
How a Digital Platform Transforms the Value Proposition in Purchasing and Buyer-Supplier Relationship Management

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Abstract:

Purpose: The role of the purchasing function is evolving towards the business area of strategic leadership, which is currently gaining particular importance in innovation management. However, the application of Industry 4.0 technologies in the purchasing processes of supply chains is in the early stages of its development. The main purpose of the paper is to explore how a digital platform transforms the value proposition in purchasing and buyer-supplier relationship management.

Design/Methodology/Approach: The study is explorative in its nature, hence, a qualitative research method was applied. The empirical research process was based on the model for conducting case study research and included five stages, the formulation of research questions, instrument development, data gathering, data analysis and dissemination.

Findings: The research findings led to the exploration of the value proposition in purchasing and buyer-supplier relationship management that might be achieved through the implementation of a digital platform in the abovementioned management fields on the supply side. The value proposition covers the main benefits in accelerating collaboration as well as enhancing innovation and performance management.

Originality/value: Despite the increasingly advanced technological transformation of business processes and relations within supply chain management, the knowledge of the impact of digital technologies on the value proposition in purchasing and buyer-supplier relationship management is surprisingly narrow. The presented case study contributes to the literature and business practice uncovering best value hidden in the potential effects of digital transformation and digital technology applications within these management areas.

Keywords: Supply chain, purchasing, buyer-supplier relationship, innovation, Industry 4.0, technology, digital platform.

JEL classification: O33.

Paper Type: Case study.

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1. Introduction

Increasing market competition, complexity, and uncertainty have determined an opportunity for purchasing to evolve its value proposition to business. Purchasing is defined as the management of the company's external resources in such a way that the supply of all goods, services, capabilities, and knowledge which are necessary for running, maintaining, and managing the company's primary and support activities is secured under the most favourable conditions (Van Weele, 2018). Purchasing can be regarded as a boundary spanning function that should be integrated with other business functions (Foerstl *et al.*, 2013; Kaufmann and Gaeckler, 2015). In the traditional approach, the purchasing function is responsible for ensuring deliveries of goods and services to the company's operations, and its key goal is cost reduction. Moreover, the modern approach emphasises that the purchasing function increases the competitive advantage of companies by means of innovation development.

There is a chance in the digital era that purchasing will increase its corporate value as an innovation leader and catalyst by linking essential external knowledge and competencies with internal business partners to ensure technology and market leadership of one's own company (Schreiber *et al.*, 2016). According to Schreiber *et al.* (2016), successful digital transformation of purchasing delivers a substantial increase in company value ranging from 5% to 10% of EBIT through an increased level of innovation. The role and effects of digitalisation in purchasing management are described in several reports by consulting companies as "a catalyst for change", a "source of revolutionary changes", "a new era", "a radical transformation", "a turning point", "a breakthrough change" or "a powerful force". Much less often, this impact is the subject of attention and analysis in academic publications and empirical research, related to purchasing and supply management. There is a research gap with regards to digital technology applications, the scale, and effects of digital transformation of this management area. According to Mogre *et al.* (2017), research contributions around purchasing development in the digital economy are extremely limited. Furthermore, Tripathi and Gupta (2021) underlined the need for case studies to empirically estimate the performance improvements resulting from procurement process re-engineering in Industry 4.0.

The article explores how a digital platform transforms the value proposition in purchasing and buyer-supplier relationship management. It is structured as follows. First, the literature on the evolution of the role of purchasing in business is reviewed, including the digital transformation of purchasing and buyer-supplier relationship management. Next, the author provides a short overview of the qualitative research methodology. This is followed by a description of the empirical findings, wherein most attention is devoted to an original case study presenting best practice on how digital platforms have become a catalyst for internal and external cooperation on innovation development, with the active participation of the purchasing function.

Finally, the author discusses the findings within the theoretical context of the evolution of purchasing and elaborates on the managerial implications.

