The Current And Future Impact Of Artificial Intelligence On Business

Ann Geisel

Abstract: The use of artificial intelligence (AI) programs has become widespread in business processes. There is some confusion as to what technology is considered AI. There are several levels or types of AI. When referring to artificial intelligence, it is necessary to define the capabilities of the technology. Businesses use a fundamental form of AI, with limited learning capabilities. The costs of the use and development of AI run the continuum from potential job loss or retraining to danger to human life. There may be aspects of the evolving technology that haven’t yet been considered. AI has the potential to create a better world for humanity. Artificial intelligence will continue to evolve in the future and change the landscape of business. Both individuals and organizations need to prepare for the future by embracing the technology and understanding which shifts are required to be successful in the future.

Index Terms: AI in marketing, artificial intelligence, business intelligence, future of AI, preparing for AI

1 INTRODUCTION
Artificial intelligence is a complex entity. There are several definitions and many more impressions of what constitutes AI. The risks associated with AI are varied. Those risks are mainly dependent on the level of AI that is being considered. A basic artificial intelligence program, or automation, has a very different risk than a program that is self-aware. The benefits of artificial intelligence outweigh the risks, especially in business applications. AI applications are already being utilized by businesses and are expected to continue to grow. Artificial intelligence will become more prevalent in business processes which will require adjustments by society.

2 DEFINING AI
There is no single definition of artificial intelligence. In an article in Forbes, the author argues that many companies are claiming their programs have AI, but he disagrees. The author describes AI as, “A true artificially-intelligent system is one that can learn on its own. We’re talking about neural networks from the likes of Google’s DeepMind, which can make connections and reach meanings without relying on pre-defined behavioral algorithms. True A.I. can improve on past iterations, getting smarter and more aware, allowing it to enhance its capabilities and its knowledge [1]. The author goes on to say that there is no stopping the evolution of AI. Many people point to Alan Turing as the first to determine whether a computer is intelligent. Turing suggested that if computers showed human level conversational abilities, we should be assured of their intelligence. Turing proposed a conversational test for human-level intelligence which has been named the Turing test. The test measures verbal dexterity, background knowledge, and underlying reasoning ability [2].

According to the Committee on Technology. Subcommittee on Machine Learning and Artificial Intelligence [3], there are many categories of AI. These include thinking like humans, acting like humans, thinking rationally, and acting rationally. Venture capitalist Frank Chen broke AI into five categories: logical reasoning, knowledge representation, planning and navigation, natural language processing, and perception [3]. Although most are aware of the core idea of AI, it is difficult to pin down. “This diversity of AI problems and solutions, and the foundation of AI in human evaluation of the performance and accuracy of algorithms makes it difficult to clearly define a bright-line distinction between what constitutes AI and what does not” (p. 7) [3]. In addition to all the different categories listed to define AI, there is also the question of self-awareness. Arend Hintze, an Assistant Professor of Integrative Biology & Computer Science and Engineering at Michigan State University, has spent years researching AI. In an article in The Conversation, he states that there are four different types of AI. These four types are on a continuum from reactive to self-aware. The Type I AI that Hintze describes is reactive. This type of machine does not form memories nor use past experiences to make decisions. His example for this type is that of Deep Blue, IBM’s chess-playing computer which beat Garry Kasparov in the late 1990s. This type of computer acts on what it sees; it doesn’t rely on an internal concept of the world [4]. Hintze categorizes his Type II AI as those with limited memories. These machines can look into the past. The shortcoming with this machine is that it doesn’t remember its experiences and use those experiences to handle new situations. For his Type II machine, Hintze gives the example of self-driving cars. These cars can observe the speed and direction of other cars. The observations are added to the cars database along with other driving elements [4]. The next two types of AI does not yet exist. Hintze classifies his Type III AI as the theory of mind. The theory of mind-machine will form an understanding that people, creatures, and objects in the world and can have thoughts and emotions that affect their behavior. This type of machine can interact socially. The Theory IV AI are considered self-aware, which also includes the theory of mind. Hintze views self-awareness as knowing about their internal state. He uses the example of wanting something compared to knowing that you want something. Hintze believes that we are a long way from creating self-aware machines. The more we can understand memory, learning, and the ability to base decisions on past experiences the closer we come to creating self-aware AI [4]. Many hours of research have gone into

