

# Areas of Action for Process Automation in Drop Shipment

David Kuhlen

Technische Hochschule Lübeck  
Mönkhofer Weg 239  
23562 Lübeck, Germany

**Abstract.** In the context of e-commerce, the advantages of so-called DropShipments are critically assessed. The present paper addresses the introduction of DropShipment business models against the backdrop of the associated process automation. Process automation plays a critical role in ensuring fast and efficient process execution at high order volumes. Consequently, the introduction of dropshipping also places extensive demands on the automation of business processes. While full process automation is technically feasible, it is subject to practical limitations. To this end, the dropshipping business model is analyzed in this paper with a focus on the technical implementation of automated business processes. The areas of action necessary for the implementation of automated dropshipping processes are analyzed. The analysis is based on a survey that examines the overall importance of the business model, the contribution of key action areas to developing integration solutions supporting automated processes, and future IT requirements. In the course of the survey, 19 to 21 dual Bachelor students in Computer Science and Business Informatics were asked for their assessments. The majority of respondents have no prior knowledge of *DropShipping*, so the survey results primarily reflect their spontaneous assessments after receiving an introduction to the topic. The study concludes that the DropShipping business model will gain increasing importance in the future. Furthermore, it became evident that requirements analysis, in particular, represents a significant effort while offering high value in developing integration solutions for automated process handling. The data analysis shows that the cost-benefit potential of using artificial intelligence methods to enable automated processes is optimal. Finally, it was found that creating automated DropShipping processes requires, to a particularly high degree, the expertise of software developers.

**Keywords:** DropShipping, Process Automation, Software Engineering

## 1 Introduction

Due to the growing importance of online commerce, the significance of so-called “Drop-Shipping business models” is also increasing. For corporate IT, the implementation of *DropShipping* entails a wide range of adaptation requirements, such as the integration of enterprise applications along the supply chain. It is advisable to carry out a target process analysis beforehand [13] to realize the potential for process automation. The implementation of extensive process automation is crucial for enabling the rapid processing of orders, which is often demanded by online retail customers. To examine the areas of action associated with the introduction of *DropShipping business models*, this paper presents the results of a survey. The survey was conducted among dual students of computer science and business informatics who have practical experience and received an introduction to the topic of *DropShipping* before the survey. The respondents shared their assessments. This paper explores the challenges and solutions associated with process automation in this context.

The research work is divided into several research sections. The processing of sections RP1 to RP2 is based on the aforementioned survey. First, the importance of the Drop-

Shipping business model is examined (RP1). Based on this, areas of action for the implementation of dropshipping processes are identified and described (RP2). In a subsequent empirical analysis, these areas of action (RP2.1) and the impact of dropshipping on IT (RP2.2) are analyzed. This interaction is further analyzed with regard to the challenges and opportunities of process automation (RP3).

The remainder of this paper is structured as follows: the following section discusses related work. Section 3 describes the research methodology, including in particular a description of the survey. The survey results are presented in Section 4. The paper concludes with a summary and an outlook. The bibliography is provided at the end of the paper.