2. Evolution and Digital Transformation of Purchasing and Buyer-Supplier Relationship Management – Literature Review

The evolution of the place and role of the purchasing function in companies and supply chains is represented in the literature by maturity models. They constitute a general approach to the elements of maturity of the purchasing function and the gradual increase of its role in achieving goals and building competitive advantage of companies. Based on the results of the literature review, it should be pointed out that purchasing is evolving from a passive to an integrating function (Reck and Long, 1988), from a reactive to a world-class process (Burt and Doyle, 1993), from product-centred to performance-centred function (Stannack and Jones, 1996), from early role recognition to advanced involvement (Jones, 1999), from reactive to proactive and leading in identifying and meeting the needs of internal and external customers (Cavinato, 1999), from low to strategic development (Cousins *et al.*, 2006), from a reactive role to integration in the supply chain (Monczka *et al.*, 2010), from a transactional to a leading business function (Mena, 2014), from providing supply to value management (Chick and Handfield, 2015), and from a transactional orientation to value chain integration (Van Weele, 2018). Key elements in the evolution of this function have been identified as follows: strategic approach, position in the organisational structure, internal integration in the company, external integration in the supply chain, performance measurement, the use of technology and employee competences in purchasing departments (Ocicka, 2019).

Purchasing is evolving from a function directed mainly at the supply side of the market to a function focused on market needs on the demand side, identified among the company's end customers (Chick and Handfield, 2015). Increasingly, it provides value within innovation management, among other things through the implementation of innovation in the purchasing department and process, the identification of sources of rare (innovative) resources, purchasing more innovations in less time, cooperation in cross-functional projects (or the management thereof) in order to develop different types of innovations, acceleration of the design and development cycle as well as the commercialisation of product innovations, the identification of suppliers with innovative potential, early supplier involvement, the co-creation of innovations with suppliers and supplier development.

As the role of the purchasing function in strategic and innovation management increases, there will be an increasingly important need to manage relationships with internal customers and external suppliers. In this context, digital technologies might help companies to collaborate in interdependent and dynamic innovation ecosystems, creating a web of tech-enabled services that connect parties inside and outside of the organisation and digitalising their cooperation.

The main emerging technologies affecting supply chain management in the 21st century include, Big Data Analytics, the Internet of Things, robotics and automation, cloud computing, mobile technologies and electronic wearables, autonomous vehicles and drones, 3D printing and other advanced manufacturing technologies, virtual and augmented reality, cognitive technologies and artificial intelligence, social media, technologies supporting digital security and enabling human-machine and machine-machine interaction, intelligent agents, blockchain and other technologies related to Industry 4.0 (Nowosel *et al.*, 2015; Schreiber *et al.*, 2016; Von der Gracht *et al.*, 2016).

There are fundamental principles for a comprehensive intervention by digitalisation in purchasing and supply management, namely, to use multiple digital technologies and evolve from internal development to focus more on contributing to external value (Singh Srani and Lorentz, 2018). It was found that digital transformation involves changes in strategies, processes, and organisational structures within this business area (Kleeman and Glas, 2017). Digitalisation in purchasing management is exerting influence on various aspects – from the collection and transmission of data using information and communication systems to the automation of processes and the development of digital purchasing platforms determining the transformation of management models. On the one hand, digital technologies are on pace to automate most routine purchasing processes within three to five years; on the other hand, digitalisation unleashes new sources of value (Jahani *et al.*, 2021) and gives purchasing a larger strategic role (Easton and Epstein, 2018). The significance of Industry 4.0 technologies for the efficiency and resilience of procurement activities has been especially clear during the COVID-19 pandemic (Jerome *et al.*, 2021).

