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Artificial Intelligence Implementation in Small Businesses

Abstract

Object: The main purpose of the paper is to make an overview on AI implementation in small businesses and to figure out if small businesses should use AI for their operations. The AI tools became extremely popular within the last decade; however, most businesses do not recognize its potential benefits.

Methods: A SWOT analysis that is supported by secondary research and dedicated survey among 32 business owners that incorporated AI tools.

Findings: Most survey participants indicated the high value of AI tools in enhancing business efficiency while the initial implementation cost being low due to the fact most participants use common AI solutions that are free or require minimal monetary investments, while the SWOT analysis illustrated high implementation and maintenance cost for uncommon AI solutions. However, common AI comes with more potential threats that can be eliminated by personalized AI tools.

Conclusions: AI can be a powerful boost for small businesses to operate more efficiently and to reduce unnecessary costs. However, small businesses should consider their own business needs and potential threats to fully utilize AI.

Keywords: artificial intelligence, implementation, maintenance, machine learning, deep learning, business needs, competitive advantage, decision making.

Introduction

In recent decades, Artificial Intelligence (AI) has become one of the most popular and intriguing technologies in the world. The usage of artificial intelligence, a term in today's society, is expanding quickly across a range of sectors. Since AI has the ability to increase productivity, save costs, and improve decision-making, small firms are not an exception to this trend. The use of AI in small firms, however, is not without its difficulties, since smaller companies sometimes lack the resources and technical expertise necessary to develop and operate such technology.

In recent years, there has been an increase in the usage of AI in small enterprises. Among other advantages, AI may help small firms automate processes, analyze data, and enhance consumer experiences (Loureiro et al., 2021). Chat bots with AI capabilities, for instance, may handle consumer questions and complaints, freeing up staff time for other activities. By evaluating client data and configuring campaigns appropriately, AI may assist small firms in personalizing their marketing initiatives. AI can also assist small firms in streamlining their operations by automating procedures like shipping and inventory management.

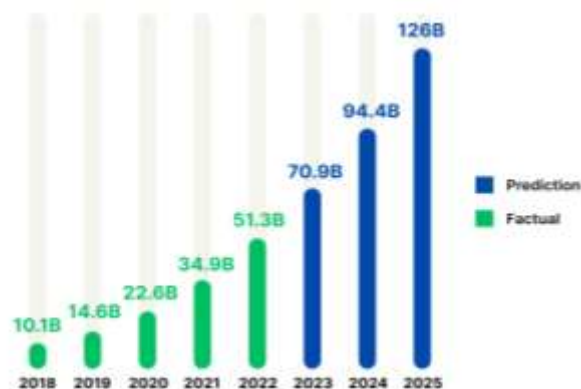


Figure 1.0 AI software market's global annual revenue, USD

Note – compiled by the authors based on (Beccue, 2023)

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According to Figure 1.0, annual revenue generated by AI in the global market has significantly risen over the past 5 years from \$10.1 billion to \$51.3 billion, and is expected to double within the next two years. This rise illustrates the significance of AI in the current market and its potential in the future to help businesses to generate revenue. In addition, it demonstrates that businesses incorporating AI tools are more likely to grow financially and have potential to generate more money.

Despite these advantages, there are still certain difficulties in small organizations when implementing AI. Small firms frequently lack the funding and technical professionals necessary to manage such technologies. Furthermore, small enterprises may find it difficult to compete with larger corporations due to the high cost of AI deployment. More than half of small firms polled in the US, UK, and Canada indicated they planned to invest in AI in the upcoming 12 months, according to a research by Burström et al. (2021). However, the same survey indicated that due to worries about complexity and expense, many small firms are reluctant to engage in AI. Sestino and De Mauro (2021) have released another study that emphasizes the necessity for small firms to invest in digital technologies like artificial intelligence in order to be competitive in the modern global economy. According to the study, small firms run the danger of slipping behind their larger competitors if they don't utilize digital technology.

Small enterprises contribute significantly to Kazakhstan's economy, creating 60% of jobs and more than 30% of GDP. The Kazakhstani government has realized the value of small enterprises and launched a variety of programs to aid in their expansion. These programs offer funding options, tax benefits, and entrepreneur training courses. But the adoption of AI in SMEs has been gradual, and many SMEs in Kazakhstan are still oblivious to the potential advantages of AI.

According to a research done by Mohamed et al. (2021), there is a dearth of knowledge regarding AI in Kazakhstan. Only 12% of Kazakhstan's small and medium-sized businesses (SMEs) have used AI technology, with the majority operating in the retail and hotel industries. The survey also discovered that a lack of resources and awareness about AI are the primary obstacles to its implementation in SMEs.