• Ann Geisel is currently the Director of Development and Design at Cougar Mountain Software and recently received her MBA from Northwest Nazarene University. E-mail: AnnGeisel@cougarmtn.com
defining AI. Numerous industries claim to use AI in their products. In the accounting industry, AI is referred to the automation of tasks. According to Sarah Ovaska-Few [5], “AI technology that enables computers to perform decision-based tasks previously left to humans. It shows up in many forms, including machine-based learning that can progressively become better at analysis and decisions the more it is used, and speech-based technology that can understand different voices and languages. AI is already part of the business landscape, and it is growing rapidly.

3 General risks of AI
Experts agree that there are two scenarios of how AI could pose the greatest risk. The first scenario would be when AI is programmed to do something devastating. A system could be programmed to kill. The programs could result in a war with mass casualties. Also, the programs could be coded to be extremely difficult to stop or turn off. The other scenario that experts are worried about is when AI is programmed to do something beneficial but uses destructive methods. For example, if the program was given a task such as getting a person to the airport as fast as possible, it may not consider safety [6]. These two scenarios provide an overview of risk for basic AI, but as mentioned before, there are multiple types and levels of intelligence. To compare and understand the risks, Hintze’s four types of AI will be used in the following risk assessments [4].

3.1 Type I AI
Since Type I AI mainly involves process automation, the risks to society are minimal. The significant risk of AI performing tasks is the loss of jobs. According to an article in USA Today, “Automation could destroy as many as 73 million U.S. jobs by 2030, but economic growth, rising productivity, and other forces could more than offset the losses, according to a new report by McKinsey Global Institute” [7]. The article goes on to explain that although specific jobs will be lost, there will be similar occupations with different tasks that employees will perform. Workers will be needed to operate the machines as well as manage the increased productivity and economic growth that automation will generate. Physical jobs are most susceptible to automation. High-level, people-managing tasks with unpredictable environments are the least susceptible. High-wage workers are also expected to be less affected. It is anticipated that the prominent challenge will be to retrain millions of workers [7]. Retraining employees may sound daunting, but historically when there has been an economic shift which impacts workers, retraining has been gradual and implemented with attrition.

3.2 Type II AI
Type II takes automation up a bit to include tasks that are not ordinarily thought of in the automation realm. Driverless cars are a good example. This type of AI could cost Americans another five million jobs. Unfortunately, the drivers who make their living driving taxis, buses, vans, and trucks could be out of a job. Drivers are generally from the same demographic as the workers who lost their jobs to factory innovation. Since 2000, five million manufacturing jobs have been lost to automation [8]. The impact to society is the same as in Type I AI; it just involves more workers and additional industries.

3.3 Type III AI
Type III AI or socially aware AI opens up a different area of risk. Socially aware AI machines may not be programmed to perform the most altruistic of tasks. In fact, these machines can be dangerous due to human beings. Humans tend to trust machines or computer programs more than they trust other humans. For example, on the mobile dating application, Tinder, there has been frequent infiltration by bots posing as real people. The bots gain a person’s trust and then try to get them to share exploitable information [9]. It is not too challenging to imagine how some people could use this type of technology to break the law, without ever coming in contact with their victims.

