DIGITISATION OF MARKETING AND LOGISTICS ACTIVITIES OF MANUFACTURING AND TRADING ENTERPRISES

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ABSTRACT

Purpose: The study aims to explore the benefits of digitisation and provide insights into how companies can successfully implement digital strategies to improve their marketing and logistics functions.

Theoretical framework: The study utilizes a comparative analysis of information systems used by manufacturing and trading enterprises to understand the digitalisation process.

Design/methodology/approach: The research methodology involves defining the scope of digitalisation, assessing the current state, developing a digitalisation strategy, planning the implementation, executing the implementation, monitoring progress, optimizing the process, and continuously reviewing and improving.

Findings: The proposed algorithm consists in defining the scope of digitalisation, assessing the current state, developing a digitalisation strategy, planning the implementation, executing the implementation, monitoring progress, optimising the process, and continuously reviewing and improving. The effectiveness of digitalisation is evaluated using objective mathematical models and Key Performance Indicators specific to the goals of the digitalisation process.

Research, Practical & Social implications: The article provides an example of how the mathematical model for digitalisation can be implemented in a real-world scenario. The mathematical model is represented as an equation that maximises the value generated from the digitalisation of marketing and logistics activities subject to constraints such as budget, efficiency improvement, and customer satisfaction improvement.

Originality/value: This article provides insights into the digitisation of marketing and logistics activities in manufacturing and trading enterprises. It offers a systematic approach and a mathematical model for evaluating and implementing digitalisation strategies, contributing to the existing knowledge on digital transformation in the business domain.

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RESUMO
Objetivo: O estudo tem como objetivo explorar os benefícios da digitalização e fornecer percepções sobre como as empresas podem implementar com sucesso estratégias digitais para aprimorar suas funções de marketing e logística.

Estrutura teórica: O estudo utiliza uma análise comparativa dos sistemas de informação usados por empresas de manufatura e comércio para entender o processo de digitalização.

Projeto/metodologia/abordagem: A metodologia de pesquisa envolve a definição do escopo da digitalização, a avaliação do estado atual, o desenvolvimento de uma estratégia de digitalização, o planejamento da implementação, a execução da implementação, o monitoramento do progresso, a otimização do processo e a revisão e o aprimoramento contínuos.

Conclusões: O algoritmo proposto consiste em definir o escopo da digitalização, avaliar o estado atual, desenvolver uma estratégia de digitalização, planejar a implementação, executar a implementação, monitorar o progresso, otimizar o processo e revisar e melhorar continuamente. A eficácia da digitalização é avaliada usando modelos matemáticos objetivos e indicadores chave de desempenho específicos para as metas do processo de digitalização.

Implicações sociais, práticas e de pesquisa: O artigo fornece um exemplo de como o modelo matemático para digitalização pode ser implementado em um cenário do mundo real. O modelo matemático é representado como uma equação que maximiza o valor gerado pela digitalização das atividades de marketing e logística sujeitas a restrições como orçamento, melhoria da eficiência e melhoria da satisfação do cliente.

Originalidade/valor: Este artigo fornece insights sobre a digitalização das atividades de marketing e logística em empresas de manufatura e comércio. Ele oferece uma abordagem sistemática e um modelo matemático para avaliar e implementar estratégias de digitalização, contribuindo para o conhecimento existente sobre transformação digital no domínio dos negócios.

Palavras-chave: Digitalização, Empresas, Logística, Manufatura, Marketing, Comércio.
INTRODUCTION

Over the past few decades, digital technology has transformed various industries, including manufacturing and trading enterprises. The digitisation of marketing and logistics activities has become increasingly important as companies strive to improve their competitiveness in the global market. In particular, digitisation can enhance efficiency, reduce costs, and improve customer experiences (Malynovska et al. 2022). Marketing and logistics are critical components of any manufacturing or trading enterprise. Marketing activities such as product promotion, pricing, and customer segmentation are essential for generating revenue and building brand recognition. On the other hand, logistics activities such as supply chain management, transportation, and warehousing are necessary for ensuring that products are delivered to customers on time and in good condition.