This article's goal is to give a thorough overview of how AI is used in small firms, with a particular emphasis on the situation in Kazakhstan. The potential advantages of AI for small businesses will be examined in the article, along with the difficulties small firms may have in embracing and utilizing this technology. The article will also showcase an analysis based on the survey conducted with small business owners in Kazakhstan that have successfully used AI technology and offer helpful guidance for entrepreneurs who are thinking about doing the same. The article is written to increase public awareness of the potential advantages of AI for small firms.

Literature Review

An area of computer science known as artificial intelligence (AI) tries to develop intelligent robots that are capable of carrying out activities that would ordinarily require human intellect, such as comprehending natural language, seeing patterns, and making judgment calls (Zhang & Lu, 2021). AI may be divided into two primary categories: weak or narrow AI, which is created to carry out certain tasks, and strong or general AI, which strives to create robots that are capable of carrying out any intellectual job.

The development of early computing systems that were capable of carrying out simple tasks in the 1950s gave rise to the idea of artificial intelligence. However, AI did not start to receive broad attention or evolve into a substantial area of study and development until the twenty-first century (Haenlein & Kaplan, 2019). There are several ways to look at AI, and some supporters claim that it has the power to completely transform society and enhance human existence in innumerable ways. AI may be used, for instance, to create novel medicinal therapies, improve transportation, or even slow down climate change (Davenport, Kalakota, 2019). While others have expressed worry that AI might have unfavorable effects, such as escalating economic inequality and causing job losses as machines take the place of humans in the workforce (Mutascu, 2021).

AI comes in a variety of forms, and each form has certain characteristics, uses, and applications. The most fundamental type of AI, rule-based AI, involves creating a collection of rules or if-then statements that direct how the machine behaves. This kind of AI is best suited for resolving straightforward issues with definite, established rules. For instance, rule-based AI is used by chatbots that respond to FAQs on a company's website. Machine learning (ML) is a subset of artificial intelligence that gives computers the ability to learn from data and develop over time without explicit programming. Based on past data, ML algorithms may find patterns and forecast the future. Predictive maintenance, tailored marketing, and fraud detection are a few examples of ML uses in business. In order to execute complicated tasks like image identification and natural

language processing, deep learning is a subset of machine learning. Applications like facial recognition, driverless cars, and speech recognition all make use of deep learning algorithms. Machines can comprehend and evaluate human language, including text and speech, thanks to natural language processing (NLP). Applications like chatbots, virtual assistants, and sentiment analysis all make use of NLP. Computer vision helps machines comprehend and analyze visual data, including pictures and movies. Applications for computer vision include object detection, facial recognition, and autonomous vehicles. Robotics: This branch of artificial intelligence entails creating robots that can work alone or with human aid (Al-Shabandar et al., 2019).

By altering interactions and connections between stakeholders and citizens, artificial intelligence is reshaping business, the economy, and society. Due to its promise to increase productivity, improve decision-making, and save costs, AI is being used by organizations all over the world. Businesses that use AI applications should see improvements in terms of additional business value, such as higher revenue, lower costs, and better operational effectiveness (Huang & Rust, 2021). AI technology is being applied in the business world to improve decision-making, expedite operations, and improve customer experience. For instance, businesses use chatbots and virtual assistants to offer help and customer care. To extract insights from massive amounts of data, AI-powered data analytics technologies are being deployed, which may assist enterprises in making data-driven choices.

However, a new set of obstacles and difficulties are signaled by the integration of AI into organizational activities. Some of these include using cross-domain knowledge to create models that are precise and insightful, locating, integrating, and purifying a variety of data sources, and integrating AI applications with current systems and processes (Lin-Greenberg, 2020). Organizations must comprehend these issues and the technologies' potential for value addition.

Data quality is one of the main obstacles to deploying AI. AI uses a ton of data to generate precise predictions and judgments. Results that are skewed or erroneous might be the consequence of poor data quality. Businesses must make sure that the data they utilize is reliable, pertinent, and current. The expense of integrating AI is a major obstacle as well. AI necessitates considerable financial, human, and technological expenditures (Mikalef et al., 2019). For small and medium-sized firms, the expense might be particularly difficult. But lately, the price of adopting AI has been falling, making it more affordable for companies of all sizes. Another challenge organizations have when deploying AI is the lack of trained workers. Personnel with particular abilities in machine learning, data science, and computer programming are needed to implement AI technology. There is a talent shortage as a result of the huge growth in the demand for these trained workers in recent years.