3.4 Type IV AI
The risks of Type IV AI are vastly different than the previous three. As a self-aware entity, Type IV would be able to cause all sort of havoc. According to Vincent Muller (p. 298) [10], “the estimation of technical experts is that by 2050 the probability of high-level machine intelligence (that surpasses human ability in nearly all respects) goes beyond the 50% mark.” Muller goes on to argue that without knowing what AI will look like in the future makes the problem of identifying the risks rather daunting. Elon Musk, Steven Hawking, Steve Wozniak, and hundreds of others issued a letter to the International Joint Conference in Buenos Aires, Argentina. The letter was a warning stating that “artificial intelligence can potentially be more dangerous than nuclear weapons” [11]. Bill Gates is also concerned about artificial intelligence. Gates is worried about super-intelligent machines. He is not concerned with the other types of AI [11]. The intelligence of machines is currently increasing. An article in Harvard Business Review points to the fact that if a smart machine today has the intelligence of an average person, and IQ of 100, using the rate of technological progress would raise the IQ of these machines by 1.5 points per year. “By 2025 these machines will have an IQ greater than 90% of the U.S. population” [12]. Technology continues to advance, and AI is becoming more intelligent. Self-aware AI machines will be able to create more machines, and there is always the danger of whether they will see the need for human beings at all. Regardless of how careful the creators of this type of AI are, there is always the possibility of not addressing every possible safety scenario. The real worry with superintelligent computers is not about malevolence, but competence. The concern is a matter of aligning human goals with the goals of the program. Machines can have goals, those that were programmed into the machine. The problem may be how the machines reach their goals, rather than the machine having different goals.

4 Benefits of AI

4.1 General
In addition to the risks, AI technology provides enormous benefits to society. For example, there is an AI application on smartphones called “Climate Basic” which helps farmers increase yields on their land. “The application draws on local temperature and erosion records, expected precipitation, soil quality and other agricultural data to determine how to maximize yields for each plot.” According to the Department of Agriculture, the use of AI has produced the biggest crops in the country’s history [13]. The benefits of AI are only limited by man’s imagination. In the future we will see programs that can
conduct teaching and training, real-time problem solving, dynamic scheduling and predictive analysis, custom textbooks, empowering the disabled, and even virtual humans, just to name a few [14]. One of the areas that AI is already making an impact is in business intelligence.

4.2 Business
Business intelligence applications use algorithms to identify trends and create insights from a company’s database or external inputs. Business intelligence applications are expected to be one of the fastest growing areas in AI technology over the next ten years [15]. One example of business intelligence use is a program called HANA. HANA is SAP’s cloud platform that companies can use to manage their databases. The program views data such as sales transactions and customer information and looks for trends and irregularities. HANA accesses data in real time which makes for faster decision making. The intent with HANA is to make data-driven decisions that are better informed. The benefits of using business intelligence include infrastructure cost reductions and operational efficiency. Organizations expect to realize an average five-year return on their investment of programs like HABA of 575% [15]. Another way that businesses are taking advantage of business intelligence is in the use of business dashboards. Several software companies are creating analytical dashboards that can gather information from other sources to enable managers to make informed decisions. One such startup is called Domo. Domo is a cloud-based dashboard that can scale with the size of a company. It can be used for large or small organizations. Domo can pull data from sources such as Salesforce, Square, Facebook, Shopify, and many other applications. The program can help companies gain insight into their customers, sales, or product inventory [15]. Watson, the IBM AI platform for business, is a collection of services and capabilities that include machine learning, reasoning, and decision technologies as well as language, speech, and vision technologies. Most people remember that Watson as a contestant on Jeopardy! where it beat the 74-time straight champion Ken Jennings [16]. Watson is now available for businesses to use to analyze their data. Companies can use Watson’s service to automate predictive analytics and cognitive capabilities. Specific business areas are impacted more by AI than others.