Based on the model of the evolution of IT systems supporting purchasing and supply management, the following milestones might be indicated: MRP, ERP, e-procurement, and Procurement 4.0 (Glas and Kleemann, 2016). The discussions of purchasing and supply chain managers in recent years include statements about the development of Purchasing 4.0 or Procurement 4.0 presenting the digital transformation of purchasing management considering the concept of Industry 4.0 (Blechmann and Engelen, 2020). Digital technologies create a new ecosystem accelerating the development of purchasing management, which evolves to digital procurement, wherein procurement moves to the centre of value creation by connecting the business with a network of external partners to create new business models (Yap *et al.*, 2018). Furthermore, it is possible to achieve technological synergy effects with suppliers. Kleeman and Glas (2017) proposed the segmentation of suppliers into four groups, namely digital supply champions, digital traditionalists, digital potentials, and digital laggards (pp. 24-25), depending on the potential and the ability to develop and apply digital technologies.

Crucial changes in purchasing management influenced by modern digital technologies have been predefined because of research carried out by Fraunhofer-Institut fuer Materialfluss und Logistik IML and Bundesverband Materialwirtschaft, Einkauf und Logistik e.V. It was pointed out that the operational aspects of purchasing management will be automated, while increasing the concentration of the purchasing function on strategic aspects for which requirements and challenges will increase (Pellengahr *et al.*, 2016).

Additionally, Bienhaus and Haddud (2018) from the University of Liverpool conducted an international survey among 414 purchasing and logistics managers focused on the digital transformation of the purchasing area in companies. It aimed to assess the impact of digitalisation on purchasing and supply chain management, at the strategic level. The results of the research have shown that artificial intelligence, Big Data and the Internet of Things are key elements that can be used in operational management, leaving more potential for activities of strategic importance realised by people. The assessment of barriers to the digital transformation of the purchasing area proves that organisations are currently not prepared for significant changes and have so far recognised both the potential and the risk associated with progressing digitalisation to only a limited extent. The application of digital technologies in purchasing is still a relatively new field that lacks empirical insights.

3. Research Methodology

Considering the exploratory nature of the paper and the need to obtain an in-depth knowledge of the exploitation and influence of digital technologies on innovation development, the case study methodology was applied. The empirical research process was based on the model for conducting case study research presented by Seuring (2005), comprising five stages: formulation of research questions, instrument development, data gathering, data analysis and dissemination.

- (1) The following research questions were at the centre of the author's attention:
 - What is the role of purchasing in the company's supply chain management?
 - How is the purchasing function involved in the development of innovation?
 - What is the scope of cooperation of the purchasing function with other internal functions and external suppliers in the development of innovation?
 - What is the role of digital platforms in purchasing and buyer-supplier relationship management?
 - What effects does the company achieve through the implementation of emerging technologies?
- (2) The interview scenario was a research instrument used during the semi-structured in-depth interviews carried out with a purchasing manager representing manufacturing company A.
- (3) Primary and secondary data were collected.

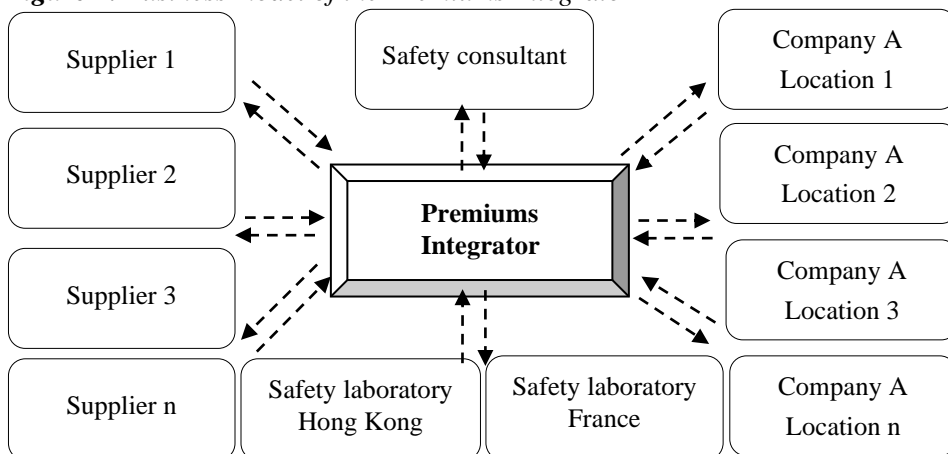
- (4) The analysis of data was carefully carried out. Direct consultations with the purchasing manager were an integral part of the analysis. The authorisation of the case study was the final result of the cooperation.
- (5) The article was designed, prepared and submitted to the journal.