Methods

In order to identify the potential of AI implementation in small businesses, the SWOT analysis method has been chosen. This analysis helps not only to identify different sides to AI in business, but also helps to identify potential benefits in the future and what threats to consider while implementing the technology. A SWOT analysis can assist in identifying the internal and external elements that may have an impact on the efficiency of AI adoption in small firms. The analysis is based on the secondary research on AI implementation and the conducted survey.

The survey was conducted in the first quarter of 2023 in Kazakhstan with participants from Almaty, Astana, Shymkent and Karaganda. The target audience of the survey is small business owners that incorporated AI tools in their business operations. The number of participants is 32 with businesses ranging from 3 months old to 6 years old. Survey has 6 close-ended and 5 open-ended questions that help to evaluate the businesses' experience with AI adoption in terms of efficiency boost, money-time consumption and the field of work. Clusterization of answers was used to structure and group data.

There are several limitations to the conducted survey. Due to the fact that a little percentage of small businesses in Kazakhstan incorporates AI tools, it leaves us with a small number of participants. Moreover, almost 70 percent of participants possess business that operates in the field of media or retail, which makes the results majorly affected by these two fields.

Results

The results of the research have been compiled in the SWOT analysis table that represents the main findings regarding AI and its usage in small businesses from business owners' point of view. This section of the article describes each point in the table and provides supporting information from the survey or/and the secondary research.

Table. SWOT analysis on AI implementation in small businesses

Strengths	Weaknesses	Opportunities	Threats
Improved Efficiency	Require Technical Skills	Automating Business	Privacy issues
Cost Savings	Dependence on AI	Improved Decision-making	Lack of Standardization
Competitive Advantage	Limited Flexibility	Access to new Media	Keep up with AI tools
Free to Start	High implementation cost for uncommon AI solutions	Enhance the Product	Dependence on third-parties

Note – compiled by the authors

Strengths. Automating tedious and repetitive operations is one way AI might increase productivity in small organizations. AI-powered chat bots, for instance, may handle customer support enquiries, freeing up staff members' time to concentrate on more strategic efforts. AI can also automate data input and scheduling chores, which lowers the possibility of mistakes and increases accuracy in general. Small company owners reported that automation technology had helped them save time and money in proportions of 72% and 65%, respectively (Salesforce, 2018).

AI may also increase productivity by optimizing operations. Small firms may make modifications and improve their operations by using AI to discover inefficiencies and bottlenecks in their processes. AI, for instance, may support supply chain management by optimizing inventory levels and forecasting demand. According to research by Accenture, AI can boost small enterprises' productivity by up to 40%.



Figure 2.0 Average evaluation of AI effectiveness in small businesses based on survey

Note – compiled by the authors

According to Figure 2.0, the average estimation of AI boosting the effectiveness of the business was 6.94 out of 10, which indicates the high level of satisfaction among participants regarding effectiveness of AI in their businesses. Participants indicate task, ideation and planning optimizations as a primary reasoning for high evaluation. In addition, they gave concrete examples of using media AI tools that help to edit digital content in the form of text, picture, and video: Chat GPT, MidJourney, Capcut AI tools, remove.bg, and Copy AI.

Moreover, Chatbots powered by AI can respond to routine client questions, freeing up staff members to work on more difficult problems. Chatbots will enable organizations to save more than \$8 billion annually by 2022 (Chong et al., 2021). These strengths of optimization of business operations and reducing costs give competitive advantage to businesses incorporating AI tools. In addition, 9 out of 10 AI tools indicated by participants are free or have free versions, which makes the AI implementation cost neglectible at the start compared to the value it provides.

Weaknesses. There is plenty of AI tools that require a different set of technical and analytical skills to fully operate, such as prompt design, output validation and requirement identification.



Figure 3.0 Average evaluation of investments in AI implementation based on survey

Note – compiled by the authors

According to Figure 3.0, the average estimation of required time investment in AI technologies was 4.84 out of 10, which indicates the medium level of time consumption among participants regarding AI implementation in their businesses. Participants express the need to have some sort of technical knowledge to operate with AI tools to get quality output.

Despite the fact that participants indicated a small evaluation of monetary investment of 2.43, it does not represent the real cost of complex and custom AI implementation. The possible reason for monetary investment evaluation being low in Figure 3.0 is participants' needs being within the scope of common AI's possibilities, which means free AI tools are suitable for their business needs. However, when business needs are outside of free and common AI tools' capabilities, AI becomes expensive. The initial cost needed to use custom AI might be a substantial barrier for small enterprises. Many small firms do not have the means to spend on technology, software, and employees since these costs can mount up rapidly. The cost of implementing AI for small organizations can range from \$10,000 to \$1 million, according to Garbuio & Lin (2019), with maintenance being 20 to 50 percent of the initial investment.

