In order to generate a distance matrix using Glynn's approach, we made use of the equation D = R - 1. This was done because we had the presumption that a higher amount of separation between two topics would be associated with a lower degree of correlation.

**TABLE 3:** R'S MATRIX OF INTER-TOPIC CORRELATION

| | **Business implication** | **Human implications** | **Industries applications** | **Social applications** | **Predictive methods** | **Recognition methods** |
|---|---|---|---|---|---|---|
| Business implication | 1.32 | -0.33 | -0.12 | -0.43 | -0.25 | -0.21 |
| Human implications | -0.23 | 1.89 | -0.15 | -0.33 | -0.25 | -0.29 |
| Industries applications | -0.12 | -0.16 | 1.23 | -0.23 | 0.17 | -0.14 |
| Social applications | -0.21 | -0.22 | -0.22 | 1.54 | -0.08 | -0.12 |
| Predictive methods | -0.23 | -0.32 | -0.35 | -0.19 | 1.09 | -0.22 |
| Recognition methods | -0.31 | -0.29 | -0.12 | -0.43 | -0.13 | 1.78 |

The graphical result displayed in was achieved by using the matrix D as a distance matrix for the topic network and making sure the width of the edges reflected the pair-wise distance that was recorded in D. This allowed us to produce the output shown in. The size of the nodes has a negative correlation with the relative frequency of the themes that appear in the texts that make up the corpus. There is a negative association between edge-width and the inter-topic distance, which can be calculated by looking at pair-wise correlations between the topics in the corpus.

## 6. Result and Discussion

The results of the investigation as well as the implications they have are taken into consideration. At the beginning of this part, both the results of the research and some examples illustrating how the produced techniques have been used to evaluate the potential for value loss that may be caused by AI and ML in a variety of business contexts are offered. The examples illustrate how the created methods have been applied. It demonstrates the circumstances under which the value of these technologies has grown as well as those circumstances under which the value has decreased. In addition to this, it does research on the factors that influence these outcomes, such as the precision of the algorithms, the amount of expertise possessed by the workforce, and the degree to which the strategy is aligned. This section shows the utility of the framework for understanding the value implications of various alternatives by utilising both hypothetical scenarios and actual data from the real world. In addition to this, it offers a critical analysis of the benefits as well as the drawbacks that are presented by the framework. This section gives a summary of the findings of the study and sheds light on the intricate link that exists between AI/ML and economic value, in addition to elaborating on the relevance of this connection for the long-term objectives and operational procedures of organizations.

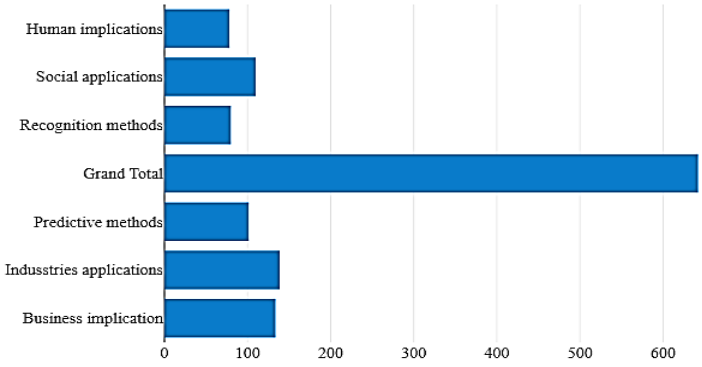


**FIG 2:** MULTIDIMENSIONAL IMPACT METRICS

In the context of the business consequences shown in Figure 2, the lowest value is 27, and the highest value is 802; the mean value is 133.67; this value is calculated using the data. This figure most likely illustrates the usual influence or the impact of specific factors on the operations of the company. The fact that these components are relevant across a range of industries is shown by the fact that Applications received a mean score of 138.67. The usage or effectiveness of prediction instruments is represented by the prediction Methods category, which has an average score of 101.5. The Grand Total column, which has a total of 642.17, provides a comprehensive picture of the cumulative effect and underlines the combined influence of all of the indicators via its use of a grand total. The "Recognition Methods" category, which has a mean score of 80, indicates the application or application of recognition techniques. The fact that social apps, on average, get a score of 110, lends credence to the notion that these components are relevant or accepted in social contexts. The last category, Human Implications, has a mean score of 78.33 and illustrates the effects or consequences that the phenomenon has on human-related traits. The range of variability and relevance is shown by these metrics' minimum and maximum values. For example, the smallest value for Business Implication is 27, which represents the least seen influence, and the highest value for this measure is 802, which shows the largest observed impact. Both of these values reflect the range of possible outcomes and relevance.

