DEVELOPING A NEW BUSINESS OPPORTUNITIES
VIA ARTIFICIAL INTELLIGENCE:
NEW STRATEGIC MANAGEMENT MODEL

Prof. Dr. Sayed Mahmoud El Sayed El Khouly

Professor of Business Administration. Faculty of Business. Ain Shams University

Eng. Kareem Yasser, IT Consultant

Dr. Engy Ahmed Yehia

Assistant Professor of Business Administration. Faculty of Business. Ain Shams University

ABSTRACT

As we are living in the fourth industrial revolution era which is differentiated by the speed of technological breakthroughs, the enormous amount of data available can't be handled by the traditional analytical methods to generate new business opportunities. This study will tackle the optimization cycle by analyzing large amounts of usable data to create business opportunities. It provides a model for using Big Data Analytics to support service innovation and design. It is also a working framework for generating a business opportunities engine. It explains artificial intelligence (AI) and its contributions to creating business opportunities from big data and how it helps in improving the strategic planning structure. The study concluded that AI and machine learning added prediction and opportunity values to business data. It also clarifies that AI enriches the experience of business suggestions not only by predicting the best business ideas but also by recommending the best personnel and companies as investors for their preferred project ideas.

المستخلص

نظرًا لأننا نعيش في عصر الثورة الصناعية الرابعة الذي يتميز بسرعة الإختراقات التكنولوجية ، فلا يمكن معالجة الكمية الهائلة من البيانات المتاحة من خلال الأساليب التحليلية التقليدية لتوليد فرص عمل جديدة. من هنا تتناول هذه الدراسة دورة التحسين من خلال تحليل كميات كبيرة من البيانات القابلة للاستخدام لخلق فرص عمل. فهي توفر نموذجًا لاستخدام تحليل البيانات الضخمة لدعم ابتكار الخدمة وتصميمها. فالدراسة تمثل إطار لتوليد محرك فرص عمل. و توضح دور الذكاء الاصطناعي (AI)ومساهماته في خلق فرص عمل من خلال تحليل البيانات الضخم و ايضا دوره في تحسين هيكل التخطيط الاستراتيجية. وتوصلت الدراسة إلى أن الذكاء الاصطناعي والتعلم الآلي أضافا قيم التنبؤ والفرص إلى بيانات الأعمال. وايضا اوضحت أن الذكاء الاصطناعي يُثري تجربة مقترحات الأعمال ليس فقط من خلال التنبؤ بأفضل الأفكار التجارية ولكن أيضًا من خلال التوصية بأفضل الموظفين والشركات كمستثمرين لأفكار المشاريع المفضلة.

الكلمات المفتاحية: الذكاء الاصطناعي ، فرص العمل ، نموذج الإدارة الإستراتيجية ، البيانات الضخمة.

INTRODUCTION.

Intelligent automation means the implementation of the computer programs AI and Big Data Machine Learning Algorithms, data analysis, the detection of similarities, pattern recognition, decision aid knowledge, forecasts, and recommendations. AI allows the systems to interpret external data correctly, and to learn from and use them for specific objectives and tasks via flexible adaptation. The algorithms and mathematical methods used by computer systems for optimal execution of a specific task are machine learning, without obvious instructions based on patterns of inference. Artificial Intelligence (AI) based algorithms, using deep neural networks, are transforming the way we approach real-world jobs done by humans. Claudé and Combe (2018) identify that in today's world AI is seen primarily as a support to major business decisions rather than a decision-maker. Without a doubt, artificial intelligence can afford a great opportunity for societies and economies.

This study extends the vision to create a smart business operating system. This includes scoring (ideas, financial status, the existence of opportunities, etc.), advice, and intelligent links between Venture capital and start-up prospects. This process is based on a variety of market analytics assisted by several elements of the application, such as corporate social networks, Score framework, recommendation, and geolocation analyzer, and quality developers for (Quality Proposal), business experience developer, competitiveness analyzer, plan predictions and forecasting. The study has three main phases to achieve the opportunity recommendations, First: business opportunity model inputs, second: business opportunity model processing, and finally business opportunity model outputs.

LITERATURE REVIEW
Artificial Intelligence

There is no day that passes on which we do not hear news about artificial intelligence (AI): autonomous cars, spam filters, Siri, chess computers, killer robots, and much more. What exactly is AI? The basis of AI was in the mid-20th century, especially in the works of British mathematician Alan Turing (Turing, 1950). The actual year of birth of AI is the year 1956, during the six-week conference Summer Research Project on Artificial Intelligence at Dartmouth College. To achieve this purpose, an application for funding was made in the former year. The research questions included proved to reveal many long-term research goals of AI (McCarthy et al, 2006).

Organizations need to radically rethink innovation and agility in order to remain competitive. AI's ability to automate human decisions will play a crucial role in the future of almost every organization's value chain, be it in research and development, procurement, pricing, marketing, or sales. Therefore, the different organizations that invest in AI early on will be the leaders of their sector in the coming decades. Those that do not invest now are

likely to be put out of business by a new AI-driven competitor (P. Glauner, 2020).

AI is the comprehensive general acquaintance common-sense cognitive engine. The artificial intelligence (AI) business platform model is virtually in affluence with the cloud model. It concerns AI solutions that can work together on the top layer of the other digital systems, like a Customer Relationship Management (CRM) and Enterprise Resource Planning (ERP) business system. AI admittances in the digital data fluid through the coordination, fueling business enhancements over phases. In this business model, the business will safely keep a recurrent subscription (Shrutika Mishra, 2021).