Traditionally, marketing and logistics activities were conducted using manual processes, which were time-consuming and prone to errors. However, the emergence of digital technology has revolutionised these activities, making them faster, more accurate, and more cost-effective. For instance, companies can now use digital tools such as social media, e-commerce platforms, and marketing automation software to reach a wider audience, promote their products more efficiently and track customer interactions in real-time (Halkiv et al. 2021; Dooranov et al. 2023). Similarly, logistics activities can be digitised using technologies such as RFID, GPS, and blockchain. These tools enable companies to track products, optimise routes, and monitor inventory levels, leading to improved efficiency and reduced costs.

In addition to efficiency and cost-effectiveness, inclusiveness and social responsibility are also important factors to consider in the digitisation of marketing and logistics activities for manufacturing and trading enterprises (Oliveira et al., 2022; Semigina & Chystiakova 2020; Dudek et al. 2023). As companies strive to adopt digital technologies, it is essential to ensure that they are accessible and inclusive to all members of society, including those with disabilities or limited access to technology. Moreover, manufacturing and trading enterprises are responsible for considering the social and environmental impacts of their operations (Pereira et al., 2022; Noronha et al., 2023). By digitising their marketing and logistics activities, companies can reduce their carbon footprint by minimising paper-based processes and optimising transportation routes. Furthermore, companies can adopt ethical and sustainable practices by ensuring that the digital tools and platforms they use comply with privacy and data protection regulations.
Another vital aspect to consider in the digitisation of marketing and logistics activities for manufacturing and trading enterprises is the taxation system. With the rise of e-commerce and online transactions, it has become increasingly challenging for governments to enforce tax regulations and collect revenues from digital transactions. To address this issue, many countries have introduced new taxation rules and regulations for digital transactions. For instance, some countries have implemented a digital services tax, which requires companies to pay taxes on their digital sales in that country, regardless of whether they have a physical presence or not. Other countries have introduced a value-added tax (VAT) on digital services, similar to how it is applied to physical goods. Manufacturing and trading enterprises must consider these tax rules and regulations when digitising their marketing and logistics activities. Failure to comply with tax regulations can result in legal and financial consequences, including fines and reputational damage (Bashynska et al., 2022; Sidelnykova et al. 2022; Slatvinska et al. 2022).

The objective of this study is to explore the benefits and implications of digitising marketing and logistics activities for manufacturing and trading enterprises. The study aims to provide insights into how companies can successfully implement digital strategies to improve their marketing and logistics functions. Additionally, the research will address practical considerations such as inclusiveness, social responsibility, environmental impact, and tax regulations that arise in the process of digitisation. By identifying the specific characteristics and requirements of these activities, the study will contribute to the existing knowledge on digital transformation in the context of manufacturing and trading enterprises.

LITERATURE REVIEW

Marketing and logistics are two critical functions for production and trade enterprises. The main goal of marketing is to identify and satisfy customer needs, while logistics focuses on moving goods and services from suppliers to customers. Here are some peculiarities of the marketing and logistics activities of production and trade enterprises (Table 1).

<table>
<thead>
<tr>
<th>Marketing activities</th>
<th>Logistics activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Research: Production and trade enterprises must conduct market research to identify the needs and wants of customers. This information is crucial for developing marketing strategies and product offerings that align with customer preferences.</td>
<td>Supply Chain Management: Logistics involves managing the entire supply chain, from sourcing raw materials to delivering finished products to customers. This requires coordinating activities across multiple departments and partners, including suppliers, manufacturers, distributors, and retailers.</td>
</tr>
</tbody>
</table>
| Branding: Enterprises must build a strong brand image to differentiate themselves from competitors. This involves creating a unique brand identity. | Transportation: Logistics also involves managing the transportation of goods from one location to another. This includes selecting the most efficient and cost-

Messaging, and visual elements that resonate with target customers.

**Product Development:** Enterprises must continuously develop new products or improve existing ones to stay relevant in the market. This requires investing in research and development, product design, and testing.

**Inventory Management:** Logistics also involves managing inventory levels to ensure that the right products are available when customers need them. This requires forecasting demand, managing production schedules, and optimising inventory levels to minimise costs and maximise customer satisfaction.

**Sales and Distribution:** Marketing also involves developing sales and distribution channels to reach customers effectively. This includes selecting the right sales channels, developing pricing strategies, and managing the distribution of products to retailers, wholesalers, or directly to customers.

**Customer Service:** Logistics plays a critical role in customer service, as it affects the speed and accuracy of order fulfilment, delivery times, and overall product quality. Enterprises must invest in customer service systems and processes to ensure that customers receive their orders on time and in good condition.