The selection of a qualitative research method is justified by the fact that a case study is an empirical enquiry that investigates a contemporary phenomenon within its real-life context and is particularly appropriate in new, emerging fields of research (Yin, 2003).

4. Unpacking Best Value – Case Study of a Collaborative Digital Platform

Company A decided to implement an innovative digital platform following its regional strategy to have one supplier who will be responsible for ordering all premiums for marketing, trade marketing and human resources activities across countries in Central and Eastern Europe (CE). This provider gained CE Premiums Integrator (PI) status for Poland, the Baltic states (Lithuania, Latvia, Estonia), the Czech Republic, Slovakia, Hungary, Romania, Bulgaria, and the Eastern Adriatic markets (Serbia, Bosnia, Slovenia). The chosen PI has over 30 years of expertise in the premiums industry with a deep understanding and knowledge of the supply chain and develops direct sourcing with one of the largest sourcing teams in the FMCG industry, including more than 1,500 factories and suppliers on a global scale. The supplier follows the strictest protocols to protect the largest brands of its clients, including compliance with health and safety rules, minimisation of production risk, testing and inspection protocols, factory audits and evaluation, as well as detailed and certified processes. It is part of Sedex, which is one of the world's largest organisations in terms of sustainable supply chain management.

Figure 1. Business model of the Premiums Integrator



Source: Materials of the Premiums Integrator.

This unique online platform, called Web Tool, is the result of cooperation between the purchasing department of company A, which knows the needs of internal customers, and the selected PI. Both business partners agreed on its architecture and functionality. The Web Tool is a tailor-made technological innovation that facilitated the next step to implementing process and organisational innovations, and finally led to the development of a new business model of collaboration between company A, the PI and suppliers within the supply chain (Figure 1). It mirrors the needs of most marketing and purchasing stakeholders as a comprehensive solution for many countries. The main goal behind the platform is to allow the end users to purchase premiums or ask for a quotation for new products based on briefs prepared by the requesting departments. The platform was designed to enable intuitive navigation by its users, mostly by “clicking” windows or icons and attaching documents, which encourages them to use as well as develop it further. The solution is based on Web/JAVA technology and included a connection to company A’s ERP system to enable a smooth ordering process (using SAP EDI).

Internal customers communicate directly with the PI through the Web Tool without involving the purchasing department, which has access to everything and receives automatic messages about all projects. They send their requests to the PI and accept the individual stages of the process as detailed in the process in place, e.g. price, the final design of the premium, etc. This made it easier for the purchasing department to convince them to become involved. The end users are also able to prepare and send requisitions which, after routing to the ERP system, are automatically transferred as official purchase orders sent to the PI, maintaining reference numbers.

Thanks to this solution, the number of interactions between internal customers and the purchasing department was reduced significantly, which resulted in faster fulfilment of their needs. If an internal customer talks to the PI, it is the PI’s responsibility to make a summary and include it in the Web Tool; hence, the purchasing department has a complete picture of the situation. The workload associated with the purchase of a new premium was transferred from internal customers and the purchasing department to the PI responsible for providing the required premiums on time, at the best price on the market, as well as being of high quality, meeting safety requirements. The PI selects suppliers through RFI and/or RFQ as well as managing the supplier base, cooperating with preferred suppliers, and identifying potential new suppliers around the world. It is the PI’s responsibility to prepare all documents for safety tests and to supervise the entire process.

The platform contains a description of purchasing, production, and delivery processes, use case videos, premiums visualisations, information on safety tests, requirements and the necessary documents, depending on whether the project involves creating the premium from the beginning, including designing and building an injection mould, modifying an existing premium or branding an existing product.

Thanks to this, users know how much time they need to plan their activities in advance to receive the premium in the required time. The Web Tool has a calendar for each project which means that the user knows which stage the project is at – whether in the product testing phase or in the production phase - and when delivery is planned.