## 2 Related Work

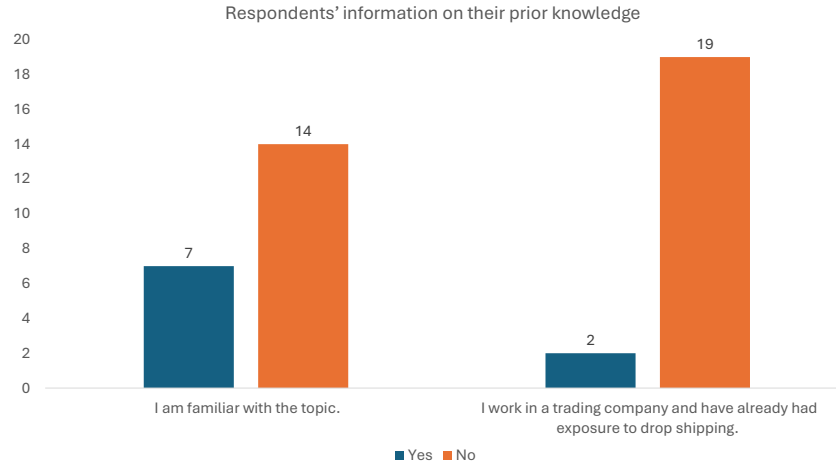
The present work is closely related to studies in the field of DropShipping. A comprehensive introduction to the topic of *DropShipping* is provided in [31]. Youderian and Hayes recommend paying attention to the partners' ability to ensure fast and seamless process flows when selecting partners for implementing the DropShipping business and point out that this capability also depends on the IT systems used [31, p. 24 f.]. Singh et al. discuss the significance of DropShipping business models [23]. Singh et al. describe the possibility that routine DropShipping processes, such as updating inventory quantities, can be carried out either manually or automatically through the use of IT integrations [23]. Furthermore, Singh et al. elaborate on the benefits and challenges of DropShipping [23]. Mostarac et al. explain the implementation of the *DropShipping* business model [20]. The focus is placed on the interaction of actors along the supply chain, highlighting the contribution of DropShipping to risk reduction [20]. Laseinde examines *DropShipping supply chains* in South African e-commerce, focusing on stakeholder motivations and challenges associated with the business model [17]. Laseinde highlights the potential of IT solutions for process automation through which operations can be streamlined [17, p. 155]. Mandla addresses innovative approaches to strengthening e-commerce and also discusses process automation and DropShipping [18]. Mandla, for example, sees potential in reducing error risks through automated data reconciliation [18, p. 2]. Danyil examines e-commerce business models, including *DropShipping*, with a particular focus on strategies for addressing challenges in international trade [5]. Technical solutions enable process automation, which offers economic advantages [6] [5, p. 35]. Renon et al. compare the DropShipping business model with the alternative in which companies handle *fulfillment* themselves [22]. Renon et al. conclude that, for the company studied, the *DropShipping business model* is advantageous [22]. Information technology (IT) is identified by Renon et al. as a critical success factor, for example, in reducing order fulfillment time [22]. In the preliminary work to this publication [14], a reference model of the *DropShipping business* was described, which can support the implementation of end-to-end automated processes.

Particularly noteworthy are publications that examine aspects of artificial intelligence in the context of introducing DropShipping. For example, [26] introduces the product "Zero2Launch" and discusses the use of *artificial intelligence* in the context of DropShipping. Keerthana et al. present an approach to optimizing DropShipping operations using artificial intelligence, for instance, by identifying price trends [8].

## 3 Method

To meet the objectives of research areas RP1 to RP3, a survey was conducted. The survey targeted dual IT students enrolled in the Computer Science and Business Informatics programs. Due to the dual study format, the students already possess practical experience.

Prior to the *survey*, the students received an introduction to the topic of *DropShipping*. By applying the *survey* methodology, the opinions and assessments of aspiring IT professionals within the context of their education were collected. During the survey, participants were asked about their prior knowledge. The results of this inquiry are presented in Figure 1. It is evident that the respondents largely had no prior knowledge of *DropShipping*. Consequently, the survey results primarily reflect the respondents' spontaneous assessments.



**Fig. 1.** Survey participants' information on their prior knowledge. The figure presents the participants' self-assessment. Own illustration, created with Microsoft© Excel© [3] and Microsoft© PowerPoint© [4]

Given the respondents' prior knowledge, the introductory briefing they received was particularly important. During this introduction, challenges and solutions related to process automation in DropShipping were discussed. The structure of the business model was explained, as detailed in [14]. The focus was on processes for order fulfillment, supply chain management, and catalog maintenance. Regarding the importance of process automation, attention was drawn to its impact on the interaction of actors, particularly in terms of process speed and cost. In terms of solutions, the participants were briefly explained the concepts of *Requirements Analysis*, *Organization*, *Standard Processes*, the *Implementation of IT Integrations*, and the *Use of AI* within this context.

The survey evaluates the overall significance of the dropshipping business model as well as specific areas of activity (RP1; RP2.1 ff.). It is conducted among dual study program students majoring in computer science or business informatics. Prior to the survey, the students received an introduction to the dropshipping business model that explained its objectives and functionality. The survey was conducted using Mentimeter [19].

Table 1 presents the questions included in the survey. The column labeled (*n*) refers to the number of participants who responded to the respective question. During the survey, participants were asked to assess the areas of activity *Requirements Analysis*, *Organization*, *Design*, *Planning*, and *Implementation* in terms of both the efforts involved and the potential benefits (RP2.1). For each area, participants provided ratings in the dimensions *Costs e.g., implementation efforts, working hours* and *Benefits e.g., revenues from accelerated processes*, using a scale from 0 to 10 points. The evaluation of statements (RP1 and RP2.2), in contrast, was carried out on a scale ranging from -10 to +10 points, where negative values indicate disagreement and positive values indicate agreement.