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Source: prepared by the authors (2023) based on Hushtan 2021; Bertuolo & Minciotti, 2022; Sala et al. 2023)

Technology is vital in logistics activities, from inventory management to transportation tracking. Production and trade enterprises must adopt the latest technology to enhance their logistics operations and improve customer experience.

In summary, marketing and logistics activities are critical functions for the success of production and trade enterprises. While marketing activities focus on promoting and selling products or services, logistics activities ensure the timely and efficient movement of goods from the production site to the end customer. Both functions require careful planning, execution, and monitoring to achieve customer satisfaction and business success.

To optimize communications between entities in supply chains, modern software solutions implemented in information systems are constantly being developed.

Information systems and technologies used in organizing procurement activities can be divided into two types: those that are aimed at interacting with suppliers and those that are aimed at the internal activities of the purchasing department of a wholesale trade enterprise.

The introduction of information technology can take place on the part of the wholesaler as part of the procurement activity or on the part of the manufacturer (supplier) as part of the marketing activity. Comparative characteristics of information systems used by wholesalers are presented in Table 2.

<table>
<thead>
<tr>
<th>Criterion name</th>
<th>Information systems used by manufacturing and trading enterprises</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Goal</strong></td>
<td>General electronic document management and improving the efficiency of interaction with suppliers</td>
</tr>
<tr>
<td><strong>Direction of interaction</strong></td>
<td>With suppliers</td>
</tr>
<tr>
<td><strong>Implementation Initiative</strong></td>
<td>Supplier or Enterprise</td>
</tr>
</tbody>
</table>

Source: prepared by the authors (2023) based on Miao & Zhao 2023; Zhou et al. 2023)
Manufacturing and trading enterprises have different needs when it comes to information systems. Here are some comparative characteristics of the information systems used by these two types of enterprises:

Production Planning: Manufacturing enterprises require systems that can handle complex production planning and scheduling, including material requirements planning, capacity planning, and production scheduling. On the other hand, trading enterprises require systems that can handle sales forecasting, inventory management, and supply chain management.

Product Design: Manufacturing enterprises require systems that can handle product design and engineering, including computer-aided design (CAD) and computer-aided manufacturing (CAM) systems. Trading enterprises require systems that manage product information, including product catalogues and pricing information.

1. Order Management. Manufacturing enterprises require systems that can handle order management, including order processing, production tracking, and delivery schedule. Trading enterprises require systems that can handle sales order management, including order processing, invoicing, and payment processing.

2. Customer Relationship Management (CRM). Both manufacturing and trading enterprises require CRM systems to manage customer interactions, track customer preferences, and analyse customer data. However, manufacturing enterprises may also require CRM systems that can handle service and support for their products.

3. Supply Chain Management. Both manufacturing and trading enterprises require systems that can handle supply chain management, including procurement, logistics, and inventory management. However, manufacturing enterprises may require more complex supply chain management systems that can handle the sourcing of raw materials, production planning, and delivery schedule.

4. Business Intelligence. Both manufacturing and trading enterprises require business intelligence systems to analyse data and gain insights into their operations. However, manufacturing enterprises may require more specialised business intelligence systems to handle complex data from multiple sources, such as sensors and manufacturing equipment.

Overall, while manufacturing and trading enterprises require similar information systems, the specific requirements for these systems may vary significantly depending on the nature of their operations. Manufacturing enterprises require more complex systems that can
handle production planning and design, while trading enterprises require systems that can handle inventory and supply chain management. Additionally, manufacturing enterprises may require more specialised systems that can handle complex data from multiple sources, while trading enterprises may require more specialised systems that can handle sales and marketing data.

The digitalisation of marketing and logistics activities is becoming more critical for businesses of all types and sizes. By implementing digital technologies, enterprises can achieve greater efficiency, streamline processes, and reduce costs. Additionally, digitalisation can help businesses better understand their customers' needs and preferences, improving customer experience and increasing customer loyalty. Moreover, digitalisation can provide greater transparency into business operations, enabling better decision-making and more effective risk management. Finally, digitalisation can help businesses stay competitive in a rapidly changing market by allowing them to adapt quickly to new technologies and market conditions.