Thanks to the platform, it is possible to consolidate orders from individual countries, which leads to savings for the company because of synergy, buying more premiums at a lower price, spreading the costs of safety tests over several countries and covering these costs only once. Previously, premiums were designed in cooperation with various suppliers and information sharing between countries was very limited – if it took place at all. The Web Tool works for several European countries – a given country has a preview of what is being carried out in another country and can join or renew the production of a given premium. Safety tests are valid for a specified period, so a given country that renews the production of a premium previously manufactured and tested for another country does not need safety tests or undergoes them to a very limited extent, which significantly reduces delivery time and brings savings.

Furthermore, in the past, company A experienced difficulties with the quality of the ordered or required premiums. Some premiums did not pass safety tests, or it was necessary to redesign them and conduct the safety test again, as the colours of the premiums as well as the appearance of the product or brand logo did not meet the guidelines described in the brand book. If something was not in line with the guidelines, it could not be manufactured and placed on the market. The Web Tool has an archive of all projects completed and cancelled by the PI, including those that were provided for company A before the supplier became the PI. Thanks to such an approach, each end user could see what was produced, when and for which country with the price and deadline, which makes it possible to renew production.

Furthermore, the PI has a separate design department, where new premiums are created/developed based on the briefs received from internal customers, but also based on market trends, including social media analysis, or one's own ideas. Concepts from suppliers that the PI has worked with are also collected. The PI repeatedly sends new proposals via the platform, anticipating the needs of internal customers. It uses the "What's new" section for this purpose. Additionally, it organises inspirational workshops and sample roadshows. All ideas acquired inspire internal customers to conduct new marketing campaigns for a given product. The Web Tool also has a catalogue of finished products ready for purchasing, e.g., cups, pens, paper, and linen bags, etc., that can be marked with a given product brand depending on the needs. These finished goods are previously tested for safety in accordance with company A's policy, so the lead time is much shorter. The platform works as a catalyst for collaboration between company A and the PI. A dedicated,

individual approach to the projects of business units in CE has a positive impact on supplier development, and is involved, creates ideas, and connects stakeholders.

The platform has replaced email communication between users and the PI. The Web Tool has been connected to the inboxes of individual users so that they do not have to check the status of their projects every time. When new information appears, they automatically receive an e-mail in their inbox with the appropriate information. Additionally, users can decide if they wish to receive messages about other brands and countries. The Web Tool also introduced chat between the Integrator and individual departments in all countries, such as the design department, the technical support department, the internal control department, and logistics department. Depending on the needs or problems with the Web Tool, the user can contact the appropriate person on the Integrator's side. The purchasing department has access to all sections and information on the Integrator, ongoing and completed projects for company brands, as well as communication between all users and the Integrator.

The platform analyses savings calculated by the Integrator based on the Excel file provided by the purchasing department and access to the so-called purchase windows that operate in such a way that, for example, a given country reports a demand for a given premium for a given brand of the company and such information is sent to users in other countries assigned to that particular brand. They can join the purchase, and by increasing the quantity of premiums ordered by individual countries, automatic premium price calculation takes place. The purchasing function has a preview of which countries have made submissions and the quantity requested and how the price changes as a result.

5. Discussion

The purchasing function at the highest levels of its maturity is making an increasing impact on building the competitive advantage of companies through innovation. According to estimates, between 40% and 60% of opportunities to create innovation in supply chains come from suppliers (Ferreiro *et al.*, 2014). Referring to Mena (2014), the largest value of the purchasing function comes from external sources identified in the supply base. Supplier innovation management is extending the innovation capabilities of the purchasing function and the entire company, driving the continuous exchange of knowledge and innovation development in supply chains. Suppliers were recognised as having significant innovation potential (Wagner, 2012). Exploiting the potential of co-creating and implementing innovations in cooperation with suppliers allows companies to significantly increase the value provided to customers and other supply chain stakeholders (Kibbeling *et al.*, 2013).