Figure 3 presents a selection of the several statistical analyses that may be carried out in order to determine whether or not a dataset adheres to the normal distribution. These tests are essential for statistical analysis because they assist determine whether or not a dataset follows the normal distribution. The normal distribution is the foundation for a large number of statistical procedures, therefore knowing whether or not a dataset follows the normal distribution is essential. The results of four separate normality tests are shown in the table below. These models are referred to as the Shapiro-Wilk, Anderson-Darling, Kolmogorov-Smirnov, and Kolmogorov-Smirnov (Lilliefors Correction), respectively. It provides the p-value for the null hypothesis, which states that the data have a normal distribution and serves as the foundation for each test. The p-values are very important for determining whether or not the data deviates significantly from the normal distribution. The findings shown in the table provide evidence that the data do not adhere to the characteristics of a normal distribution. This assertion is supported by the fact that the p-values obtained from all four tests were, on average, rather low. In particular, the p-values that were below the commonly accepted significance level of 0.05 (expressed as.001 in the Shapiro-Wilk and Anderson-Darling tests) were especially convincing. The title of the table, which reads "Statistical Normality Tests for Data Distribution," makes it very obvious that the purpose of the table is to determine whether or not the data follow a normal distribution.

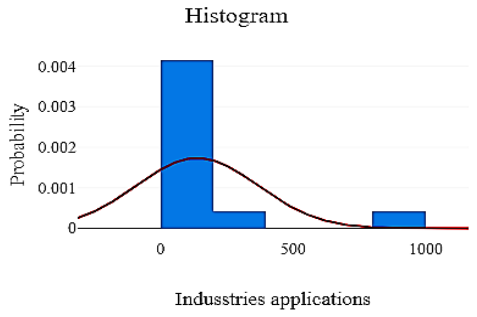


**FIG 3:** TESTS TO ENSURE THAT INDUSTRIAL APPLICATIONS ARE DISTRIBUTED NORMALLY

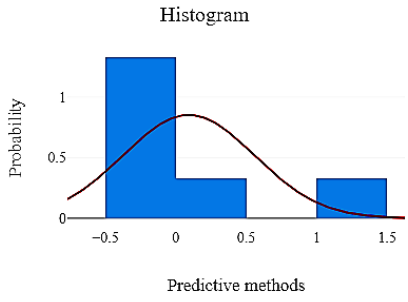


**FIG 4**: PREDICTIVE APPROACH TESTS FOR NORMAL DISTRIBUTION

Figure 4 presents a number of statistical tests that may be used to determine whether or not a dataset follows the normal distribution. These tests are essential for statistical analysis because they indicate whether or not the data adhere to the normal distribution (also known as the Gaussian distribution), which is a fundamental principle underlying a great deal of statistical methodology. The following normality tests were performed: Shapiro-Wilk, Anderson-Darling, and Kolmogorov-Smirnov with Lilliefors Correction. The results of each of these tests are shown in the table below. The p-values that correspond to each test are shown below, with lower p-values indicating a departure from normality in the data. The results of the Shapiro-Wilk and Anderson-Darling tests in this case have p-values that are much lower than the standard significance level of 0.05, which indicates that the data do not follow a normal distribution in any significant way. However, neither the Kolmogorov-Smirnov test nor the Kolmogorov-Smirnov test (Lilliefors Correction) identify any meaningful deviations from normality. The purpose of the table is to provide assistance to researchers in identifying whether or not the dataset they are working with is normal and in deciding whether or not certain statistical studies are appropriate for their data depending on the distribution of the data.