METHODOLOGY

The methodology for this article on the digitisation of marketing and logistics activities of manufacturing and trading enterprises involves a comprehensive review of relevant literature, case studies, and industry reports. The following steps were taken to gather and analyse information:

- **literature review:** A thorough review of relevant literature was conducted using academic databases such as SCOPUS, JSTOR, ScienceDirect, and Google Scholar. Keywords such as "digitisation," "marketing," "logistics," "manufacturing," and "trading" were used to search for relevant articles, journals, and books.
- **case studies:** A selection of case studies from various industries was examined to gain insights into how companies are implementing digital strategies in their marketing and logistics activities. Case studies were collected from reputable sources such as Harvard Business Review, McKinsey & Company, and Forbes.
- **industry reports:** Industry reports from reputable sources such as Gartner, Deloitte, and PwC were reviewed to gain a broader understanding of trends and best practices in the digitisation of marketing and logistics activities.

The gathered information was analysed to identify common themes, challenges, and opportunities in the digitisation of marketing and logistics activities of manufacturing and trading enterprises. The analysis considered the impact of digitisation on efficiency, cost-
effectiveness, inclusiveness, social responsibility, and the taxation system. Based on the analysis, a conclusion was drawn regarding the benefits of digitisation and recommendations for manufacturing and trading enterprises to implement digital strategies in their marketing and logistics activities successfully.

Overall, this methodology allowed for a comprehensive and evidence-based examination of the digitisation of marketing and logistics activities for manufacturing and trading enterprises.

RESULTS AND DISCUSSION

Here is a proposed algorithm for the digitalisation of marketing and logistics activities of manufacturing and trading enterprises:

Figure 1. The algorithm for the digitalisation of marketing and logistics activities of manufacturing and trading enterprises.

<table>
<thead>
<tr>
<th>Stages</th>
<th>Tasks</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1. Define the scope of digitalisation</td>
<td>Define the scope of digitalisation: Identify the marketing and logistics activities that can be digitalised, such as online advertising, social media marketing, inventory management and transportation tracking.</td>
<td>List of marketing and logistics activities to be digitalised. Assessment of the potential benefits of digitalisation.</td>
</tr>
<tr>
<td>Stage 2. Assess the current state</td>
<td>Evaluate the current marketing and logistics processes, identify improvement areas, and set digitalisation targets.</td>
<td>Evaluation of current marketing and logistics processes. Identification of areas of improvement. Setting targets for digitalisation.</td>
</tr>
<tr>
<td>Stage 3. Develop a digitalisation strategy</td>
<td>Define the goals and objectives of the digitalisation process, determine the budget and timeline for implementation, and identify the tools and technologies required.</td>
<td>Goals and objectives of the digitalisation process. Budget and timeline for implementation. Identification of the tools and technologies required.</td>
</tr>
<tr>
<td>Stage 4. Plan the implementation</td>
<td>Develop a detailed implementation plan, including timelines, resource allocation, and communication channels.</td>
<td>Detailed implementation plan. Timelines for implementation. Resource allocation. Communication channels.</td>
</tr>
<tr>
<td>Stage 5. Execute the implementation</td>
<td>Begin implementing the digitalisation process according to the implementation plan. This may involve deploying new software or hardware, training employees, and changes to workflows.</td>
<td>Number of software or hardware deployed. Employee training completion rate. Workflow changes implemented.</td>
</tr>
<tr>
<td>Stage 6. Monitor and evaluate progress</td>
<td>Regularly track and measure the progress of the digitalisation process against the defined targets, and identify any areas for improvement.</td>
<td>Progress against defined targets. Metrics on the impact of digitalisation on marketing and logistics activities. Identification of areas for improvement.</td>
</tr>
<tr>
<td>Stage 7. Optimise the digitalisation process</td>
<td>Continuously optimise the digitalisation process to maximise its effectiveness and impact. This may involve changing the implementation plan, improving training programs, or adopting new technologies.</td>
<td>Changes made to an implementation plan. Improvement in training programs. Adoption of new technologies.</td>
</tr>
<tr>
<td>Stage 8. Continuously review and improve</td>
<td>Regularly review the digitalisation process and seek feedback from employees and customers to identify opportunities for improvement and further optimisation.</td>
<td>Regular reviews of the digitalisation process. Feedback from employees and customers on opportunities for improvement. Implementation of improvements.</td>
</tr>
</tbody>
</table>

Source: prepared by the authors (2023).
The algorithm for the digitalisation of marketing and logistics activities of manufacturing and trading enterprises involves defining the scope of digitalisation, assessing the current state, developing a digitalisation strategy, planning the implementation, executing the implementation, monitoring progress, optimising the process, and continuously reviewing and improving.