During the following decades, Many AI studies have been divided into two main different areas: expert systems and machine learning. Expert systems involve rule-based descriptions of knowledge and make decisions or forecasts based on input/data. On the other side, machine learning is based on recognizing patterns in data. Over the previous decades, many innovative and value-adding applications have emerged. The machine learning principle is outlined in two Definitions. Definition one "Machine learning is the field of study that gives computers the skill to learn without being explicitly programmed" (Samuel, 1959). Definition two "A computer program learns from experience E with respect to some class of tasks T and performance measure P, if its performance at tasks in T, as measured by P, improves with experience E" (Mitchell, 1997). Obviously, the algorithm of machine learning finds patterns from examples.

These patterns are used later to make decisions based on inputs. Both, expert systems and machine learning have their own advantages and disadvantages: Expert systems, on the one hand, have the advantage that they are understandable and interpretable and thus their decisions are comprehensible. On the other hand, it regularly takes a great effort, or sometimes it even turns out to be impossible to understand and describe its complex problems in detail. (Russell &Norvig, 2009). Ünal & Kılınç (2021) mentioned

that developing a human brain through neuroscience studies is not yet clear because the human brain is too much complicated, then they discussed the usage of AI as a CEO's right-hand assistance, the final decision must be from the physical human being.

While Redchuk & Mateo (2022) focused on opportunities that arise around new business models linked to AI. In addition, the study looked into the framework of the adoption of AI/ML in a traditional industrial environment toward a smart manufacturing approach. They proposed an innovative methodology to put AI/ML in the hands of process operators. It aimed to show how it was possible to achieve better results in a less complex and time-consuming adoption process. The work also highlighted the need for an important quantity of data from the process to approach this kind of solution.

This study developed an AI framework that will generate recommendations for business opportunities in the middle east and north Africa territory, which in return will help human business developers to capture those opportunities.

The inspiration of artificial intelligence (AI) was to generate a self-directed machine capable of human-like thinking (McCorduck, 2009). In 1956, John McCarthy organized a research group and coined the concept of AI. This group supposed that every aspect of learning can be so precisely described that, it could be simulated by a machine. Applications include determining how to make machines use language, form abstractions and concepts, and solve complicated problems (McCarthy et al, 2006). The massive and growing data available today and the steady improvements of computational power and algorithms have generated numerous applications of AI across many diverse industries. So artificial intelligence could be defined as "computational agents that act intelligently" (Poole & Mackworth, 2010).

Artificial intelligence (AI) has been changing industries and companies have comprised its use to adopt innovative business models. Companies that successfully capitalize on AI can create disruptive innovation through their new business models and processes, enabling them to potentially transform the global competitive landscape (Lee et al, 2019).

Artificial intelligence building blocks

Any information system contains hardware, software, data, people, and procedures (Silver, Markus, & Beath, 1995), and is viewed as separate from its environment. It interacts with its environment in a basic input-process-output method, where the inputs are raw data from human or physical sources, the process is the value-creating manipulation of this data, and the outputs consist of meaningful information fed back to the environment (Ackoff, 1989).

Regarding AI as the theory and practice of developing systems acting to achieve the best-expected outcome, AI systems can be deconstructed into the six building blocks illustrated in Figure 1: structured data, unstructured data, pre-processes, main processes, knowledge base, and information. (Paschen, Kietzmann, & Kietzmann, 2019). The study explains AI from an input–processes–output lens and the building blocks of AI.

FIGURE 1
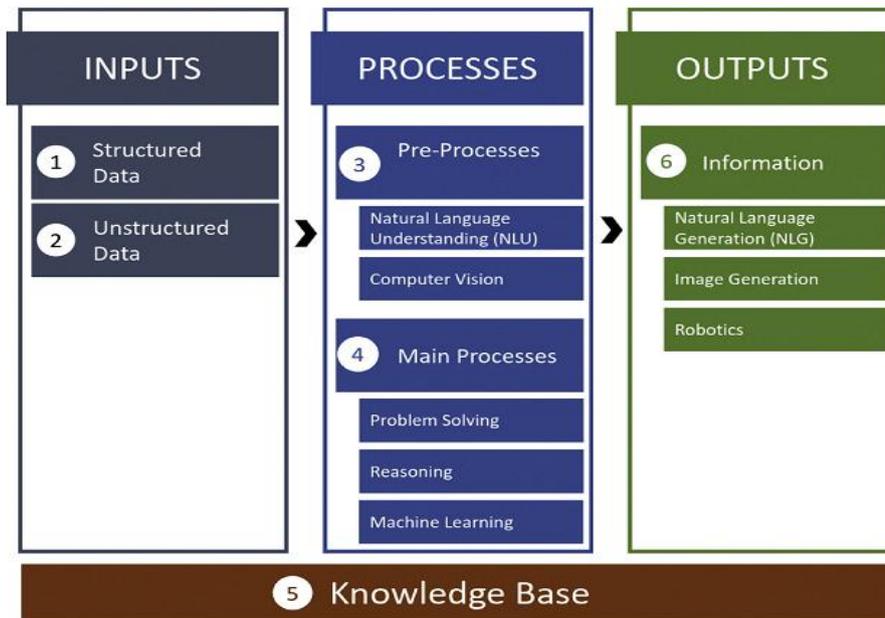
Building blocks of artificial intelligence systems
Source: Paschen et al. (2019)

In the following section, the study will briefly introduce a brief explanation of the AI building blocks.

Inputs

1. Structured data

Structured data is a set of standardized and organized data that represents the core of business analytics and intelligence. Examples of internal data may be inventory figures, sales data, or production levels, while external structured data may be found in web-browsing metrics or stock-exchange data. AI can help in the process of analyzing this data in real-time (Paschen, Wilson, & Ferreira, 2020).

2. Unstructured data

Unstructured data is not standardized or organized, so it is more difficult to analyze. Much of the data produced by the proliferation of social media, IoT, and mobile devices falls into this category like blog posts, reviews, or tweets, any of which can contain text, audio, or video files. AI can handle these input data (Doan et al, 2009).