In addition, AI models can be inflexible, being a major drawback in a rapidly changing market. Because AI systems are created to function within a set of constraints, it may be challenging for them to adjust to changing conditions. For instance, the AI system might not be able to adapt rapidly enough to handle changes in market conditions or a sudden rush of consumers at a small firm. 72% of executives think that the adoption of AI has not been adaptable enough to shifting company demands (Canhoto, Clear, 2020).

Opportunities. Because of the development of more AI models and the data enlargements, the better data processing and output quality is a potential opportunity of implementing AI. Decision-making errors are less likely since AI systems can process data more faster and more precisely than humans. Small firms may make better decisions about marketing, sales, and product development thanks to AI-powered analytics tools that can spot patterns and trends in consumer behavior that may not be obvious to humans.

Small firms may more efficiently detect and manage risks with the use of AI technology. Using data analysis, AI-powered risk management tools, for instance, can spot risks to a small business's operations or finances and enable them to take preventative action. Bussmann et al. (2020) claim that AI can enhance risk management by up to 25%.

In addition, small business owners can now generate high-quality videos, photos, and other media material without the need for costly equipment or specialized editing software thanks to the availability of AI-powered editing tools. An AI-powered editing tool like Adobe Sensei, for instance, can evaluate video material and make wise editing choices based on elements like audio quality, lighting, and camera position. 85% of organizations now utilize video as a marketing strategy (Verma et al., 2021). The availability of AI-powered picture editing tools is also expanding, enabling small companies to produce photographs with a professional appearance for usage on social media and other platforms. For instance, Canva, a design tool driven by AI, can automatically change the color and arrangement of photos to make them more aesthetically pleasing. There are now over 25 million companies utilizing Instagram for marketing (Vlacic et al., 2021).

Threats. The susceptibility to cyberattacks is one of the privacy issues with AI in small organizations. Small firms are more vulnerable to cyberattacks that damage their systems and data because they lack the funding to put strong cybersecurity safeguards in place. According to Yampolskiy (2016), small businesses are the most often targets of cyberattacks, accounting for 43% of all cyberattacks. These cyberattacks may cost small businesses money and damage their reputation with customers.

The difficulty of integrating various AI solutions with current systems is one of the key problems with the lack of standardization. Due to the potential need for firms to invest in new technology or staff to handle the integration process, this might result in operational inefficiencies and higher costs. In addition, the absence of standards can make it challenging for organizations to compare and assess various AI systems, creating confusion and doubt about which solutions are best suited for their requirements. More than 70% of the organizations faced the issue of lack of standards in AI, with many saying that this was a major hurdle to adoption (Yu & Carroll, 2021).

Risk of vendor lock-in is one of the key issues of relying on third-party providers. It may be challenging for small firms to switch service providers or implement new technologies since they may become dependent on a single vendor for their AI solutions. Due to this, small enterprises may not be as flexible or adaptable and may find it challenging to adjust to shifting market conditions or client demands (Ali et al., 2020). In addition, if the third-party service is down, the entire business operation is at risk. For example, Chat GPT faced issues with availability before including paid subscription and stayed unstable for weeks.

Discussions

The SWOT analysis delivers significant insights into the strengths, weaknesses, opportunities, and threats of AI implementation in small businesses while providing a thorough summary of its current situation. The analysis persistently illustrated that the advantages of AI deployment outweigh its disadvantages due to the fact it provides high value to the business compared to its minimal investment with most AI tools being free to low-cost as of now. However, the analysis also provides a lot of potential threats that need to be considered if a company wants to continuously integrate AI in its business operations with minimal risks of data leakage, data corruption or business being dependent on unstable products.

This suggests that starting basic AI implementation in a small business is relatively easy and requires minimal to no monetary investment if the business does not require custom or complex solutions. The main factor that dictates whether a small business needs to use AI or not is business needs. AI deployment can utilize mentioned strengths and opportunities in a small business if tasks that need to be solved are common and can be accomplished within the scope of open-source data.

For businesses that are already implementing basic or common AI tools, the transition to more personalized AI solutions should be considered a high cost investment that can make AI solutions more secure from the threats such as dependency on third-party tools, privacy issues and lack of standardization. However, a business should consider return-on-investment (ROI) of personalized AI to a particular business model as the cost of implementation and maintenance of such AI is pretty high.

Conclusions

The research concludes that it is important that small businesses do not view AI as an expensive tool only available to larger enterprises, but it should be seen as a valuable opportunity to boost their business and reduce possible costs. With the ability to automate processes and gain insights through data analysis, small businesses can increase efficiency, improve decision-making, and ultimately achieve greater success.