Purchasing managers increasingly often participate in cross-functional and cross-organisational projects aimed at sharing knowledge and developing innovation. In a networked economy, this role is particularly important in creating value provided to end customers. From the perspective of supply chain management, innovation development refers to the process of making changes to products, services and processes that results in creating new value for the organisation and its clients through cooperation among partners within the supply network (Narasimhan and Narayanan, 2013).

Therefore, the importance of the purchasing function is best represented by the coupled open innovation model, which involves combining purposive inflows and outflows of knowledge to collaboratively develop and/or commercialise an innovation (Chesbrough and Bogers, 2014). It is worth mentioning in this context that relationships developed with suppliers with high innovation potential are perceived as a valuable, rare, unlimited and unchangeable resource (Yan *et al.*, 2017). Cross-functional integration leads to the dissemination of knowledge about organisational dynamics, market intelligence and customer needs on both a departmental and individual level as well as helping to generate interdependency among functions (Murillo-Oviedo *et al.*, 2019). In turn, elements of external integration with suppliers include the exchange of information through ICT, strategic partnerships and a joint commitment to business processes (Cousins *et al.*, 2006).

The research results confirmed that emerging digital technologies are important in building the significance of the purchasing function and creating its collaboration with internal customers and suppliers. At the beginning, the leading role of purchasing is underlined as a function that introduces companies into the era of digitalisation, which results directly from the need to purchase technologies and services accompanying their implementation (Pellengahr *et al.*, 2016). Digital technologies are transforming purchasing strategies, organisations, and processes, exerting influence at the strategic, tactical, and operational level of purchasing management (Kleeman and Glas, 2017).

From a strategic perspective, modern technologies support the internal and external integration of business functions and processes within the company and the supply chain. Digital transformation even leads to the development of new business models of relationship management in supply chains. An increasing usage of digital collaborative platforms will be a hallmark of future relationships between buyers and suppliers (Gottge *et al.*, 2020), that become more intense and complex. As the case study of company A proves, new models can be created and based on shared digital platforms integrating internal and external stakeholders of purchasing processes. The presented case study shows that digital technologies drive both

internal and external collaboration towards the development of innovation as a source of value.

Furthermore, the research results indicate that digital technologies at the current and future stages of their deployment are and will be an important element of the maturity of purchasing as a business function and process. As also emphasised in the literature, purchasing digitalisation is based on the use of numerous and various digital technologies and their application for internal and external integration (Singh Srani and Lorentz, 2019). However, as the results of research conducted among 504 purchasing managers in 39 countries indicate, the implementation of modern, emerging technologies is currently at a low level (Deloitte, 2018). The most advanced technological solutions are applied by market leaders, whose best practices are worth following for others.

6. Scientific, Practical and Social Implications

The purchasing function is increasingly often involved in cross-functional innovation development projects in companies and is beginning to play a leading role therein. Best practice of company A indicates that emerging digital technologies are becoming a catalyst for internal and external collaboration on innovation development, with the proactive participation of the purchasing function. Furthermore, digital technologies are transforming the role of purchasing in the innovation development process. This function not only buys innovations as before, but significantly increases the focal company's innovativeness by collaborating with internal customers and external suppliers. Moreover, digital technologies drive suppliers to take the initiative and offer innovative ideas. The research results enrich the literature on purchasing and the related business practice, emphasising the huge potential for exploring new value propositions in purchasing and buyer-supplier relationship management in the era of digital transformation.

7. Research Limitations and Suggestions for Future Studies

The findings presented above are preliminary and exploratory due to the limitations of the case study method in terms of generalisation. The article forms the basis for scientific discussion on research results in other countries and a comparison thereof. There is an opportunity to conduct a multi-case study, including the analysis of other industries in different countries.

References:

- Aminoff, A., Kiviniemi, M. 2016. Driving Supplier Innovations towards Digitalization of Infrastructure Projects, The XXVII ISPIM Innovation Conference – Blending Tomorrow's Innovation Vintage. Porto, Portugal.