Processes

1. Preprocesses

Preprocessing of unstructured data incorporates data cleaning, transformation, and selection so that the data can be further processed. Two types are natural language understanding (NLU) and computer vision. AI systems apply NLU to interpret human spoken and written language. In a first step of speech recognition, human language is transcribed into text; this allows the system to recognize spoken words but does not allow it to ascribe meaning to them. Most NLU applications use a lexicon and a set of grammar rules to analyze the structure, relationships, and context of words or phrases in natural language. The meaning that is most likely in the spoken text is later established using statistical modeling and machine learning. (Zhuang et al, 2017).

Images transformation is done using Computer vision so that the representations can interface with the AI system. This processing is a very demanding task for computers and represents a bottleneck for AI systems working with the results (Forsyth & Ponce, 2011).

2. Main processes

The main processes in AI include three different types of intelligent behavior: first, problem solving, second, reasoning, and third, machine learning. Machine learning customs the two other types of processes to acquire new or adjusted existing knowledge to attain the desired results in a more effective way. Problem solving means choosing the solution that best attains a

goal (Tecuci, 2012).   Reasoning uses logic to come up with conclusions from available data. AI systems go beyond traditional capabilities in reasoning under uncertain conditions (Pecora, 2014).

Machine learning allows AI systems to improve their performance without depending on predefined rules already saved in the system (Lee & Shin, 2020). Early machine learning was supervised by humans who defined preprogrammed rules for the systems to base their learning on, but the limitations of this approach soon became apparent. Deep machine learning augments the system's ability to solve more problems more efficiently and rises the accuracy of recurring task solutions (Sebag, 2014).

Data storage: Knowledge base

Intelligent behavior depends on the previous data storage, information, or knowledge so that the experiences reflected in that knowledge can impact subsequent behavior. In earlier information systems, relational databases involved in structured data that could allow the storage and retrieval of material from past processes. In AI systems, these representations can be structured data, unstructured data, or data from preprocessing, as well as information generated by the system itself for the AI processes. Deep learning leads to implicit knowledge where the stored information from only a single network layer could not be interpreted without the context of the other layers. Thus, artificial neural networks act as implicit knowledge bases (Huang, Tsou, & Lee, 2006).

Outputs: Information

When completing the processes, an AI system must relate the meaningful information resulting from these processes to its environment, either as a basis for decision making or as inputs for other information systems. AI information generation is used for nonhuman tasks in a variety of business applications. Robotics lets machines use the information to physically interact with their environment. AI-driven machines can navigate complex physical

environments, pick items in warehouses, move fluidly, and run with very accomplished balance (Evans, 2003).

Strategic Management

Along with the development of Strategic management as a field of research and practice, its focus has moved from specific -intra-firm issues to the broad and complex dynamics of systems beyond the organizational boundaries (Jofre, 2011).

Strategic management involves making decisions and taking actions that can help organizations achieve their objectives by adopting a systematic way of formulating the strategy, implementing the strategy, and evaluating and controlling the strategy implemented.   Strategic management, therefore, integrates various functional areas like marketing, management, finance, accounting, human resources, production, and information systems in a formal and systematic manner consistent with the objectives of the organization and superior performance. This definition also suggests that strategic management comprises three key components, namely, strategy formulation, strategy implementation, and strategy evaluation (Fred & Forest, 2015).

The main objective of strategic management is to attain a competitive advantage, strategic management achieves this purpose through formulating an effective business strategy. In turn, this business strategy is dependent on the internal and external environments. Related to the concept of the external environment of an organization, the literature on strategic management often discusses a concept named competitive intelligence. This concept can be defined as an ethical and systematic process, program, and function of gathering, analyzing, and managing information about the external environment (Nasri & Zarai, 2013).

This information can be used for making decisions at any level, leading to a competitive advantage (Bose, 2008). The external environment consists of opportunities and threats. Competitive intelligence manages the information of the external environment and its nature is proactive. So, it could be used to assess the

current and the potential external environment, as well as the external opportunities and threats (Tanascovici & Hagiu, 2013). Related to the concept of the internal environment of an organization, there is a concept referred to as knowledge management in literature. Comprehensively, knowledge management is a process, cycle, and discipline of knowledge acquisition, knowledge creation, knowledge sharing, and knowledge application. This can be used to make effective decisions at any level. These effective decisions provide a competitive edge for the organization. knowledge management is less proactive than competitive intelligence and focuses on internal knowledge mainly (Momeni et al, 2012). This could lead that knowledge management can be used to assess the current and potential internal environment of an organization. As the internal environment is mainly composed of strengths and weaknesses.

Strategic management via artificial intelligence

Recent advancements and innovations in information storage and processing have enabled an explosion in the abilities and potential of intelligent systems to revolutionize all types of industries. The fundamental principle of AI is machine learning, or the ability of a computer to improve upon its own capabilities by continuously analyzing its interactions with the real world (Garbuio & Lin, 2019).

Artificial intelligence (AI) is a cornerstone of any business. It is a technology that has a great impact on organizations and plays a vital role in management. AI changes the ways of business management and modifies strategic theories. It supports the companies to have a competitive edge in the market and leads the managers to achieve a great success (Sleem, 2019). This study will indicate the impact of adapting artificial intelligence in improving strategic management, and how it reshapes the models of strategic management.

Artificial intelligence is not only technology in the business, but it is also a huge program that controls everything in the

organization, it has the ability to connect people, strategy, and processes (Tsui, Garner, & Staab, 2000). Through using artificial intelligence, the strategic management process becomes more applicable and can design the organization's strategy using the data from the internal resources and external environment of the organization. AI helps the top management make decisions to define a realistic organization's goals and objectives that align with the vision and mission of the organization. Also, with the help of AI, top managers can develop and implement the different strategies and attain a high value for the organization and analyze the actions of its competitors, this will allow the organization to compete and be a market leader (Holloway, 1983).