**Table 1.** Survey Questions (Questions for Research Parts qRP)

Code	Description	$n$
qRP1	<b>How do you evaluate the following statements?</b> Dropshipping will play an even more important role in the future.	19
qRP2.1	<b>Please evaluate the following solution options for promoting process automation based on their associated costs and benefits</b>	
qRP2.1a	Requirements Analysis: Target process analysis and design at the start of the project	21
qRP2.1b	Organization: Agreement on appropriate Service Level Agreements (SLAs) between partners	20
qRP2.1c	Design: Use of artificial intelligence for risk assessment	21
qRP2.1d	Planning: Establishment of a standard process	21
qRP2.1e	Implementation: Use of centralized integration solutions, e.g., via an ESB	19
qRP2.2	<b>How do you evaluate the following statements?</b>	
qRP2.2a	Business models like dropshipping will lead to increasing demands on IT in the future.	19
qRP2.2b	To support business models like dropshipping, IT applications must provide adequate interfaces (APIs).	19
qRP2.2c	Projects for the implementation of dropshipping require the expertise of software developers.	19

## 4 Results

### 4.1 RP1: Analysis of Assessments Regarding the Future Importance of the Business Model

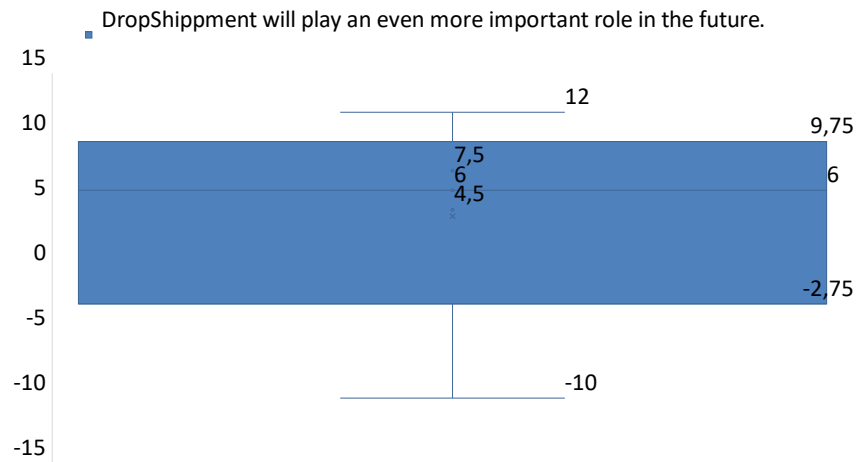
As outlined in Section 3, the analysis of the business model involves an assessment of both its importance and its operational mechanism. The assessment of its importance is based on the evaluation of responses to qRP1, while the investigation of its operational mechanism draws on the state of current research.

Figure 2 illustrates the distribution of participant evaluations regarding the future importance of the DropShipping business model. This is presented as a boxplot, depicting the minimum, the 0.25 quantile ( $q_{0.25}$ ), the median, the 0.75 quantile ( $q_{0.75}$ ), and the calculated upper bound for typical values. The latter is computed as  $q_{0.75} + \frac{3}{2}(q_{0.75} - q_{0.25})$ . The evaluation was conducted as part of qRP1, described in Section 3. Participants rated future importance on a scale from -10 to +10. The arithmetic mean of these evaluations was  $\bar{x} = 4.789$ , indicating a moderately high level of importance. The median rating was 6.

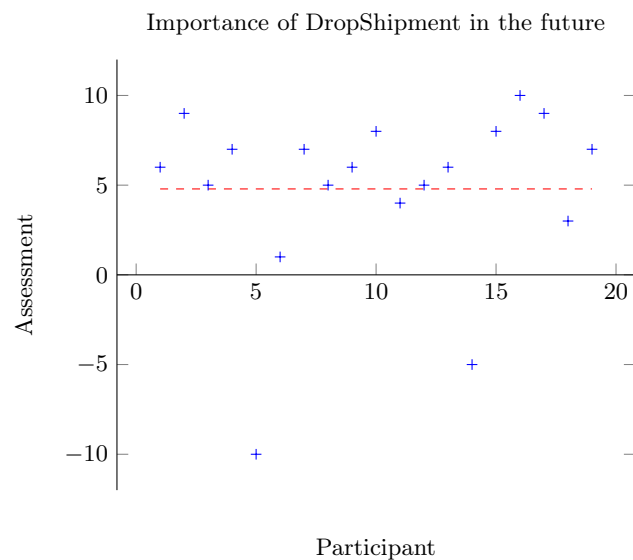
Figure 3 displays individual participant responses to qRP1. The x-axis represents the participants, while the y-axis indicates their assessment of the business model's future importance. The mean value of 4.789 is marked by a dashed line. Out of 19 participants, 2 gave a negative assessment of future importance (one with -10 points, one with -5 points).