- Bienhaus, F., Haddud, A. 2018. Procurement 4.0: factors influencing the digitalisation of procurement and supply chains. *Business Process Management Journal*. <https://doi.org/10.1108/BPMJ-06-2017-0139>.
- Blechmann, J., Engelen, M. 2020. Einkauf 4.0 – Möglichkeiten und Herausforderungen der Digitalisierung im Einkauf. Februar.
- Burt, D.N., Doyle, M.F. 1993. *The American Keiretsu*, Business One Irwin. Homewood.
- Cavinato, J. L. 1999. Fitting purchasing to the five stages of strategic management. *European Journal of Purchasing and Supply Management*. [https://doi.org/10.1016/S0969-7012\(99\)00012-X](https://doi.org/10.1016/S0969-7012(99)00012-X).
- Chesbrough, H., Bogers, M. 2014. Explicating Open Innovation. In: H. Chesbrough, W. Vanhaverbeke, J. West (ed.), *New Frontiers in Open Innovation*. Oxford University Press, Oxford.
- Chick, G., Handfield, R. 2015. *The Procurement Value Proposition. The Rise of Supply Management*. Kogan Page. Croydon.
- Cousins, P.D., Lawson, B., Squire, B. 2006. An empirical taxonomy of purchasing functions. *International Journal of Operations & Production Management*. <https://doi.org/10.1108/01443570610672239>.
- Deloitte. 2018. *Leadership: Driving innovation and delivering impact*.
- Easton, S., Epstein, E. 2018. *The Future of Procurement Arrives at Last*. A.T. Kearney.
- Ferreiro, T., Zappone-Fabre, E., Cordon, C. 2014. The organizational design shift, in C. Cordon, T. Ferreiro (ed.), *The Value Chain Shift. Seven Challenges Facing Top Executives*. IMD Global Value Chain Center. Lausanne.
- Foerstl, K., Hartmann, E., Wynstra, F., Moser, R. 2013. Cross-functional integration and functional coordination in purchasing and supply management. Antecedents and effects on purchasing and firm performance. *International Journal of Operations & Production Management*. <https://doi.org/10.1108/IJOPM-09-2011-0349>.
- Glas, A.H., Kleeman, F.C. 2016. The Impact of Industry 4.0 on Procurement and Supply Management: A Conceptual and Qualitative Analysis. *International Journal of Business and Management Invention*, 5.
- Gottge, S., Menzel, T., Forslund, H. 2020. Industry 4.0 technologies in the purchasing process. *Industrial Management & Data Systems*. <https://doi.org/10.1108/IMDS-05-2019-0304>.
- Jahani, N., Sepehri, A., Vandchali, H.R., Tirkolae, E.B. 2021. Application of Industry 4.0 in the Procurement Processes of Supply Chains: A Systematic Literature Review. *Sustainability*. <https://doi.org/10.3390/su13147520>.
- Jerome, J.J.J., Saxena, D., Sonwaney, V., Foropon, C. 2021. Procurement 4.0 to the rescue: catalysing its adoption by modelling the challenges. *Benchmarking: An International Journal*. <https://doi.org/10.1108/BIJ-01-2021-0030>.
- Jones, D. 1999. *Development models*. Supply Management.
- Kaufmann, L., Gaeckler, J. 2015. On the relationship between purchasing integration and purchasing decision-making speed. *International Journal of Physical Distribution & Logistics Management*. <https://doi.org/10.1108/IJPDLM-05-2013-0150>.
- Kibbeling, M., Van der Bij, H., Van Weele, A.J. 2013. Market Orientation and Innovativeness in Supply Chains: Supplier's Impact on Customer Satisfaction. *Journal of Product Innovation Management*. <https://doi.org/10.1111/jpim.12007>.
- Kleemann, C.F., Glas, H.A. 2017. *Einkauf 4.0. Digitale Transformation der Beschaffung*. Springer Gabler, Wiesbaden.