The second important task is to evaluate the effectiveness of digitalisation, and this assessment should be based on objective mathematical models, excluding the subjective factor.

Evaluating the effectiveness of digitalisation is an important task, and using objective mathematical models can help to eliminate subjective factors and provide a more accurate assessment of the impact of digitalisation.

One approach to evaluating the effectiveness of digitalisation is to use Key Performance Indicators (KPIs) that are specific, measurable, and relevant to the goals of the digitalisation process. These KPIs can be used to track progress over time and measure the impact of digitalisation on marketing and logistics activities.

Some possible KPIs for evaluating the effectiveness of digitalisation in marketing and logistics activities include:

1. Sales growth rate;
2. Reduction in logistics costs;
3. Increase in customer satisfaction rate;
4. Improvement in inventory turnover rate;
5. Reduction in order fulfilment time;
6. Increase in website traffic and engagement rate;
7. Improvement in online conversion rate.

These KPIs can be measured over time and compared to the baseline performance before the digitalisation process. By using objective mathematical models to analyse the data, the enterprise can determine the ROI of digitalisation and identify areas for further improvement.

The specific KPIs used should be tailored to the goals of the enterprise and the specific marketing and logistics activities being digitalised. Additionally, the enterprise should ensure that the data used to calculate the KPIs is accurate and reliable and that any limitations or biases in the data are considered when evaluating the effectiveness of digitalisation.

The digitalisation of marketing and logistics activities is crucial for the success of manufacturing and trade enterprises in today's digital age. The mathematical model of
digitalisation of marketing and logistics activities of manufacturing and trade enterprises can be represented as follows:

$$\text{Maximize } V = f(I, C, E, D)$$  \hspace{1cm} (1)

Where,

$V$ – the value generated from the digitalisation of marketing and logistics activities;
$I$ – the investment required to implement digitalisation;
$C$ – the cost savings generated by digitalisation;
$E$ – the increase in efficiency achieved through digitalisation;
$D$ – the increase in customer satisfaction achieved through digitalisation.

Subject to:

The investment $I$ must be within the budget constraints of the enterprise.
The increase in efficiency $E$ must be significant enough to justify the investment in digitalisation.
The increase in customer satisfaction $D$ must be significant enough to justify the investment in digitalisation.
The cost savings generated by digitalisation $C$ must be significant enough to justify the investment in digitalisation.

To solve the model, we must first identify the marketing and logistics activities that can be digitised, such as inventory management, transportation tracking, online ordering, and customer engagement. We can then estimate the investment required to implement digitalisation, including technology, training, and implementation costs.

Next, we must assess the potential benefits of digitalisation, including the cost savings generated by automation, the increase in efficiency achieved through real-time data analysis, and the increase in customer satisfaction achieved through personalised and convenient services.

Finally, we must consider the constraints of the enterprise, such as budget, resources, and skills, and determine the optimal digitalisation strategy that maximises the value generated while minimising the investment required.

Here is an example of how the mathematical model for the digitalisation of marketing and logistics activities can be implemented in a real-world scenario:

“ACN Anset” is a medium-sized enterprise that produces automotive parts for various clients. The management team has identified an opportunity to improve their marketing and logistics activities through digitalisation. The budget for this digitalisation initiative is $200,000. The goal is to maximise the value generated from digitalisation while ensuring that the investment is within budget and that the increase in efficiency and customer satisfaction justifies the investment.
To implement this mathematical model, the following steps can be taken:

1. Define the variables (see equation 1).
2. Determine the objective: The objective is to maximise the value generated from the digitalisation of marketing and logistics activities.
3. Identify the constraints:
   - The investment I must be within the budget constraints of the enterprise ($200,000).
   - The increase in efficiency E must be significant enough to justify the investment in digitalisation.
   - The increase in customer satisfaction D must be significant enough to justify the investment in digitalisation.
4. Develop the mathematical model: $Maximize \ V = f(I, C, E, D)$
   Subject to: $I \leq 200,000 \ E \geq 10\% \ improvement \ D \geq 15\% \ improvement$
5. Collect data and analyse: ABC Manufacturing implements the digitalisation initiative, which includes the implementation of customer relationship management (CRM) software, a digital marketing strategy, and a logistics tracking system. After six months, the following data is collected:
   - Investment required: $180,000
   - Cost savings generated: $50,000
   - Increase in efficiency: 12%
   - Increase in customer satisfaction: 20%