Figure 4 presents the distribution of given ratings ( $b$ ) within the categories *very important* ( $5 \leq b$ ), *important* ( $1 \leq b < 5$ ), *unimportant* ( $-5 < b \leq 0$ ), and *very unimportant* ( $b \leq -5$ ). The majority (74%) rated the DropShipping model as *very important*.

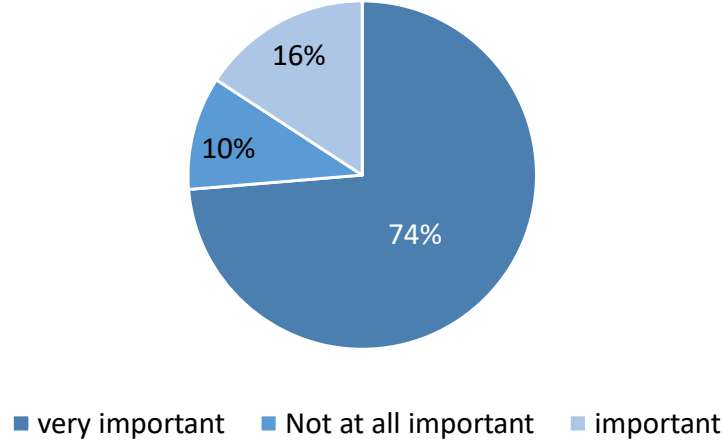
The analysis of qRP1 clearly suggests a growing future relevance for the DropShipping business model, which is plausible considering the anticipated growth of the e-commerce market [25]. Danyil describes the possibility of hybrid forms of the *DropShipping* business



**Fig. 2.** Assessment of the participants' survey responses regarding the future importance of the drop shipment business model. Presentation of the results for qRP1 as a box plot. Own illustration, created with Microsoft© Excel© [3] and Microsoft© PowerPoint© [4]



**Fig. 3.** Assessment of the future relevance of the business model, where -10 indicates that the model plays no role and +10 reflects a strongly increasing significance. Own illustration, created with TikZ (tikzpicture) being part of TeX Live Version 2024 [27] on the basis of data sets preprocessed with Microsoft Excel 2019 [3]



**Fig. 4.** Evaluation of the future importance of the drop shipment business model presented in the form of a pie chart. For this purpose, the numerical assessments of qRP1 were categorized by importance ( $\text{qRP1} \geq 5 \rightarrow$  Very important;  $5 > \text{qRP1} > 0 \rightarrow$  Important;  $0 \geq \text{qRP1} > -5 \rightarrow$  Unimportant;  $\text{qRP1} \leq -5 \rightarrow$  Very unimportant). Own illustration, created with Microsoft© Excel© [3] and Microsoft© PowerPoint© [4]

[5, p. 24], whereby it can be assumed that the resulting opportunities, due to additional options, could tend to increase the significance of the business model. It should be noted that in [14] the hybrid form of the business model is not mentioned; however, it is conceivable based on the distribution of roles.

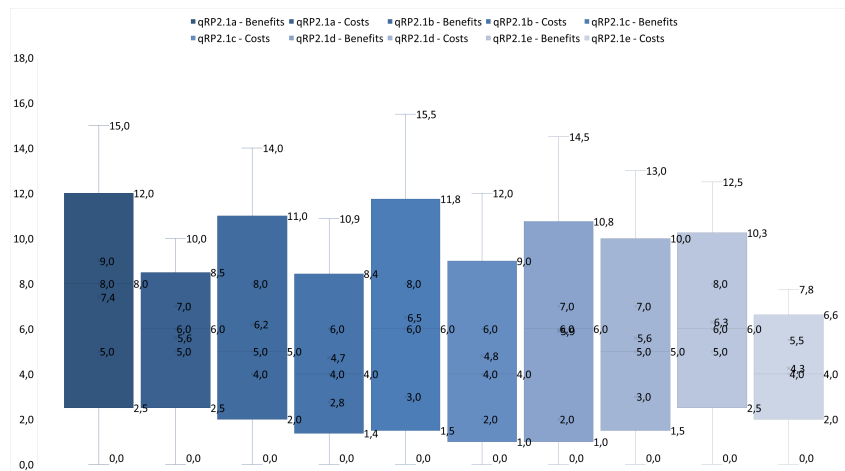
#### 4.2 RP2: Areas of Action for Process Implementation

