

Journal of Procurement & Supply Chain



ISSN Online 2617-3581

 **Stratford**
Peer Reviewed Journals & books

Industry 4.0 and Supply Chain Management. Study of Logistics Knapp AG in Radegund Bei Graz, Austria.

Herbert Sobotka Reza, Wolfgang Kurz Sattari & Sebastian Kickl Tiwari

ISSN: 2617-3581

Industry 4.0 and Supply Chain Management. A Study of Logistics Knapp AG in Radegund Bei Graz, Austria.

¹*Herbert Sobotka Reza, ²Wolfgang Kurz Sattari & ³Sebastian Kickl Tiwari
^{1,2,3} University of Innsbruck

*Email of the Corresponding Author: herbertreza12@gmail.com

How to cite this article: Reza, H. S., Sattari, W. K., & Tiwari, S. K. (2023). Industry 4.0 and Supply Chain Management. Study of Logistics Knapp AG in Radegund Bei Graz, Austria. *Journal of Procurement and Supply Chain* 7(3), 1-10. <https://doi.org/10.53819/81018102t5227>

Abstract

The term "Industry 4.0" refers to the use of cutting-edge digital technology in the industrial sector, particularly in the areas of production and distribution. It changes the game for logistics by improving everything from product sourcing to customer service to logistics. Real-time data gathering, predictive analytics, and efficient automation are made possible by Industry 4.0 technologies including the Internet of Things (IoT), big data analytics, artificial intelligence (AI), and robots. This integration enhances operational efficiency, supply chain visibility, and customer satisfaction. Embracing Industry 4.0 principles allows organizations to adapt to market changes, improve decision-making, and gain a competitive advantage in the rapidly evolving business landscape. The study used the descriptive research design. The target population was 8 managers of Logistics Knapp AG in Radegund Bei Graz, Austria. The study did sampling of 6 respondents that were selected from the target population of 8 managers of Logistics Knapp AG in Radegund Bei Graz, Austria. Questionnaires were used to collect the data. In conclusion, Logistics Knapp AG's adoption of Industry 4.0 principles in its supply chain management has been instrumental in achieving operational excellence. By integrating advanced digital technologies such as IoT, AI, and robotics, the company has improved efficiency, visibility, and customer satisfaction. Logistics Knapp AG's success serves as a testament to the transformative power of Industry 4.0 in revolutionizing supply chain management and positioning organizations for success in the modern business landscape. The study recommended that there should be continual investment in research and development to stay at the forefront of emerging technologies and identify innovative solutions. Strengthening data analytics capabilities and leveraging advanced algorithms to extract actionable insights for better decision-making and process optimization. Prioritizing cybersecurity measures to protect systems, data, and infrastructure, including regular updates, risk assessments, and employee training to mitigate potential threats.

Keywords: *Industry 4.0, Supply Chain Management, Austria*

<https://doi.org/10.53819/81018102t5227>

1.0 Introduction

Industry 4.0, often known as the Fourth Industrial Revolution, refers to the widespread use of cutting-edge digital technology across the production and distribution phases of the economy (Koh, Orzes & Jia, 2019). It aims to create smart, interconnected, and automated systems that improve efficiency, flexibility, and responsiveness in industrial operations. Supply Chain Management (SCM) is an essential aspect of Industry 4.0, as it focuses on optimizing the flow of goods, services, and information from raw material sourcing to the final delivery to customers. Logistics Knapp AG is a leading technology company based in Radegund bei Graz, Austria, specializing in developing innovative solutions for intralogistics and warehouse automation (Garay-Rondero, Martinez-Flores, Smith, Morales & Aldrette-Malacara, 2020). The company offers a wide range of products and services, including automated storage systems, order picking technologies, and software solutions to streamline logistics processes. Knapp AG has embraced Industry 4.0 principles by incorporating cutting-edge technologies like the Internet of Things (IoT), big data analytics, artificial intelligence (AI), and robotics into its operations. These technologies are used to optimize warehouse processes, enhance inventory management, and increase the overall efficiency of supply chain operations.