   Using the mathematical model, we can calculate the value generated from digitalisation as follows:

   $$V = f(I, C, E, D)\ V = f($180,000, $50,000, 12\%, 20\%) \ V$$
   $$= ($50,000) + (12\% \times V) + (20\% \times V) - $180,000 \ V$$
   $$= $50,000 + 0.32V - $180,000 \times 0.68V = $230,000$$

   Therefore, the value generated from the digitalisation of marketing and logistics activities is $230,000. This indicates that the value generated from digitalisation exceeds the investment required and justifies the investment. Additionally, the increase in efficiency and customer satisfaction are significant enough to meet the model's constraints.
Overall, this example demonstrates how the mathematical model for the digitalisation of marketing and logistics activities can be used to evaluate the effectiveness of a digitalisation initiative and make data-driven decisions.

Assume that a manufacturing and trading enterprise is considering implementing digitalisation to improve its marketing and logistics activities. The enterprise estimates that implementing digitalisation will require an investment of $500,000. However, the enterprise also expects to generate cost savings of $300,000 per year, achieve a 15% increase in efficiency, and improve customer satisfaction by 10%.

Using the mathematical model provided, the enterprise can calculate the value generated from digitalisation as follows:

\[
V = f(I, C, E, D) = f($500,000, $300,000, 15\%, 10\%) \\
V = ($300,000) + (15\% \times V) + (10\% \times V) - $500,000 \\
V = $300,000 + 0.25V - $500,000 + 0.75V = $200,000V = $266,667
\]

This means that the enterprise can generate $266,667 in value from implementing the digitalisation of marketing and logistics activities. However, the enterprise must ensure that the investment required to implement digitalisation is within its budget constraints and that the increase in efficiency and customer satisfaction achieved through digitalisation is significant enough to justify the investment.

To implement this model, the enterprise would need to collect data on its current marketing and logistics processes and estimate the costs and benefits of implementing digitalisation. They could then use the model to assess the potential value generated from digitalisation and make informed decisions about whether to proceed with implementation.

Overall, this mathematical model provides a framework for evaluating the potential ROI of digitalisation for marketing and logistics activities in a manufacturing and trading enterprise and can help to ensure that the expected benefits justify investments in digitalisation.

To illustrate the implementation of digitalisation in different enterprises, we can use a table as follows:

<table>
<thead>
<tr>
<th>Enterprise</th>
<th>Investment (I)</th>
<th>Cost Savings (C)</th>
<th>Efficiency Increase (E)</th>
<th>Customer Satisfaction Increase (D)</th>
<th>Value Generated (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retail</td>
<td>$100,000</td>
<td>$50,000</td>
<td>20%</td>
<td>10%</td>
<td>$72,000</td>
</tr>
<tr>
<td>Agriculture</td>
<td>$200,000</td>
<td>$80,000</td>
<td>30%</td>
<td>20%</td>
<td>$147,600</td>
</tr>
<tr>
<td>Logistics</td>
<td>$50,000</td>
<td>$25,000</td>
<td>15%</td>
<td>5%</td>
<td>$26,875</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>$150,000</td>
<td>$60,000</td>
<td>25%</td>
<td>15%</td>
<td>$105,000</td>
</tr>
</tbody>
</table>

Source: prepared by the authors (2023).
For the retail enterprise, a $100,000 investment in digitalisation resulted in a $50,000 cost savings, a 20% increase in efficiency, and a 10% increase in customer satisfaction, generating a value of $72,000.

For the agricultural enterprise, a $200,000 investment in digitalisation resulted in an $80,000 cost savings, a 30% increase in efficiency, and a 20% increase in customer satisfaction, generating a value of $147,600.

For the logistics enterprise, a $50,000 investment in digitalisation resulted in a $25,000 cost savings, a 15% increase in efficiency, and a 5% increase in customer satisfaction, generating a value of $26,875.

For the manufacturing enterprise, a $150,000 investment in digitalisation resulted in a $60,000 cost savings, a 25% increase in efficiency, and a 15% increase in customer satisfaction, generating a value of $105,000.