As part of qRP2.1, the areas of action *Requirements Engineering* (qRP2.1a), *Organization* (qRP2.1b), *Design* (qRP2.1c), *Planning* (qRP2.1d), and *Implementation* (qRP2.1e) were evaluated based on *Costs* and *Benefits*. The distribution of these evaluations is visualized using a boxplot in 5. The graphical representation follows the same conventions as the boxplot in Figure 2; see Section 4.1 for details. The analysis reveals that the areas qRP2.1a and qRP2.1e received the highest benefit ratings, each with a median of 5. Likewise, the costs associated with qRP2.1a (median 5) and qRP2.1e (median 4) were rated highest. The lowest benefit was attributed to qRP2.1b (median 5). The greatest variance in assessments occurred for qRP2.1c.

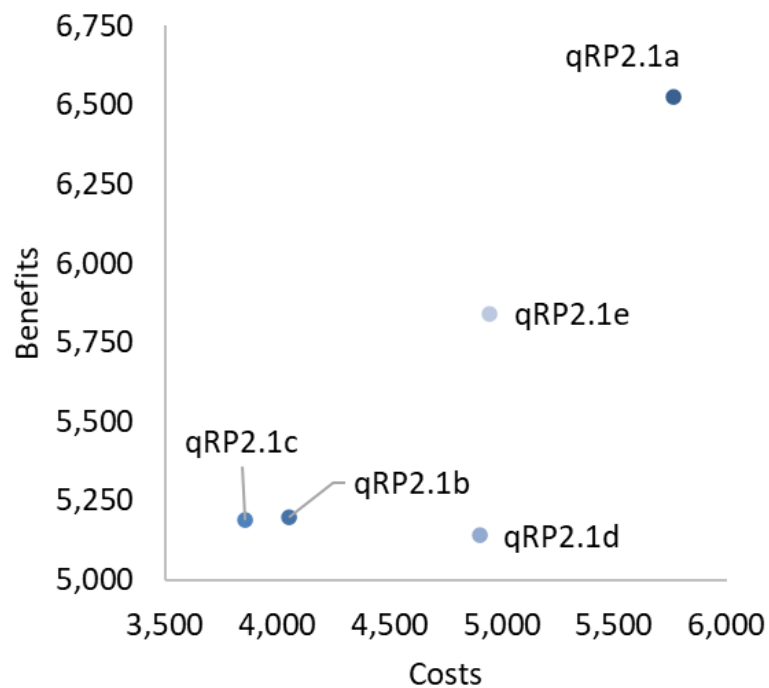
In a further evaluation, mean values for cost and benefit ratings were calculated for each area qRP2.1a to qRP2.1e. Based on the ratio of cost (x-axis) to benefit (y-axis), the evaluations of the action areas were plotted in a coordinate system, see 6. The figure illustrates that qRP2.1a (Requirements Engineering) yields both the highest costs and the greatest benefits ( $x = 5.762$ ;  $y = 6.524$ ). By contrast, the costs and benefits of qRP2.1c (Design) were rated the lowest ( $x = 3.857$ ;  $y = 5.190$ ).

Figure 7 presents the results of a further analysis, calculating the *return on investment* (ROI) from the mean ratings of each action area. The ROI for each area qRP2.1a–e was determined by dividing the average benefit rating by the average cost rating. The analysis shows that qRP2.1c (application of artificial intelligence) achieves the highest ROI at 134.57%. The lowest benefit-to-cost ratio was recorded for qRP2.1d (process standardization) at 104.85%.