Most researchers suggest that AI implementation is expensive and should not be considered at a small scale; however, we see that AI tools have become more accessible to small businesses. While some level of technical skill may be required, AI can often be utilized with minimal to no monetary investment. Small businesses should take advantage of the benefits it can offer. By carefully considering their needs and investing in the right tools and resources, small business owners can harness the power of AI to stay competitive and grow their businesses.

The research can be improved by collecting more answers from different small businesses, examining the benefits of AI implementation within some period of time and testing different AI tools for different business needs.

Overall, AI can become a great business boost if implemented correctly considering the business needs and potential threats regarding the technology. Small businesses should implement basic to complex AI solutions to increase productivity, save time and reduce possible costs.

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Шағын бизнеске жасанды интеллект енгізу

Аңдатпа:

Мақсаты: Мақаланың негізгі мақсаты — шағын бизнеске жасанды интеллектті енгізуге шолу жасау және шағын бизнес өз қызметінде жасанды интеллектті қолдануы керек пе екенін анықтау. Жасанды интеллект құралдары соңғы онжылдықта өте танымал болды, дегенмен көптеген компаниялар бұл технологияның әлеуетті артықшылықтарын түсінбейді.

Әдісі: SWOT талдауы жасанды интеллект құралдарын пайдаланған 32 шағын бизнес иелерінің арасындағы арнайы сауалнама мен қайталама зерттеулерге сүйене отырып жасалған.

Қорытынды: Сауалнамаға қатысушылардың көпшілігі іске асырудың бастапқы құны төмен болғандықтан бизнестің тиімділігін арттыру үшін жасанды интеллект құралдарының жоғары құндылығын атап өтті. Оның себебі — қатысушылардың көпшілігі тегін немесе аз ақшалай инвестицияны қажет ететін жалпы жасанды интеллект шешімдерін пайдаланады, ал SWOT талдауы әдеттен тыс жасанды интеллект шешімдерін енгізу мен қызмет көрсетудің жоғары құнын көрсетті. Жалпы жасанды интеллект көптеген ықтимал қауіптермен бірге келеді, ал жекелендірілген жасанды интеллект құралдары бұл қауіптерді жоя алады.

Тұжырымдама: Жасанды интеллект шағын бизнестің тиімділігін арттыруға және қажетсіз шығындарды азайтуға күшті ынталандыру бола алады. Дегенмен, шағын бизнес жасанды интеллектті толық пайдалану үшін өздерінің бизнес қажеттіліктері мен ықтимал қауіптерін ескеруі керек.

Кілт сөздер: жасанды интеллект, енгізу, техникалық қызмет көрсету, машиналық оқыту, терең оқыту, бизнес қажеттіліктері, бәсекелестік артықшылықтар, шешім қабылдау.

А.Ж. Тиштыкбаева, Н.Н. Гелашвили, А.Е. Турусбеков

Внедрение искусственного интеллекта в малый бизнес

Аннотация:

Цель: Сделать обзор внедрения искусственного интеллекта в малом бизнесе и выяснить, следует ли малому бизнесу использовать искусственный интеллект в своей деятельности. Инструменты искусственного интеллекта стали чрезвычайно популярными за последнее десятилетие, однако большинство компаний не осознают их потенциальных преимуществ.

Методы: SWOT-анализ, подкрепленный вторичными исследованиями и специальным опросом среди 32 владельцев бизнеса, которые использовали инструменты искусственного интеллекта.

Результаты: Большинство участников опроса указали на высокую ценность инструментов искусственного интеллекта для повышения эффективности бизнеса при низкой начальной стоимости внедрения из-за того, что большинство участников используют распространенные решения для искусственного интеллекта, которые бесплатны или требуют минимальных денежных вложений, в то время как SWOT-анализ показал высокую стоимость внедрения и обслуживания необычных решений для искусственного интеллекта. Однако обычный искусственный интеллект сопряжен с большим количеством потенциальных угроз, которые могут быть устранены с помощью персонализированных инструментов искусственного интеллекта.

Выводы: Искусственный интеллект может стать мощным стимулом для повышения эффективности работы малого бизнеса и снижения ненужных затрат. Однако малым предприятиям следует учитывать свои собственные бизнес-потребности и потенциальные угрозы, чтобы в полной мере использовать искусственный интеллект.

Ключевые слова: искусственный интеллект, внедрение, техническое обслуживание, машинное обучение, глубокое обучение, бизнес-потребности, конкурентное преимущество, принятие решений.