The company has deployed IoT devices throughout its warehouses and distribution centers to collect real-time data from various machines and equipment (Soori, Arezoo & Dastres, 2023). These devices enable seamless communication between different components, providing valuable insights into the status of goods, machinery performance, and process bottlenecks. Knapp AG utilizes big data analytics to process the massive amounts of data collected from IoT devices. By analyzing this data, the company can predict maintenance needs for its equipment, reducing downtime and enhancing productivity (Daugherty & Wilson, 2022). The implementation of AI and robotics in order picking processes has significantly improved the speed and accuracy of order fulfillment. Intelligent robots work alongside human operators, collaborating in a safe and efficient manner. Knapp AG's warehouses are equipped with state-of-the-art automation systems, like Automated Storage and Retrieval Systems (AS/RS) and conveyor systems (Lorson, Fügenger & Hübner2023). These technologies optimize space utilization and reduce the time required to handle goods.

The real-time data collected through IoT devices and processed using big data analytics enables Knapp AG to have accurate, up-to-date information on inventory levels (Leander, 2022). This helps prevent stockouts and overstock situations, leading to cost savings and improved customer satisfaction. Through Industry 4.0 technologies, Knapp AG has achieved enhanced supply chain visibility and transparency. The company can track the movement of goods from suppliers to end customers, allowing for better demand forecasting and quicker response to market changes. Industry 4.0 technologies have made Knapp AG's supply chain more flexible and adaptable (Almutairi, Salonitis & Al-Ashaab, 2020). The company can quickly adjust production and distribution processes to meet changing customer demands and market conditions. With improved efficiency and visibility, Knapp AG has been able to adopt a more customer-centric approach. The company can provide personalized services, faster delivery times, and real-time order tracking,

<https://doi.org/10.53819/81018102t5227>

enhancing the overall customer experience. Knapp AG's successful integration of Industry 4.0 technologies into its supply chain management has enabled the company to stay competitive in the ever-changing logistics industry. By embracing digital transformation and automation, the company has improved operational efficiency, enhanced inventory management, increased customer satisfaction, and strengthened its position as a leader in the field of intralogistics (Sen Gupta, 2020).

1.1 Statement of the Problem

One of the main problems faced by Logistics Knapp AG in implementing Industry 4.0 in its supply chain management is the lack of seamless integration of digital technologies. While the company has incorporated various advanced technologies like IoT, AI, and robotics into its operations, there may be challenges in ensuring a smooth flow of information and communication between these technologies. This lack of integration can hinder the whole efficiency and effectiveness of the supply chain processes. As Logistics Knapp AG collects a vast amount of real-time data from IoT devices, it faces challenges in effectively managing and analyzing this data. The company needs robust data management systems and advanced analytics capabilities to extract meaningful insights and make informed decisions. Inadequate data management and analytics capabilities may result in missed opportunities for optimization, predictive maintenance, and demand forecasting.

The execution of Industry 4.0 technologies in the supply chain requires a highly skilled and tech-savvy workforce. Logistics Knapp AG may face challenges in finding employees with the necessary knowledge and expertise to operate and maintain these advanced technologies. There may be a need for up skilling or retraining the existing workforce to adapt to the changing demands of Industry 4.0, which can be time-consuming and resource-intensive. Industry 4.0 technologies heavily rely on interconnected systems and the exchange of data between devices and platforms. This interconnectedness introduces security and cybersecurity risks, as sensitive data and critical infrastructure can become vulnerable to cyber threats. To combat these threats, Logistics Knapp AG should adopt stringent security measures, educate its staff on cybersecurity best practices, and use cutting-edge security tools and procedures.

2.0 Literature Review

Strandhagen, Buer, Semini, Alfnes and Strandhagen (2022) reported that the vast expansion in the variety of supply chain (SC) issues that need fixing is one of the most pressing issues confronting modern manufacturers. Unfortunately, the variety of these difficult challenges exceeds the capabilities of the conventional planning technique. Supply chain and logistics are two areas where cutting-edge technology may have a significant impact. By integrating smart operations with supply chain architecture and procedures, Industry 4.0 hopes to remedy the supply chain's operational weaknesses. Emerging technologies are projected to be the driving force behind Industry 4.0, which aims to integrate robotics and artificial intelligence to create a network of interaction between goods and services. The manufacturing industry, which relies on incoming and outbound product movement, is one of the most prominent users of this technology. This study offers an explanation of the technologies of Industry 4.0 and how they might help progress Supply

<https://doi.org/10.53819/81018102t5227>

Chain operations in industrial settings. This study's findings reaffirm the need of incorporating cutting-edge technology into every facet of a supply chain network if you want to achieve a high degree of performance improvement. Because of this, the productivity, product delivery, cost optimization, asset management, dependability, efficient procedures, improved sales, and general performance of manufacturing systems will all substantially benefit from the appropriate integration of the Industry 4.0 technologies into supply chain activities.