Artificial intelligence also helps in improving the strategic planning structure; it defines the levels of strategy vision, mission, and objectives. Then, formulating the strategy by doing internal and external analysis via SWOT analysis, setting strategies, analyzing these strategies, choosing the appropriate strategy, and preparing the strategic plan. Evaluate the strategic plan before implementation, then start the implementation phase and practice this strategic plan, controlling and monitoring during implementation, and finally performing an evaluation of the strategic plan (Liao, 2003).

STUDY MODEL

This study provides a model for the use of Big Data Analytics to support services innovation and research into services design. The study shows how the subject field is connected together with the areas of product development and system layout study and where knowledge gaps occur, using a network map. The ineffectiveness of using and leveraging available data is the impetus behind such study, because of the absence of a strong digital infrastructure or network to improve business opportunities.

There is also a working framework for the generation of a business opportunities engine. This explains how the proposed model operates and the production phases. Several rates display the output layer (how data is collected, translated, prepared, and formatted) in the process. The learning method for AI systems

and the combining of data sets with shuffling techniques. The multiplexing algorithms and the suggestion engine are then applied to continue to generate classification outputs. Ultimately the daemons and agents used to track, modify and manage data sources, as well as training models.

The research has three main phases to reach the opportunity recommendations.

Phase 1: Business opportunity model inputs.

In this phase, the model will receive the data collected through different data resources via data entry teams or software, resources like social networks, data sites, system databases, previous market studies…etc. After the data entry process stage, there will be a data format stage to unify all the data in the same format to be ready for the next phase

Phase 2: Business opportunity model processing.

In this phase, the unified format data will go through many processes like business analyzer, AI & machine learning, simulation, localization, social platform, evaluation, scoring…etc.

Analyzing data through AI and machine learning is the core idea which will use some algorithms to make classifications and recommendations and the system will be trained using machine learning techniques.

Phase 3: Business opportunity model outputs.

In this phase, the model will recommend business opportunities that will have some attributes to help the investors to study the opportunity like business strategy, targeted markets, funding models, product specs, connections recommendations, and profit predictions.

Phase 1: Business opportunity model inputs
FIGURE 2
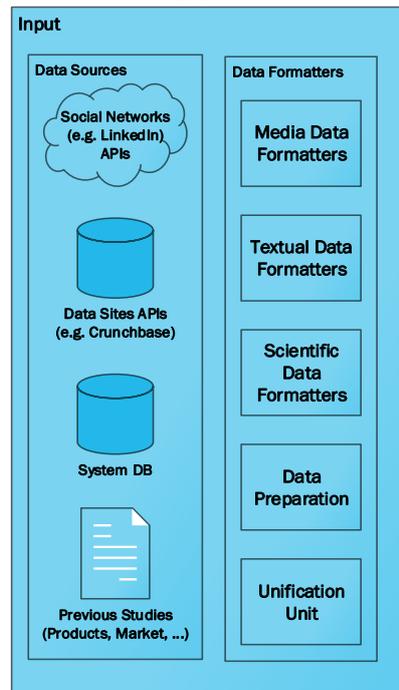
Model Input Layer
Developed by the Researchers

Inputs attributes

1. Business resources

Is everything that helps a company operates its business. It is what the company uses to do and operate its business in the right way; those resources could be human, financial, physical, and knowledge (Cristina, 2016).

2.   Machine learning

It is an application of artificial intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed. Machine learning focuses on the development of computer programs that can access data and use it to learn for themselves. There are many types of machine learning, including: supervised learning, clustering, formal analysis, and neural artificial networks (Ayyadevara, 2018).

3.   Market dynamics

It is a basic concept for supply, demand, and pricing economic models. When continual changes in the supply and demand of a product or a group of products in a given market exist, price signals are created. The changes in the supply and demand of a product or a group of products enhance a corresponding change in others and hence due to these variances the pricing signals are created (Jap, 1999).

4.   Pattern recognition

Pattern recognition could be defined as the classification of data based on obtained knowledge or statistical data obtained from certain patterns. The applicable potential is one of the important aspects of pattern recognition (Bishop, 2006).

5.   Deep Learning

It is an artificial intelligence job that imitates the workings of the human brain to process data and create patterns for use in decision making. Deep Learning has evolved hand-in-hand with the digital era, which brought an explosion of data from every region of the world. This data is simply known as Big Data, it is drawn from sources like social media, internet search engines, e-commerce platforms, and more. Companies understand the incredible potential that can result from unraveling this wealth of data and are increasingly adapting to Artificial Intelligence (AI) systems for automated support (Sarker, 2021).

6. Purchase Power

Purchasing power is the value of a currency expressed in terms of the amount of goods or services that could be bought using one unit of money. Traditionally, the purchasing power of money depended heavily upon the local value of gold and silver but was also made subject to the availability and demand of certain goods on the market (Chirico et al, 2018).

Phase 2: Business opportunity model processing.
FIGURE 3

Process

Business Analyzers	Simulation	Social Platform
Market Analyzer	Business Cycle Simulator	Business Connections Recommender
Business Opportunity Analyzer	Market Dynamics Simulator	Personality Analyzer
Risk Analysis Engine	Feedback and Fine Tuning Loops Simulator	Venture Capitals Recommender
Competition Analysis Engine		Business Cases Generator
	Objects	Value Proposition Generator

AI & Machine Learning

Deep Learning Algorithms	Opportunity Object	Evaluation & Scoring
Business Data Training Model	Management Object	Idea Evaluation
Profit Prediction Models	Strategy Object	Multiple Scoring Schemas
Scoring & Ranking Algorithms	Product Object	VC Evaluation
Customer Pattern Recognition & Identification	Funding Object	Market Needs Evaluation
Artificial Market Clustering	Market Object	

Location & Localization

Opportunities Physical Domain Identifier	Market Physical Domain Identifier
Product Physical Domain Identifier	

Model Process Layer
Developed by the Researchers
Process attributes

1. Business Competition

It is the process of companies and individuals competing in the same industry or field. This sort of competition applies to virtually all businesses and employees (Grzebyk, 2009).