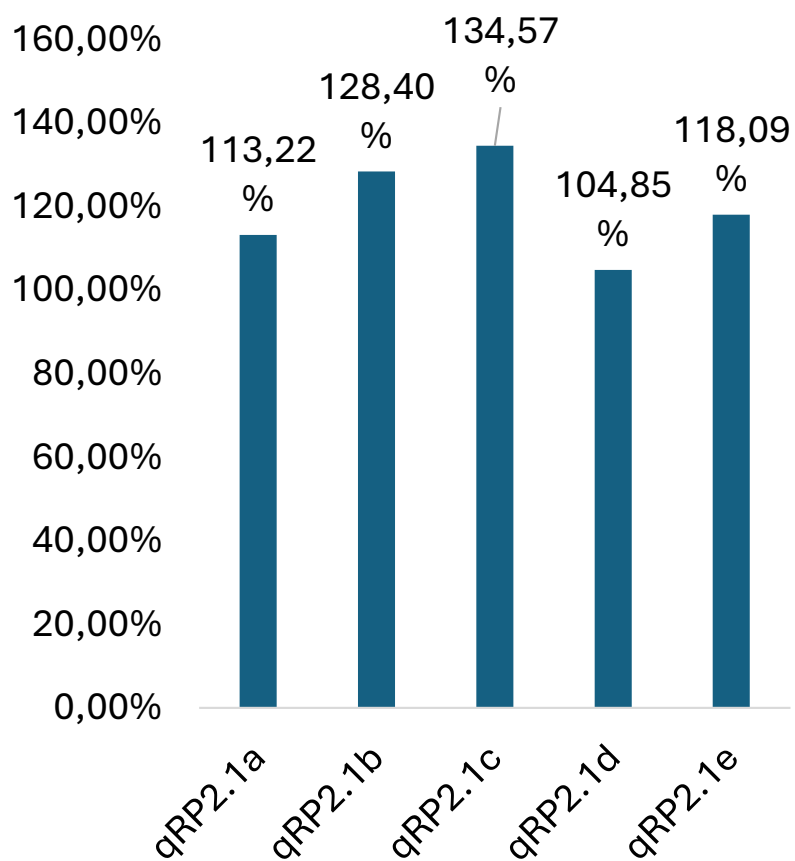
Furthermore, with an ROI of 128.40%, the agreement on service levels also demonstrates a favorable cost–benefit ratio, as illustrated in Figure 7. When defining the terms



**Fig. 5.** Variation in the evaluation of *Costs* and *Benefits* for qRP2.1 presented in the form of a box plot. Own illustration, created with Microsoft© Excel© [3] and Microsoft© PowerPoint© [4]



**Fig. 6.** Presentation of the respondents' assessment of the effort (costs) and benefits of task areas aimed at promoting process automation. The respondents evaluated the effort and benefits on a scale from 0 to 10 points, with higher values indicating greater costs or benefits. Classification of the action areas qRP2.1a–e based on their cost/benefit evaluations within a coordinate system. Own illustration, created with Microsoft© Excel© [3] and Microsoft© PowerPoint© [4]



**Fig. 7.** For the evaluation of respondents' assessments of the effort and benefits of the task areas in qRP2.1 ff., the mean values of the benefit and cost ratings are calculated for each task area and compared. The figure illustrates the ratio of benefits to costs for each action area qRP2.1a - e. Own illustration, created with Microsoft© Excel© [3] and Microsoft© PowerPoint© [4]