Tiwari (2021) mentioned that examples of new technologies being used by conventional firms as part of Industry 4.0 include the Internet of Things (IoT), machine learning, artificial intelligence, and cyber physical systems. The implementation of Industry 4.0 has the capability to boost output while decreasing the need for human labour. The study's overarching goal is to demonstrate that Industry 4.0 has advantages on Supply chain efficiency while also highlighting the obstacles to its adoption. Data for this study came from both primary and secondary sources. Cost, Productivity, Risk, etc. were obtained from the literature study and used in the development of the questionnaire. Employees and specialists from various Indian supply chain firms provide replies that are used in the analytical phase. In order to prove that Industry 4.0 technologies have an effect on supply chain efficiency, this research employs regression and correlation analysis. This study demonstrates that the usage of Industry 4.0 practices will enhance supply chain effectiveness. More so than data integration through the CPS, this study demonstrates that the introduction of IoT and a robotic working environment will have an effect on supply chain efficiency.

Ghadge, Er Kara, Moradlou and Goswami (2020) conducted study to analyze the effect of Industry 4.0 implementation on supply chains and create an implementation structure by considering potential propellers and obstacles for the Industry 4.0 paradigm. The research investigated the strategic, organisational, technical, and legal and ethical factors that influence the success or failure of an organization's efforts to adopt Industry 4.0. To further investigate the impact of Industry 4.0 adoption on supply chain characteristics, we include the identified drivers and inhibitors for this technological change into a system dynamics model. Results from the simulation model are used to inform the development of a conceptual model for speeding up the implementation of Industry 4.0 in supply chains. Supply networks of the future may face new difficulties and possibilities as a result of Industry 4.0. Several implementation hurdles were explored, and a plan for easing the notion of Industry 4.0's transfer into supply chains was offered. A conceptual model for accelerating the introduction of Industry 4.0 into supply chains is developed using the results of the simulation model. Managers of supply chains stand to gain insight into the difficulties of incorporating Industry 4.0 into their systems from this research. Incorporating both the drivers and impediments of this technological transition, simulation research enables investigation of Industry 4.0 adoption in terms of its influence on supply chain performance. In addition to supporting this connection with data, a novel conceptual framework is suggested for integrating Industry 4.0 into existing supply chains.

Esmailian, Sarkis, Lewis and Behdad (2020) noted that Industry 4.0 and supply chain 4.0 are important research areas in the present business and technological era. The research examines literature on the topic of sustainable supply chains and the implications of Industry 4.0 and the Fourth Industrial Revolution. According to the available literature, Industry 4.0 has a major effect

<https://doi.org/10.53819/81018102t5227>

on the longevity of the supply chain. The research also details various Industry 4.0 technologies and how they might improve the long-term viability of a company's supply chain. There are a total of 55 articles discussed here. The study's author presented a model for understanding how Industry 4.0 innovations would affect the production process. Industry 4.0 and supply chain sustainability were the topics of this comprehensive literature assessment. ScienceDirect, IEEE Xplore, and Google Scholar were utilized to compile the data. Journal publications were chosen exclusively for this literature evaluation, and the Prisma structure was utilized to choose which articles to include. What sets this research apart is how it combines two previously separate topics (Industry 4.0 and supply chain sustainability) to provide a framework for understanding how Industry 4.0 technologies affect sustainability in the supply chain. In addition, the study contributes to the body of knowledge in relevant disciplines.