2. Risk Analysis

Process to identify and analyze potential issues that may have a negative impact on key initiatives or critical projects to help companies avoid or mitigate these risks.

Risk analysis includes the consideration of the likelihood of adverse events caused by either the natural processes, for example, severe storms, earthquakes or, floods, or adverse events caused by malicious or inadvertent human activity, as well as the likelihood that such events could lead to harm (Baker, Ponniah & Smith, 1998).

3. Business Cycle

It is the natural rise and fall of economic growth that occurs over time. The cycle is a useful tool for analyzing the economy. It can also help you make better financial decisions. Each business cycle has four phases: Expansion, Peak, Contraction, and Trough (Comin & Gertler, 2006).

4. Value Proposition

A value proposition is a promise by a company to a customer. It is an easy-to-understand reason why a customer should purchase a product or service from that specific business. A value proposition should be a clear statement that explains how a product solves a pain point (Gummerus, 2013).

5. Business Case

A Business Case is a written or verbal value proposition that is intended to educate a decision-maker and convince them to make some kind of action. Its definition could be also a justification for a proposed project or undertaking based on its expected commercial benefit (Hsiao, R. 2008).

6. Venture Capitals

It is funding offered by stakeholders for start-up companies and small companies with a planned long-term potential for growth.

In fact, risk capital comes from well-established investors, investment banks, and all other financial institutions. Nevertheless, this is not always in a financial form; technological and management experience can be offered (Gompers, et al, 2020).

7. Artificial Intelligence

It is the simulation of processes of human intelligence by machines, particularly computer systems?

Such mechanisms include training (acquiring knowledge and guidelines for use of data), logic, and self-correction (using laws to draw rough and simple conclusions) (Russell. Norvig, & Canny 2003).

8. Business Model

A client loan rating is like a personal loan score, such as the FICO score, which is the most common loan template. A FICO score reflects a three-digit number used to determine how easily you will reimburse credit cardholders or credit card issuers. You also use the score to determine the amount of interest you pay (Leonard, 1995).

Why do I need a corporate loan score?

You will use your personal loan for lending if your business gets out of control. You might ask why special credit for your business is needed when things go smoothly. Financing can be easier: a good company credit score will help you increase your chances of a small business loan or a credit line at favorable terms.

9. Business Scoring

A business credit score is similar to a personal credit score, such as your FICO score, which is the most popular credit-scoring model. A FICO score is a three-digit number that lenders and credit card issuers use to predict how likely you are to repay them if they grant you credit. The score is also used to set the interest rate you will pay (Eisenbeis, 1996).

Why do I need a business credit score?

If your business is just getting off the ground, you are probably using your personal credit to do the borrowing. If things are going

smoothly, you might be wondering why it is necessary to establish separate credit for your business. Getting financing may be easier: Establishing a solid business credit score can help increase your chances of landing a small-business loan or line of credit at favorable terms.

10. Clustering Algorithm

Clustering may be considered as being the most significant non-monitored learning problem; as with every other issue of this kind, it involves finding a pattern in a series of unlabeled information. It is also a challenge to group a set of objects in such an extent that object in the same category (called a cluster) is more related (in a sense) to each other than to those in others (Duda, 2001).

11. Idea Scoring

One of the benefits is that measurement methods are used in project selection and maybe the most flexible way of comparing projects to one another. Scoring Models let you determine which qualities of a project are most important to your organization. Idea scoring is an effective means of determining what project is a good fit for your business. You can use various scoring models for the project selection process (Gharaibeh, 2014).

12. Need generation

The process of creating a desire for a particular product or service. It starts with showing your prospects they have a problem that needs fixing, and then it presents your business as the fixer.

Demand generation involves a combination of both inbound and outbound marketing efforts, about all brand awareness promotional activities. It is important for marketers to incorporate multiple channels in a campaign geared towards demand generation because that will enable them to reach the largest audience. (Dichter & Berge, 2002)

13. Pattern Identification

The process of recognizing patterns by using the machine-learning algorithm. Pattern recognition can be defined as the classification of data based on knowledge already gained or on

statistical information extracted from patterns and/or their representation. One of the important aspects of pattern recognition is its application potential. Pattern recognition is the process of classifying input data into objects or classes based on key features. There are two classification methods in pattern recognition: supervised and unsupervised classification. (Jain & Duin, 2004)

14. Business Management

It includes all aspects of overseeing and supervising business operations. Management is the act of allocating resources to accomplish desired goals and objectives efficiently and effectively; it comprises planning, organizing, staffing, leading or directing, and controlling an organization (a group of one or more people or entities) or effort for accomplishing a goal. (Robbins & Coulter, 2020)

Phase 3: Business opportunity model outputs
FIGURE 4
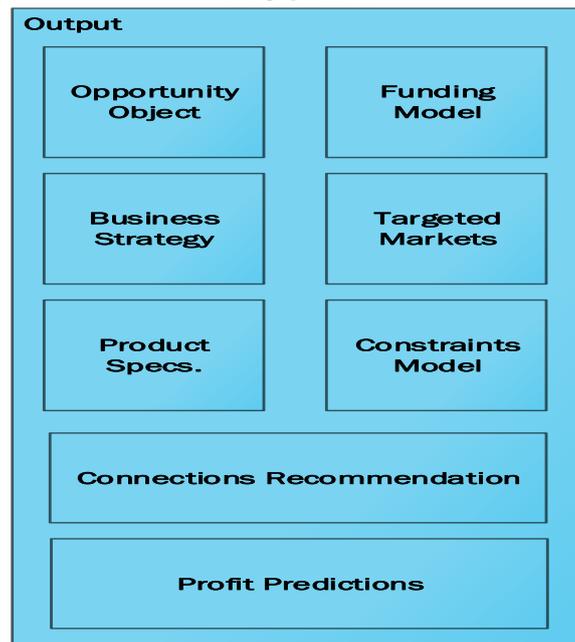
Model Output Layer
Developed by the Researchers

Outputs attributes

1. Business Profit

Profit is a financial benefit that is realized when the amount of revenue gained from a business activity exceeds the expenses, costs, and taxes needed to sustain the activity.