5 BUSINESS ASPECTS OF AI

5.1 Marketing
Current uses of AI in marketing. Marketing is defined as “The management process through which goods and services move from concept to the customer” [17]. Taking an old-world view of marketing, to market would only be the act of getting the product or service to market. Today, due to the complexity of the market, the act of marketing is much more complex. The competition in the market is fierce and crowded. There are not too many products or services that are unique. Most people working in marketing find it is a struggle to identify customers and advertise to the correct audience. There are many different strategies for companies to obtain new customers. Competing for market advantage is the goal. One of the ways a company may determine their best strategy is to identify their market. Some basic questions need to be answered. Managers need to know who are the customer segments that they will serve, what are the customer’s needs, wishes and desires, why are these particular needs the most appropriate for the organization, and how will the organization satisfy those needs [18]. Identifying the most profitable market for a product or service is one of the current functions of artificial intelligence programs. AI programs can anticipate customer needs, assist in creating highly personalized campaigns, identify customer purchasing patterns, and assist organizations in delivering better customer service. AI analyzes vast amounts of customer data, identifying characteristics of high-value customers. The switch to AI has not come without challenges. There are those who are hesitant to implement AI programs. Some people are nervous about AI simply because they don’t understand what it does. Others are worried that by using AI, they will be invading privacy at some level. An article in Forbes provides four steps to help alleviate misgivings about artificial intelligence. The first step is to emphasize the rewards. They found that most people will accept AI if they see that it will make their lives easier, even if they are anxious about the program. The next step is to be transparent. Companies need to disclose information on how customer data is being used. Appropriate levels of transparency can also help with data privacy regulations. The third step is to encourage employees. Some workers may fear to lose their jobs to AI. Companies need to underscore what their employees can do that cannot be replicated by a program. The last step is to maintain a human touch. Humans are still critical to the customer experience. Clients need to know that they can interact with a person when they desire [19]. AI can help keep organizations competitive with market information. “Marketing automation has the ability to expand the value and impact of your content, capture lead intelligence, improve lead-to-sale conversion rates, drive repeat purchasing, and most importantly, enhance the overall customer experience throughout the journey” (p. 103) [20]. Although AI as automation can assist with achieving desired marketing results for an organization, the use of the technology can be a bit overwhelming. Historically, a company’s information technology (IT) department was able to handle the different software packages, such as analytics, customer resource management, website platforms, etc., marketers are now taking over the marketing technologies. Roetzer [20] offers some help with the changing roles to include managing the new technologies. Roetzer suggests having someone in the marketing department to take responsibility for managing the different technology platforms. A company needs someone to focus on the marketing technology and ensure that the programs are delivering accurate and useful information. The marketing employee who takes on this role should engage in continuous collaboration between marketing and IT. This relationship will keep lack of communication and misunderstandings at a minimum. The company should start with core technologies and assess their technology infrastructure to identify weaknesses. Businesses should consider user reviews before implementing a solution. When selecting programs to help achieve business goals, companies need to choose the technology that is most appropriate. The company also needs to consider the skills and capacity of those who will be utilizing the programs [20]. Implementing artificial intelligence programs to assist with marketing decisions can be extremely beneficial, but there is
much to consider before adding these programs to an organization.

**Future use of AI in marketing.** Most of the possibilities of the future use of AI in marketing is just a matter of imagination. “AI advancements may also change the concept of who we are and how marketers interact with humans and their technological extensions” (p. 32) [21]. Marketing programs will need not only to understand the consumer but also understand the program the consumer is using to make their decisions. Eventually, there is a strong possibility of AI completely taking over marketing. It is easy to envision a program or multiple programs that can find the best target consumer for the organization’s product or services, create the most relevant marketing material for that audience, and determine the best avenues to distribute the material. Artificial intelligence is here to stay, and its capabilities will continue to progress at an ever-increasing rate.

**5.2 Sales**

**Current uses of AI in sales.** Sales and marketing are quite integrated. Sometimes it is difficult to determine the difference in responsibilities of each department. If the old-school definition of marketing is to bring the product to market, the old-school description of the sales department would be to be responsible for selling the product or service after it has arrived at the market. According to Art Saxby, “Sales is the team whose job it is to ‘sell what’s in stock.’ The company has specific products or services and—and it’s up to Sales to sell those things. Sales develops relationships with customers and/or channel partners. They knock down the doors, overcome objections, negotiate prices and terms and often work internally to be sure their customer’s orders are filled” [22]. Once marketing has identified the potential client, the generated leads are then handed over to the sales department. The salespeople change or convert a lead produced from marketing into a client. For that change to take place, the prospective client needs to trust the salesperson. Loyalty and trust between the customer and the business are built by the salesperson. If customers are happy with their relationship with the organization, they will recommend others which will provide marketers with more leads, and in turn, provide sales an opportunity to convert the lead into a customer. The opposite is also valid. If potential or current clients lose trust with the salesperson, they can cause organization damage by providing negative public reviews. The prominent goal of any organization is to be profitable. Without an element of profit, not even a nonprofit organization can grow and reach their goals. Tale [23].