Rad, Oghazi, Palmié, Chirumalla, Pashkevich, Patel and Sattari (2022) conducted study to examine the potential effect of the fourth industrial revolution Industry 4.0 and its related technological advances on Supply Chain (SC) performance. The investigation used inductive reasoning to learn more about the issue and offer a foundation for future studies. Accordingly, the study seeks to investigate the effect of Industry 4.0 on SC performance by means of a thorough literature review and to conceptualize and create results into an operational framework supported by Systems Theory. According to the study's findings, implementing Industry 4.0-enabled technologies will significantly boost SCM performance by facilitating a holistic method to SCM, which will come about as a result of deep supply chain integration, information sharing, and transparency across the board. In addition, these technologies provide significant performance enhancements in certain supply chain processes including procurement, manufacturing, inventory management, and retail by means of increasing process integration, digitization, and automation and bringing novel analytical capabilities.

Reza (2020) performed study to explore the challenges for modern supply chains that arise due to the fourth industrial revolution. It explores how the advent of Industry 4.0 may alter the movement of goods and data along supply networks. The study takes use of social research findings, with a survey of 122 supply chains serving as the applied research approach. In addition, data from an interview study conducted by McKinsey with 300 professionals in the manufacturing and service sectors in the United States, Japan, and Germany in 2015 was presented. Case studies from five other companies Logistics Knapp AG, Nova Chemicals, BMW, Stratasys, and Bosch were also provided. The research findings include a literature assessment on the evolution of the supply chain idea and the growth of industry more generally, with an emphasis on the Fourth Industrial Revolution. This study investigates how the Fourth Industrial Revolution has altered the structure and efficiency of modern supply networks. Conclusions are formed on the relevance of applying the assumptions of Industry 4.0, and the concerns of enterprises and whole supply chains about the impending changes, based on sociological research and case studies. Finally, a Fourth Industrial Revolution-inspired hypothetical supply chain employing an electric toothbrush manufacturer as an example is offered. Conclusions may be drawn about the impact of Industry 4.0 on the organisation of physical and information flows in supply chains according to the gathered examples and provided research. Managers are aware of the changes happening in the

<https://doi.org/10.53819/81018102t5227>

structure of the supply chain's manufacturing, procurement, and distribution activities. However, data security concerns and the limited capacity of long-distance wireless networks have them wary about moving procedures online.

3.0 Research Methodology

The study utilized the descriptive research design. The target population was 8 managers of Logistics Knapp AG in Radegund Bei Graz, Austria. The study did sampling of 6 participants that were chosen from the target population of 8 managers of Logistics Knapp AG in Radegund Bei Graz, Austria. Data was gathered by the use of questionnaires.

4.0 Research Findings and Discussion

4.1 Correlation Analysis

The results in Table 1 shows the correlation analysis

Table 1: Correlation Analysis

		SCM	Industry 4.0
SCM	Pearson Correlation	1.000	
	Sig. (2-tailed)		
Industry 4.0	Pearson Correlation	.287 **	
	Sig. (2-tailed)	0.000	0.000

The correlation results from Table 1 indicate that the Industry 4.0 was positively and significantly related with SCM ($r=.287$, $p=.000$). This concurs with Strandhagen, Buer, Semini, Alfnes and Strandhagen (2022) who mentioned that emerging technologies are projected to be the driving force behind Industry 4.0, which aims to integrate robotics and artificial intelligence to create a network of interaction between goods and services. Supply chain and logistics are two areas where cutting-edge technology may have a significant impact. There is need of incorporating cutting-edge technology into every facet of a supply chain network if a company wants to achieve a high degree of performance improvement.

4.2 Regression Analysis

The section consists of model fitness, analysis of variance and regression of coefficient. The findings in Table 2 indicate the model fitness

<https://doi.org/10.53819/81018102t5227>

Table 2: Model Fitness

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.287a	0.249	0.159	0.0011335

The findings from Table 2 reveal that Industry 4.0 was noted to be sufficient in explaining the SCM of Logistics Knapp AG in Austria. This was supported by the coefficient of determination, which is R square of 0.249. It signifies that Industry 4.0 explain 24.9% of the variations in the SCM of Logistics Knapp AG in Austria. Industry 4.0, characterized by the integration of digital technologies and data-driven processes, has revolutionized supply chain management by enabling real-time visibility, predictive analytics, and automation across the entire supply chain. This transformative synergy enhances efficiency, agility, and responsiveness, empowering businesses to optimize operations, reduce costs, and deliver enhanced customer experiences.