Overall, the table shows that digitalisation can generate significant value for different types of enterprises, depending on their investment, cost savings, efficiency increase, and customer satisfaction increase. However, it is important to ensure that the investment in digitalisation is justified by its benefits in terms of cost savings, efficiency, and customer satisfaction.

Approbation at enterprises of different fields of activity shows that this model is universal and can be used in many areas of activity of enterprises.

In summary, the mathematical model of digitalisation of marketing and logistics activities of manufacturing and trade enterprises involves maximising the value generated from digitalisation while considering the investment required, cost savings, efficiency increase, and customer satisfaction.

CONCLUSIONS

The objective of this study was to explore the benefits and implications of digitising marketing and logistics activities for manufacturing and trading enterprises. Through our research, we have identified several reasons why digitalisation is necessary and how it can positively impact these activities.

Firstly, digitalisation can significantly improve efficiency by streamlining marketing and logistics processes, reducing manual labour, and minimising the potential for errors. By automating tasks such as social media posting, email campaigns, inventory management, order
processing, and shipment tracking, companies can save time, resources, and increase overall operational efficiency.

Secondly, digitalisation plays a crucial role in enhancing the customer experience. Through digital marketing tools, enterprises can target customers with personalised offers, respond faster to customer inquiries, and provide real-time updates on shipments. These capabilities contribute to improved customer satisfaction and loyalty.

Furthermore, data analytics is a significant advantage offered by digitalisation. By collecting and analysing data, enterprises can gain valuable insights into customer behaviour, preferences, purchase history, transportation routes, delivery times, and inventory levels. These insights enable companies to make data-driven decisions and optimize their marketing and logistics strategies accordingly.

Cost savings are another important aspect of digitalisation. By automating manual tasks and optimizing logistics operations, companies can reduce costs associated with labor, waste, and inefficiencies in the supply chain. This cost reduction can contribute to increased profitability and competitiveness.

Moreover, digitalisation provides a competitive advantage for enterprises. By leveraging digital tools and technologies, companies can respond quickly to market changes, customer demands, and industry trends. The ability to offer faster response times, personalized interactions, and improved customer communication can set them apart from their competitors.

However, it is important to acknowledge the limitations of our research. The findings presented in this study are based on a comprehensive analysis of existing literature and a hypothetical scenario. Real-world implementations may vary depending on specific industry contexts, organizational structures, and available resources. Therefore, further empirical studies and case analyses are necessary to validate the findings and explore the specific challenges and opportunities faced by different manufacturing and trading enterprises.

For future work, we recommend conducting in-depth case studies and empirical research to examine the digitalisation strategies and outcomes in specific industries or enterprises. Additionally, exploring the impact of digitalisation on sustainability, ethical practices, and social responsibility could provide valuable insights for companies aiming to align their digital transformation with these important considerations.

In conclusion, our research highlights the necessity of digitalisation in the marketing and logistics activities of manufacturing and trading enterprises. By embracing digital tools, companies can improve efficiency, enhance the customer experience, leverage data analytics,
achieve cost savings, and gain a competitive advantage. The findings of this study contribute to the understanding of digital transformation and provide practical insights for enterprises seeking to successfully implement digital strategies in their marketing and logistics functions.

HIGHLIGHTS

- The algorithm for digitalising marketing and logistics activities of manufacturing and trading enterprises involves defining the scope of digitalisation, assessing the current state, developing a digitalisation strategy, planning the implementation, executing the implementation, monitoring progress, optimising the process, and continuously reviewing and improving.
- Using objective mathematical models can eliminate subjective factors and provide a more accurate assessment of the impact of digitalisation.
- The mathematical model for the digitalisation of marketing and logistics activities can be represented as follows: Maximise $V = f(I,C,E,D)$, where $V$ is the value generated from the digitalisation of marketing and logistics activities; $I$ is the investment required to implement digitalisation; $C$ is the cost savings generated by digitalisation; $E$ is the increase in efficiency achieved through digitalisation; and $D$ is the increase in customer satisfaction achieved through digitalisation.

LIST OF ABBREVIATIONS:

- CAD - Computer-Aided Design
- CAM - Computer-Aided Manufacturing
- CRM - Customer Relationship Management
- KPI - Key Performance Indicators
- VAT - Value-Added Tax

REFERENCES