There are three major types of profit: Gross profit, Operating profit, and Net profit. Each type gives the analyst more information about a company's performance, especially when compared to other time periods and industry competitors (Ball et al, 2016).

2. Business product

Products and services that companies purchase to produce their own products or to operate their business. Business products are classified based on their use rather than customer buying habits. These products are divided into six subcategories: installations; accessory equipment; raw materials; component parts and processed materials; maintenance, repair, and operating supplies; and business services (Kotler & Armstrong, 2019).

3. Business market

It is consisting of profit-making organizations. They can be industries, businesses and retailers. They buy products for business use, reselling, or making other products. Professional people do buy. The product is backed by the company's reputation, sales force, and competitive price.

Business marketing, also known as business-to-business marketing, occurs when a business markets sell its products or services to another business or organization (Kotler & Armstrong, 2019).

4. Business Strategy

A long-term plan of action designed to achieve a particular goal or set of goals or objectives. Strategy is management's game plan for strengthening the performance of the enterprise.

It states how business should be conducted to achieve the desired goals. Without a strategy, management has no roadmap to guide

them. Defining your business strategy is a core management function (Fred & Forest, 2015).

5. Funding Model

Funding models refer to direct funding support provided by the government to generally supplement the construction and/or operational costs of a project and assist the financial viability of a private sector investment. These are typically adopted under a private delivery model (Van & Koppenjan, 2001).

6. Business opportunity

A business opportunity involves the sale or lease of any product, service, equipment, etc. that will enable the purchaser-licensee to begin a business. A business opportunity, in the simplest terms, is a packaged business investment that allows the buyer to begin a business. (Technically, all franchises are business opportunities, but not all business opportunities are franchises.) Unlike a franchise, however, the business opportunity seller typically exercises no control over the buyer's business operations. In fact, in most business programs, there is no continuing relationship between the seller and the buyer after the sale is made (Baron & Ensley, 2006).

The following diagram presents an overview of the business generator framework.

FIGURE 5
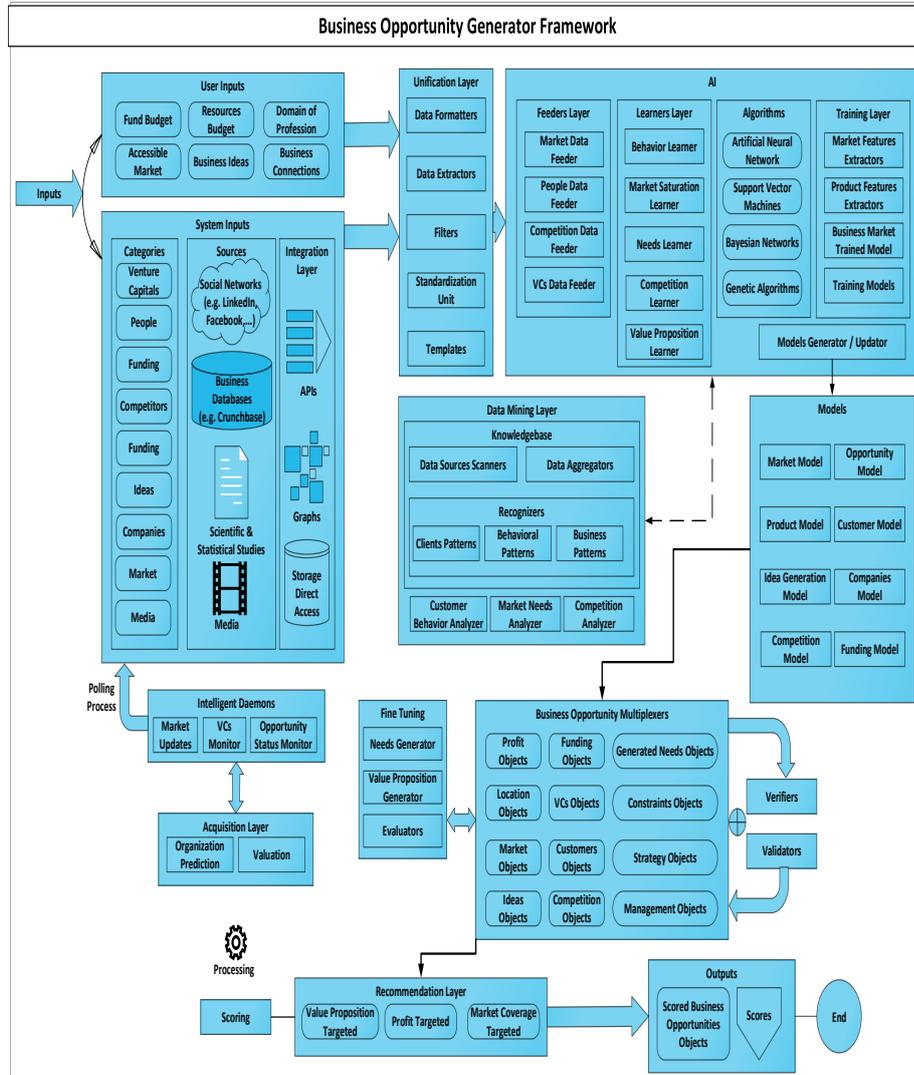
**Business Generator Framework
Developed by the Researchers**

CONCLUSION

AI enriches the experience of business automation and suggestions not only by predicting the best business ideas but also by recommending personnel and companies as investors for their preferred project ideas.