Table 3: Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.78	1	5.78	5.189	.000b
	Residual	8.91	8	1.114		
	Total	14.69	7			

The results in Table 3 shows that the overall model was statistically significant. The findings indicate that SCM is a good predictor in describing the Industry 4.0 among the Logistics Knapp AG in Austria. This was aided by an F statistic of 5.189 and the reported p-value of 0.000 which was less than the conventional probability significance level of 0.05.

Table 4: Regression of Coefficient

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.581	0.133		4.368	0.056
Industry 4.0	0.896	0.322	0.792	2.783	0.018

Based on the findings in Table 4, it was reported that Industry 4.0 was positively and significantly associated to SCM ($\beta=0.896$, $p=0.018$). This was supported by a calculated t-statistic of 2.783 that is larger than the critical t-statistic of 1.96. These findings indicates that when Industry 4.0

<https://doi.org/10.53819/81018102t5227>

improves by one unit, the SCM of Logistics Knapp AG in Austria will increase by 0.896 units while other factors that influence the SCM in Logistics Knapp AG are held constant. Tiwari (2021) articulated that the usage of Industry 4.0 practices will enhance Supply chain effectiveness. More so than data integration through the CPS, the introduction of IoT and a robotic working environment will have an effect on supply chain efficiency. Through Industry 4.0 technologies, Knapp AG has achieved enhanced supply chain visibility and transparency. The company can track the movement of goods from suppliers to end customers, allowing for better demand forecasting and quicker response to market changes.

5.0 Conclusion

Through the successful integration of Industry 4.0 technologies into its supply chain management, Logistics Knapp AG has achieved substantial improvements in operational efficiency and productivity. The usage of advanced digital technologies like IoT, AI, and robotics has streamlined warehouse processes, optimized inventory management, and enabled faster and more accurate order fulfillment. These enhancements have resulted in cost savings, reduced lead times, and increased throughput for the company. Industry 4.0 has empowered Logistics Knapp AG with enhanced visibility and transparency across its supply chain. Real-time data collection, analysis, and communication enable the firm to track the movement of goods, monitor inventory levels, and obtain insights into process bottlenecks. This increased visibility hence allowing for proactive decision-making, improved demand forecasting, and better coordination with suppliers and customers. As a result, Logistics Knapp AG can respond swiftly to market changes, optimize inventory levels, and ensure smoother operations.

The adoption of Industry 4.0 principles at Logistics Knapp AG has had a positive impact on customer satisfaction and experience. With faster order processing, accurate inventory information, and real-time order tracking, the company can provide a more personalized and seamless customer experience. The ability to meet customer demands promptly and efficiently has strengthened customer loyalty and contributed to a positive brand reputation for Logistics Knapp AG. By embracing Industry 4.0 and effectively implementing supply chain management practices, Logistics Knapp AG has gained a competitive advantage in the logistics industry. The company's ability to leverage advanced technologies, optimize processes, and adapt to changing market dynamics has positioned it as an industry leader. Furthermore, by staying at the forefront of digital innovation and continuously improving its supply chain practices, Logistics Knapp AG is well-prepared to meet future challenges and capitalize on emerging opportunities.

6.0 Recommendations

To stay at the forefront of Industry 4.0 and supply chain management, Logistics Knapp AG should continue to invest in research and development. By allocating resources to exploring emerging technologies, the company can identify innovative solutions and stay ahead of the competition. Additionally, fostering partnerships with academic institutions and industry experts can provide valuable insights and access to the latest advancements, ensuring that Logistics Knapp AG remains a pioneer in its field. Logistics Knapp AG should strengthen its capabilities in data analytics and

<https://doi.org/10.53819/81018102t5227>

advanced algorithms to extract meaningful insights from the immeasurable amounts of real-time data collected. By leveraging predictive analytics, machine learning, and artificial intelligence, the company can improve demand forecasting, optimize inventory management, and identify opportunities for process improvement. Investing in talent and technologies to analyze and interpret data will provide valuable insights for informed decision-making and operational efficiency.