- Mena, C. 2014. Introduction: the strategic role of procurement. In: C. Mena, R. Van Hoek, M. Christopher, *Leading Procurement Strategy. Driving Value through the Supply Chain*. Kogan Page, Croydon.
- Monczka, R.M., Handfield, R.B., Giunipero, L.C., Patterson, J.L., Waters, D. 2010. *Purchasing & Supply Chain Management*. South-Western Cengage Learning.
- Mogre, R., Lindgreen, A., Hingley, M. 2017. Tracing the evolution of purchasing research: future trends and directions for purchasing practices. *Journal of Business & Industrial Marketing*. <https://doi.org/10.1108/JBIM-01-2016-0004>.
- Murillo-Oviedo, A.B., Pimenta, M.L., Hilletofth, P., Reitsma, E. 2019. Achieving Market Orientation Through Cross-Functional Integration. *12 Operations and Supply Chain Management*. <http://doi.org/10.31387/oscm0380241>.
- Narasimhan, R., Narayanan, S. 2013. Perspectives on Supply Network-Enabled Innovations. *Journal of Supply Chain Management*. <https://doi.org/10.1111/jscm.12026>.
- Nowosel, K., Terrill, A., Timmermans, K. 2015. Procurement's Next Frontier. The Future Will Give Rise to an Organization of One. Accenture.
- Ocicka, B. 2019. Rola zakupów w działalności przedsiębiorstw. WN PWN, Warszawa.
- OECD, Eurostat. 2008. *Podręcznik Oslo. Zasady gromadzenia i interpretacji danych dotyczących innowacji*.
- Pellengahr, K., Richard, J. 2016. Einkauf 4.0. Digitalisierung des Einkaufs. Fraunhofer-Institut für Materialsfluss und Logistik IML, Bundesverband Materialwirtschaft, Einkauf und Logistik BME e.V., Frankfurt.
- Reck, R.F., Long, B.G. 1988. Purchasing: A Competitive Weapon. *Journal of Purchasing and Materials Management*. <https://doi.org/10.1111/j.1745-493X.1988.tb00631.x>.
- Schreiber, B., Janssen, R., Weaver, S., Peintner, S. 2016. Procurement 4.0 in the digital world. Transforming procurement into an agile, linked innovation leader and catalyst. Arthur D. Little, 1-4.
- Seuring, S. 2005. Case Study Research in Supply Chains – An Outline and Three Examples: In: H. Kotzab, S. Seuring, M. Müller, G., Reiner (ed.), *Research Methodologies in Supply Chain Management*. Physica-Verlag, Heidelberg.
- Singh Srani, J., Lorentz, H. 2019. Developing design principles for the digitalisation of purchasing and supply management. *Journal of Purchasing and Supply Management*. <https://doi.org/10.1016/j.pursup.2018.07.001>.
- Stannack, P., Jones, M. 1996. *The Death of Purchasing Procedures*. PSERA, Eindhoven.
- Tripathi, S., Gupta, M. 2021. A framework for procurement process re-engineering in Industry 4.0. *Business Process Management Journal*. <https://doi.org/10.1108/BPMJ-07-2020-0321>.
- Van Weele, A.J. 2018. *Purchasing and supply chain management*. Cengage Learning.
- Von der Gracht, H., Giunipero, L.C., Schueller, M. 2016. *Future-Proof Procurement. Now or Never: The Big Procurement Transformation*. Florida State University, KPMG.
- Wagner, S. M. 2012. Tapping Supplier Innovation. *Journal of Supply Chain Management*. <https://doi.org/10.1111/j.1745-493X.2011.03258.x>.
- Yan, T., Yang, S., Dooley, K. 2017. A theory of supplier network-based innovation value. *Journal of Purchasing and Supply Management*. <https://doi.org/10.1016/j.pursup.2017.02.002>.
- Yap, K., Wong, Ch.C., Koh, Y.H. 2018. *Procurement: Riding the Transformative Digital Wave*. A.T. Kearney.
- Yin, R.K. 2003. *Case Study Research: Design and Methods*. Third ed. Sage, Thousand Oaks, CA.