This study was done to tackle business opportunity scoring and ranking based on machine learning. It introduced a generic business model that can run on any kind of business idea or type. The used model has open data repositories in its input layer like social networks, and data sites (e.g. data.gov). It also supports private data from governmental institutions about business investment and development.

The process layer of the model includes all the needed components to run AI and train machines on abstract and rigid data to support opportunity creation based on dynamic factors. The data and features to be extracted contain all the meta-data related to different business objects and components like (market, product, HR, funding, etc.).

The model output layer shows all the business opportunity objects scored with machine learning. With the help of a multiplexer, there will be recommendations for the best homogeneous and compatible objects with their score to get the best-fit business opportunity predicted.

A working framework is also presented for this generation engine. It shows the workflows and the processing steps of the proposed model. There are many layers in the framework showing the input layer in action (how data is gathered, processed, prepared, and formatted). Also, the process of training AI machines and mixing datasets using shuffling techniques. Then came the multiplexing algorithms along with the recommendation engine to help generate ranked outputs. Finally showing the agents used to monitor and update data sources, and training models to keep it updated and fine-tuned.

To conclude the results of this study are as follows: AI and machine learning added prediction and opportunity creation values to the business data. Opportunities in terms of (products,

customer gains, etc.) can be recommended through machine learning based on a continuously updated knowledge base through the proposed framework.

REFERENCES

Ackoff, R. L. (1989). From data to wisdom. *Journal of Applied Systems Analysis*, 16(1), 3-9.

Ayyadevara, V. K. (2018). *Pro Machine Learning Algorithms: A Hands-On Approach to Implementing Algorithms in Python and R.* Apress. Berkeley, CA.

Baker S., Ponniah D. & Smith S. (1998). Techniques for the analysis of risk in major projects. *Journal of the Operational Research Society*, 49, 567-572.

Ball, R., Gerakos, J., Linnainmaa, J. T., & Nikolaev, V. (2016). Accruals, cash flows, and operating profitability in the cross section of stock returns. *Journal of Financial Economics*, 121(1), 28-45.

Baron RA, & Ensley M. (2006). Opportunity recognition as the detection of meaningful patterns: evidence from comparisons of novice and experienced entrepreneurs. *Management Science* 52: 1331–1344.

Bishop, C. M. (2006). *Pattern recognition and machine* learning. New York: Springer.

Bose, R. (2008). Competitive intelligence process and tools for intelligence analysis, *Industrial Management & Data Systems*, 108 (4), 510-528.

Chirico, Francesco, et al. (2018). Commitment escalation to a failing family business. *Journal of Small Business Management*, 56(3), 494-512.

Claudé, M. & Combe, D. (2018). The roles of artificial intelligence and humans in decision-making: Towards augmented humans. *Master's Thesis*, Umeå University School of Business, Economics and Statistics, Sweden.

Comin, D., and Gertler, M. (2006). Medium-Term Business Cycles. *American Economic Review*, 96(3), 523-551.

Cristina C. (2016). Process-and resource-aware information systems. In EDOC, 2016 *IEEE 20th International*. IEEE, 1–10.

Dichter, E., & Berger, A. A. (2002). *The Strategy of Desire*. Eighth Edition. New York, USA.

Doan, A., Naughton, J. F., Baid, A., Chai, X., Chen, F., Chen, T. et al. (2009). *The case for a structured approach to managing unstructured data.* Cornell University. Available at https://arxiv.org/abs/0909.1783

Duda, R., Hart, P., and Stork, D. (2001). *Pattern Classification*, Second Edition. New York: Wiley.

Eisenbeis, R. (1996). Recent Developments in the Application of Credit Scoring Techniques to the Evaluation of Commercial Loans. *IMA Journal of Mathematics Applied in Business and Industry*, 7, 271-290.

Evans, J. M. (2003). AI and robotics. Industrial Robot. *International Journal*, 30(2). Available at: https://doi-org.proxy. lib.sfu.ca/10'.1108/ir.2003.04930baa.002.

Forsyth, D., & Ponce, J. (2011). *Computer vision: A modern approach*. Upper Saddle River. NJ: Prentice Hall.

Fred R David, & Forest R David; (2015). *Strategic Management: A Competitive Advantage Approach, Concepts & Cases*. Fifteenth Edition, Pearson Education.

Garbuio, M., & Lin, N., (2019). Artificial Intelligence as a Growth Engine for Health Care Startups: Emerging Business Models. *California Management Review*, 61(2) 59 –83.

Gharaibeh, H. (2014). Developing a Scoring Model to Evaluate Project Management Software Packages Based on ISO/IEC Software Evaluation Criterion. *Journal of Software Engineering and Applications*, 2014, 27-41.

Gompers, P. Gornall, W., Kaplan, S & Strebulaev, I (2020). "How do venture capitalists make decisions?" *Journal of Financial Economics,* 135, 169–190.

Gummerus, J. (2013). Value creation processes and value outcomes in marketing theory— Strangers or siblings? *Marketing Theory*, 13(1), 19–46.

Grzebyk, M. (2009). Cluster concept and cooperation and the competitiveness of businesses. The company and region, competitiveness and innovation, Rzeszow, 1.

Holloway, C. (1983). Strategic management and artificial intelligence. *Long Range Planning*, 16(5), 89–93.

Hsiao, R. (2008). Knowledge sharing in a global professional service firm. *MIS Quarterly Executive*, 7(3), 399– 412.

Huang, M. J., Tsou, Y. L., & Lee, S. C. (2006). Integrating fuzzy data mining and fuzzy artificial neural networks for discovering implicit knowledge. *Knowledge-Based Systems*, 19(6), 396 403.