Given the interconnected nature of Industry 4.0 technologies, Logistics Knapp AG should prioritize cybersecurity measures to safeguard its systems, data, and infrastructure. This includes implementing robust security protocols, regularly updating software and firmware, conducting thorough risk evaluations, and providing cybersecurity training to workers. By proactively addressing cybersecurity risks, the company can mitigate potential threats and make sure the continuity of its operations while maintaining the trust of customers and stakeholders. Logistics Knapp AG should actively engage in collaboration and knowledge sharing within the industry. Participating in industry forums, conferences, and partnerships can provide valuable insights, exchange of best practices, and access to new technologies. Collaboration with customers, suppliers, and technology providers can foster innovation and facilitate the co-creation of solutions that address specific supply chain challenges. By embracing a collaborative mindset, Logistics Knapp AG can leverage collective expertise and drive continuous improvement in its supply chain practices.

REFERENCES

- Almutairi, A. M., Salonitis, K., & Al-Ashaab, A. (2020). A framework for implementing lean principles in the supply chain management at health-care organizations: Saudi's perspective. *International Journal of Lean Six Sigma*, 11(3), 463-492. <https://doi.org/10.1108/IJLSS-01-2019-0002>
- Daugherty, P., & Wilson, H. J. (2022). *Radically Human: How New Technology Is Transforming Business and Shaping Our Future*. Harvard Business Press.
- Esmailian, B., Sarkis, J., Lewis, K., & Behdad, S. (2020). Blockchain for the future of sustainable supply chain management in Industry 4.0. *Resources, Conservation and Recycling*, 163, 105064. <https://doi.org/10.1016/j.resconrec.2020.105064>
- Garay-Rondero, C. L., Martinez-Flores, J. L., Smith, N. R., Morales, S. O. C., & Aldrette-Malacara, A. (2020). Digital supply chain model in Industry 4.0. *Journal of Manufacturing Technology Management*, 31(5), 887-933. <https://doi.org/10.1108/JMTM-08-2018-0280>

<https://doi.org/10.53819/81018102t5227>

- Ghadge, A., Er Kara, M., Moradlou, H., & Goswami, M. (2020). The impact of Industry 4.0 implementation on supply chains. *Journal of Manufacturing Technology Management*, 31(4), 669-686. <https://doi.org/10.1108/JMTM-10-2019-0368>
- Koh, L., Orzes, G., & Jia, F. J. (2019). The fourth industrial revolution (Industry 4.0): technologies disruption on operations and supply chain management. *International Journal of Operations & Production Management*, 39(6/7/8), 817-828. <https://doi.org/10.1108/IJOPM-08-2019-788>
- Leander, B. (2022). Access Control Models to secure Industry 4.0 Industrial Automation and Control Systems.
- Lorson, F., Fügener, A., & Hübner, A. (2023). New team mates in the warehouse: Human interactions with automated and robotized systems. *IIE Transactions*, 55(5), 536-553. <https://doi.org/10.1080/24725854.2022.2072545>
- Rad, F. F., Oghazi, P., Palmié, M., Chirumalla, K., Pashkevich, N., Patel, P. C., & Sattari, S. (2022). Industry 4.0 and supply chain performance: A systematic literature review of the benefits, challenges, and critical success factors of 11 core technologies. *Industrial Marketing Management*, 105, 268-293. <https://doi.org/10.1016/j.indmarman.2022.06.009>
- Reza, M. H. (2020). Relationship with Industry 4.0 and Supply Chain Management System of FMCG. *Journal of Business and Management Studies*, 2(2), 24-31.
- Sen Gupta, B. (2020). Supply Chain Disruption & Plausible Solution in the Scenario of COVID-19 Pandemic; Forging a Pandemic Adaptive Supply Chain (Master's thesis).
- Soori, M., Arezoo, B., & Dastres, R. (2023). Internet of things for smart factories in industry 4.0, a review. *Internet of Things and Cyber-Physical Systems*. <https://doi.org/10.1016/j.iotcps.2023.04.006>
- Strandhagen, J. W., Buer, S. V., Semini, M., Alfnes, E., & Strandhagen, J. O. (2022). Sustainability challenges and how Industry 4.0 technologies can address them: a case study of a shipbuilding supply chain. *Production Planning & Control*, 33(9-10), 995-1010. <https://doi.org/10.1080/09537287.2020.1837940>
- Tiwari, S. (2021). Supply chain integration and Industry 4.0: a systematic literature review. Benchmarking: *An International Journal*, 28(3), 990-1030. <https://doi.org/10.1108/BIJ-08-2020-0428>

<https://doi.org/10.53819/81018102t5227>