### ❖ Human Implications

AI can provide support for human resource management (HRM) in the workplace by influencing methods and environments, ensuring greater activity effectiveness and efficiency both in terms of time and costs, as well as in the quality of the activity that is carried out, and offering itself as a legitimate ally to human work. These benefits can be realised in a number of ways. The combination of artificial intelligence and analysis of big data may provide further opportunities for the automation of service-desk business procedures. The constant development of technology and business settings presents managers with continuing challenges, including the need to produce knowledge and establish internal skills. These challenges are compounded by the fact that managers are expected to respond to these challenges in a timely manner. As a result of the fact that AI assures a rise in individual productivity as well as a decrease in the expenses associated with project execution, it has typically been recognised as a business enabler. Additionally, as was previously said, artificial intelligence acts as a "ally" in the management decision-making process. This is because AI assists human judgement and decision-making processes in areas like as strategy, planning, execution, and actions. Because data science and artificial intelligence have become such mission-critical activities, businesses have been compelled to rethink their organisational structures in order to make room for new professional positions that are centred on data. These new positions include Data Scientists, Data Analysts, Analytics developers, and big data Systems Engineers. It was necessary to do this in order to create way for these extra jobs. There are a lot of ethical problems that have been brought to light, and the majority of them revolve around the evolving concept of privacy and the decisions that businesses may need to make about how deeply they should dive into the private lives of individuals and how far they should push the boundaries of data collecting.

### ❖ Social Applications

Publications that concentrate on the use of AI in social applications demonstrate the practicality of the technology when it comes to enabling marketing research to comprehend the social behaviors of customers. On the other hand, solutions that are based on artificial intelligence (AI), fuzzy logic, and artificial neural networks (ANN) make it possible to handle unanticipated events that are associated with the formulation of marketing programmers. This is accomplished via the use of artificial neural networks. The primary contributions are focused on completing mundane chores and spreading information and knowledge that is of mutual interest, with the end objective of providing goods of increasing value to consumers. By developing descriptive models that may be used in optimisation processes, AI may be able to assist with improving consumer choice knowledge. Because of the increased proximity to clients that contemporary technology makes possible, the relationship that exists between a business and its clientele is one that is both more robust and more profound. In addition, data is vital for supporting marketing strategies such as automation and extrasensory experiences, as well as for enabling tailored offers to be made to customers based on an AI-based inference of the chance that a client will make a purchase.

### ❖ Business Implications

This topic presented how artificial intelligence (AI) influences the administration and operations of organisations, presenting exciting commercial ramifications. The papers that have been written on this topic include in-depth descriptions of the procedures of data-driven decision making, process mining, and automation. Since the 1970s, AI has been put to use in the construction of Decision Support Systems (DSS), which have shown to be effective in the generation of knowledge by transforming meaningless data into information. Artificial intelligence was included into the creation of decision support systems (DSS). According to Davenport's research, there are primarily three ways in which artificial intelligence can be beneficial to organisations: first, by automating administrative, financial, and bureaucratic tasks through Robotic Process Automation; second, by identifying hidden models in the

data and assisting managers in the interpretation of the meaning; and third, by enhancing employee or customer emotional involvement through chat-boxes and other human-like connections. According to this point of view, artificial intelligence will help the symbiosis between people and machines by allowing researchers to educate complex machines by asking AI to make decisions that need high cognitive skills but were previously deemed to be unfeasible. In other words, AI will make it possible for researchers to train sophisticated robots. Despite this, it is very uncommon to find situations in which powerful, intelligent robots that have been subjected to specialised training are granted the right to make judgements without needing the consent of a human being at the end of the process. The development of Expert Systems (ES), which can imitate human cognitive processes and explain the criteria that lead to particular findings, is another economic advantage of adopting AI. ES may help explain how certain conclusions were determined. The literature on this topic discusses a number of different commercial repercussions, one of which is the growing significance of process mining. Process mining is the capability of using artificial intelligence to conduct an analysis of log data in order to identify important trends, patterns, and opportunities for improving the effectiveness of business procedures.

## 7. Conclusions

Expertise in this field has become more dispersed as a direct result of the meteoric development in the number of business applications for artificial intelligence. This study presents the conclusions of a comprehensive examination of the published research on artificial intelligence (AI) business activation that was carried out over a period of ten years. The analysis was carried out by the authors of this study. We have constructed a hierarchical structure that is two-tiered and highlights the primary areas of research that are now being conducted as well as prospective future advancements. We employed a new combination of two established methods of machine learning known as latent Dirichlet allocation (LDA) and hierarchical clustering to produce topic structures that can be comprehended by humans. These methods are latent Dirichlet allocation (LDA) and hierarchical clustering, respectively. The following is a list of these many approaches. As a reaction to RQ1, we have formed three primary areas of focus, which we collectively refer to as IAM, which is an acronym standing for implications, applications, and models. Each topic is broken down even further into two subtopics, which are titled "Business and Human Implications," "Industrial and Social Applications," and "Prediction and Recognition Models," respectively.

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