Jain, A.K., Duin, R.P.W, (2004). *Introduction to pattern recognition,* The Oxford Companion to the Mind, Second Edition, Oxford University Press, Oxford, UK.

Jap, S. D. (1999). Pie-expansion efforts: collaboration processes in buyer-supplier relationships. *Journal of Marketing Research*. 461-75.

Jofre, S. (2011). *Strategic Management: The theory and practice of strategy in (business) organizations*. DTU Management.

Kotler, P. & Armstrong, G. (2019). *Principles of Marketing*. Eighteenth Edition. Pearson Education. New York.

Lee, J., Suh, T.,Roy, D., & Baucus, M. (2019). Emerging Technology and Business Model Innovation: The Case of Artificial Intelligence. *Journal of Open Innovation*, 5(44), 1-13.

Lee, I., & Shin, Y. J. (2020). Machine learning for enterprises: Applications, algorithm selection, and challenges. *Business Horizons*, 63(2). 157-170.

Leonard, K. J. (1995). The Development of Credit Scoring Quality Measures for Consumer Credit Applications. International *Journal of Quality and Reliability Management*, 12, 79-85.

Liao, S. (2003). Knowledge management technologies and applications literature review from 1995 to 2002. *Expert systems with applications*, 25(2), 155–164.

McCarthy, J., Minsky, M. L., Rochester, N., & Shannon, C. E. (2006). A proposal for the dartmouth summer research project on artificial intelligence. *AI Magazine*, 27(4).

McCorduck, P. (2009). *Machines Who Think: A Personal Inquiry into the History and Prospects of Artificial Intelligence*. AK Peters/CRC Press: Boca Raton, FL, USA.

Mitchell, T. M. (1997). *Machine Learning*. McGraw-Hill.

Momeni, A., Fathian, M. & Akhavan, P. (2012). Competitive intelligence and knowledge management's afinities and relations: developing a model. *Invertis Journal of Science & Technology*, 5(1), 1-7.

Nasri, W. & Zarai, M. (2013). key success factors for developing competitive intelligence in organization. *American Journal of Business and Management*, 2(3), 239-244.

P. Glauner, (2020). Unlocking the Power of Artificial Intelligence for Your Business. In P. Glauner and P. Plugmann (Eds.), *Innovative Technologies for Market Leadership: Investing in the Future,* ISBN 978-3-030-41308-8, Springer.

Paschen, J., Kietzmann, J., & Kietzmann, T. C. (2019). Artificial intelligence (AI) and its implications for market knowledge in B2B marketing. *Journal of Business and Industrial Marketing*, 34(7), 1410-1419.

Paschen, J., Wilson, M., & Ferreira, J. (2020). Collaborative intelligence: How human and artificial intelligence create value along the B2B funnel. *Business Horizons*, 63(3), 403-414.

Poole, D. L., & Mackworth, A. K. (2010). *Artificial Intelligence: Foundations of computational agents*. Cambridge University Press.

Pecora, F. (2014). Is model-based robot programming a mirage?, A brief survey of AI reasoning in robotics. *KI-Ku ̈nstliche Intelligenz*, 28(4), 255-261.

Redchuk, A. and Mateo, F. W. (2022). New Business Models on Artificial Intelligence—The Case of the Optimization of a Blast Furnace in the Steel Industry by a Machine Learning Solution. *Applied System Innovation*, 5(6). https://doi.org/ 10.3390/asi5010006.

Robbins, S. P, & Coulter, M. (2020). Management, Global Edition, 15th Edition, *Pearson Education Limited*, United Kingdom.

Russell, S. J., Norvig, P., & Canny, J. (2003). *Artificial intelligence: A modern approach*. International Edition, Pearson.

Russell, S. J & Norvig, P. (2009). *Artificial intelligence: a modern approach*, Third Edition, Pearson.

Samuel, A. L. (1959). Some studies in machine learning using the game of checkers. *IBM Journal of research and development*, 3(3), 210–229.

Sarker, I. (2021). Deep Learning: A Comprehensive Overview on Techniques, Taxonomy, Applications and Research Directions. *SN Computer Science*. 2. 10.1007/s42979-021-00815-1.

Sebag, M. (2014). A tour of machine learning: An AI perspective. *AI Communications*, 27(1), 11-23.

Shrutika Mishra and A. R. Tripathi, (2021). AI business model: an integrative business approach, Journal of Innovation and Entrepreneurship, 10(1), 1-21.

Silver, M. S., Markus, M. L., & Beath, C. M. (1995). The information technology interaction model: A foundation for the MBA core course. MIS Quarterly, 19(3), 361-390.

Sleem, M., K., (2019). The effect of artificial intelligence on improving strategic management. *Middle East Journal for Scientific Publishing*, 2(1), 28-35.

Tanascovici, M. & Hagiu, A. (2013). Competitive intelligence in the knowledge-based organization, *Network Intelligence Studies*, 1, 44-53.

Tecuci, G. (2012). Artificial intelligence. WIREs: *Computational Statistics*, 4(2), 168-180.

Tsui, E., Garner, B. J., & Staab, S. (2000). The role of artificial intelligence in knowledge management. *Knowledge based systems*, 13(5), 235–239.

Turing, A. (1950). Computing machinery and intelligence. *Mind*, 59(236), 433–460.

Ünal, A., and Kılınç, I., (2021). The feasibility of artificial intelligence performing as CEO: the vizier-shah theory. *FORESIGHT,* 23(6), 698-723.

Van Ham H., Koppenjan J. (2001). Building Public-Private Partnerships: assessing and managing risks in port development. *Public Management Review*, 3(4), 593-616.

Zhuang, Y. T., Wu, F., Chen, C., & Pan, Y. H. (2017). Challenges and opportunities: From big data to knowledge in AI 2.0. *Frontiers of Information Technology and Electronic Engineering*, 18(1), 3-14.