**Future use of AI in sales.** Currently, artificial intelligence performs many sales tasks which fall under the heading of sales forecasting and customer retention. “Mining of customer actions, sales transactions, regionals sales distribution, sales executive involvement, social sentiment, customer incident data together with time series can be used to forecast sales, recognize the positive influencers and identify customers who are at high risk of leaving [25]. Although AI already performs the tasks listed above, it does not replace the human connection between the salesperson and the client. In the future, there may be a time when customers will go further through the buying process without connecting with a salesperson, or they may complete the entire process without the human connection. The process of purchasing without a salesperson is already happening today. People purchase items and services via sites on the Internet without talking to a salesperson. It will only be a matter of time when we no longer require a live person to walk us through car or real-estate sales. The new automated sales processes may eliminate the need for a full sale’s team, but it will not eliminate the job. There will still be those clients who wish to speak with a person during and after the purchase process. For those people who make their living in sales, they would be better off learning how to implement and support artificial intelligence platforms for their company.

**5.3 Accounting and Finance**

Although accounting and finance may be two separate functions, there is too much integration regarding artificial intelligence applications to separate them. According to Josh Fredman [26], writing for Chron, both accounting and finance “play an existential role in the management of any business.” Accounting and finance direct the course of your business by ensuring legal adherence, creating budgets, analyzing performance, and developing strategy [26]. Many of these processes have been automated with AI. In addition to these tasks, some higher-level responsibilities, such as projections and forecasts have also been impacted by AI.

**Current use of AI in accounting and finance.** Accounting firms are already using AI to slash the amount of time their accountants spend on complex audits and asset estimates. At Deloitte, auditors can use AI tools to interpret thousands of contracts or deeds. The programs can extract key terms and compile and analyze the information for risk assessments and other functions. The functions of AI for accountants are varied, and there are constantly new programs that may focus on one industry or another [5]. One of the biggest benefits of AI is its ability to take large amounts of data and create information.
that is pertinent to the user. For accountants, this saves a vast amount of time. Every business can use AI applications for their financial and accounting decisions. Several analytical or business intelligence programs are in use to enable executives to make optimal business decisions. These programs are designed to take business financial information and display it on a dashboard as both visual and report widgets. This information will provide the executive the detailed information on the market, product, operations, and possible investment opportunities. The executive can then determine the best strategies to meet company goals. Some of the programs also offer predictive analytics. Predictive analytics are mainly used to predict unknown future events. Executives do this already in the form of forecasting and projections. AI uses several techniques to analyze current data to make predictions about the future. The AI is looking for trends, patterns, and irregularities to produce an accurate prediction. Several predictive analytics programs are geared to specific industries or needs. Predictive analytics in Customer relationship management (CRM), is used throughout the customer’s lifecycle to determine the best action required for each client. Predictive analytics that are applied to a business collections department will optimize the allocation of collection resources by identifying the best agencies, contact strategies, and legal actions while reducing the cost of collection. Predictive analytics that focuses on fraud detection can look for inaccurate credit applications, fraudulent transactions, identity theft, and false insurance claims. Predictive analytics is used in insurance, banking, financial services, and other industries. In addition to saving each department time and energy by delivering the information directly to the executive, predictive analytics can provide a more accurate future picture.

Future use of AI in accounting and finance. Since human beings are more apt to make mistakes, financial institutions are adopting AI at an unbelievable rate. Resource-intensive, repetitive tasks are well suited to be completed by artificial intelligence programs. Analytics provide the necessary information to executives for them to make appropriate decisions, but those decisions are still made by a human being. The day will come when there is no need for the executive to make the decision, it will be made by the program. As these technologies become more advanced, they will perform more and more complicated tasks. Employees will be needed to maintain and manage the systems, but most if not, all business processes will become automated.

6 Required Societal Adjustments
There is no doubt that AI has opened up new markets and opportunities. Recently, machines have surpassed humans in the performance of tasks. AI is expected to continue to exceed human performance on more and more tasks. As AI automation continues to create wealth and expands the economy, there will be some changes required. Many workers will need to change their skills to be successful in the new emerging economy. For the United States, these changes need to be aggressive to help Americans who are disadvantaged by the new technology. Although many jobs will become obsolete, there will be new jobs that are created by the implementation of artificial intelligence. There are some strategies designed by the U.S. government to prepare for required skill-set changes. The first strategy is to develop AI for the benefits. AI will make significant, positive contributions to productivity growth and holds incredible potential to help the U.S. maintain cutting-edge innovation. The AI push will create a dramatically increased need for people with relevant skills from all backgrounds to support and advance the field. The second strategy is to educate and train Americans for jobs of the future. As the skills demanded by the labor market change, American workers need to be prepared with education and training. Preparing will require providing affordable post-secondary educations. U.S. workers will also need assistance in successfully navigating job transitions. The third strategy is to aid workers in the transformation and empower workers to ensure broadly shared growth. This strategy includes steps to strengthen the social safety net. The social safety net includes unemployment insurance, Medicaid, the Supplemental Nutrition Assistance Program, and the Temporary Assistance for Needy Families. It is also required that policymakers will need to provide more robust interventions such as creating job creation strategies to smooth the transition. In addition to private industry, the implementation of AI creates many new challenges to the government. Even though the government has created strategies to deal with the changes in the job market, it is not always easy to precisely predict what jobs will be created based upon a future technology. The Council of Economic Advisors (CEA) has identified four categories of jobs that might realize growth based on increased implementation and demand of AI programs. The first category is engagement. The CEA has determined that humans will most likely be needed to actively engage with AI technologies throughout the completion of a task. Job demand is expected to increase for positions where humans complement AI. For example, humans would be needed to work with AI autonomous vehicles that have been created to transport the product to oversee the unloading of the product. It is also expected that there will be a need for more workers to develop the AI programs. AI is, after all, only a program that a developer has coded. Coders will be needed to generate, collect, and manage relevant data that feeds into the AI training process. The CEA has also identified supervision as another probable area of demand. Supervision encompasses all roles related to monitoring, licensing, and repair of AI. At least initially, AI will require regular repair and maintenance, which may expand job openings for those with mechanical skills. Supervision of the program is also critical, especially when the task involves possible mortality, such as medical procedures. AI will require human judgment. The last area of demand that CEA covers are that of responding to paradigm shifts. For example, managing design changes in the infrastructure may be required as self-driving vehicles become more prevalent. There may be an increasing demand to adjust the travel landscape. There may also be other shifts that will be identified. One possible shift is that of cybersecurity. Humans will have to create new methods of detecting fraudulent transactions as cybercriminals change their tactics. The important thing for people to understand is that they may have to be open to changing their current profession to survive the onslaught of AI. Individuals are not the only ones who need to prepare. Organizations need to be prepared to adjust to the new competitive landscape. An article in the Australian periodical Startup Daily gave this advice, sharing three things that a small business owner can do to prepare for the age of AI:
Digitize your business: get online with a business website and automate as many manual processes as you can.

Focus on the customer experience that your product or service delivers. In the age of robotics, human contact will very likely become more valuable.

Broaden your business network. Create relationships and partnerships that will enable you to connect more strongly with people.

No matter which strategy that a business uses to compete in the market, to be competitive, it will have to embrace AI technology. Another area of adjustment is how the law is affected by AI. In his book, When Robots Kill: Artificial Intelligence Under Criminal Law, Gabriel Hallevy [30] presents arguments as to whether artificial intelligence should be held criminally liable. Hallevy concludes that if an AI entity meets the requirements, then there would be no reason not to impose criminal liability on it. As he sees it, if we don’t impose criminal liability on AI, then we must change the basic definition of criminal liability. There may also be liability questions regarding the developers who create the program and the company that produces it.

7 CONCLUSION
AI means many things to different people. Currently, AI is used for information and automation and has minimal learning capabilities. We are many years away from a fully self-aware AI program. All levels of AI carry risk. The primary AI programs are mainly a risk to skilled labor. Higher-level AI could post real dangers to humanity. The benefits of AI continue to grow, which will ensure that the technology is here to stay. Businesses and society as a whole will need to learn to use the new technology and make adjustments. Companies will need to incorporate AI to remain competitive, and workers may need to change their skill set to retain employment. As AI technology continues to evolve, questions concerning issues such as legal liabilities will continue to surface.

REFERENCES