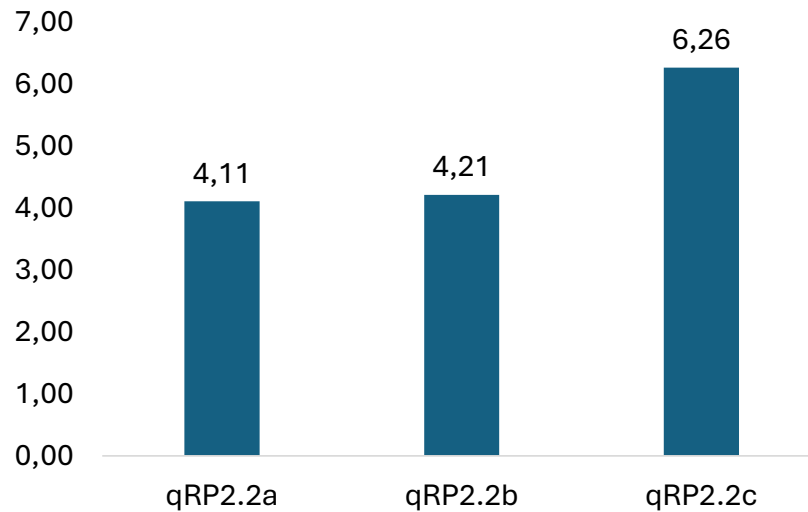


and conditions, the allocation of risks must be clarified [28, p. 253]. One relevant issue is determining who bears the inventory risk—i.e., the cost of storing items that fail to sell. This risk typically falls on the MaterialProvider, DropShipper, or DropShipManager due to the structure of the replenishment process. According to [29, 9], a many-to-many (M:N) relationship can exist between ShopOperators and DropShippers in a DropShipment model. Risk-sharing among participants may be negotiated through pricing strategies. The handling of returns must also be clarified. One possible arrangement is for the logistics partner to manage returns; however, the related costs must be assessed in proportion to the value of the returned goods. On the organizational level, it is essential to select partners who can reliably support the dropshipping process. Mistakes by a partner may lead to negative customer experiences, which online marketplace operators typically penalize to avoid customer churn.

Additional technical challenges arise in process automation. Winiarski and Marcinkowski argue that in the DropShipment model, extensive data exchanges among the partners must be implemented, such as transmitting inventory levels, prices, offers, and orders [29, 290]. Since the same product is often sold on competing platforms, cost pressures increase, making process automation a critical factor [29]. From a technical standpoint, integration of the partners' information systems is required. This necessitates a thorough requirements engineering phase to clarify which system maintains which master data, how data transfers are initiated, and what data formats will be used.

- **Financial Model:** The introduction of a DropShipment business model constitutes an investment. According to Witkowski, the initial investment is relatively low and can be reversed quickly if the business proves unprofitable [30, p. 96]. Agreements with partners must be reached to ensure that the model is profitable for all stakeholders. Key topics include warehousing costs and inventory risk. It must be clarified who bears the warehousing costs and the risk associated with the goods (cf. [23, p. 14], [20, p. 0145], [7, p. 70], [28], [21]). Goods stored with the logistics partner (DropShipper) incur costs, which may be borne by either the wholesaler or retailer. Retailers often have better visibility into expected sales volumes due to their proximity to customers.
- **Business Model Design:** Before introducing a DropShipment business model, the business process must be refined. These include defining roles, structuring communication relationships (linear, star-shaped), and establishing processes, such as return handling, see [14]. The logistics partner may process returns, but this incurs costs, which may be billed to the retailer.
- **IT Integration:** Common IT integration challenges must be addressed, such as continuous data exchange (e.g., inventory data) [28, p. 247]. Questions include who is responsible for delivering data (pull vs. post-request; event-based or time-based), what data is transmitted, and in which format (data format, interface type, such as EDI). Automated data transmission is essential. In practice, EDI is often used.
- **Organizational:** Organizational challenges include ensuring partner reliability [23, p. 14], which is critical to success [28, p. 248]. Given potential business scaling, standardization of processes should also be planned.

As part of qRP2.2, a survey investigated the impact of business models such as DropShipment on IT. The results are summarized in Figure 5. The bar chart clearly shows increased IT demand (qRP2.2a), growing requirements for suitable interfaces (qRP2.2b), and higher demand for software development expertise (qRP2.2c). The strongest agreement was expressed for qRP2.2c, reflecting the participants' assessment that software development skills are required to implement DropShipment models. The average rating for qRP2.2c is  $\bar{x} = 6.26$  points.



**Fig. 8.** As part of qRP2.2 ff., participants were surveyed on IT requirements in selected categories. Participants could rate specific statements on a scale from -10 to +10 points, with higher values indicating stronger agreement. The presentation shows the arithmetic mean of the ratings for the assessments that drop shipment will lead to increasing IT requirements in the future (qRP2.2a), that software developer expertise is required (qRP2.2b), and that appropriate APIs are needed (qRP2.2c). Own illustration, created with Microsoft® Excel® [3] and Microsoft® PowerPoint® [4]

Figure 9 shows a further analysis of the variability in responses to qRP2.2a–c. The boxplot representation follows the same conventions as previous ones; see Section 4.1. The results indicate that responses to qRP2.2b show low variability, suggesting high confidence among respondents. The responses to qRP2.2a and qRP2.2c demonstrate similar levels of variance.

### 4.3 RP3: Challenges of Process Automation

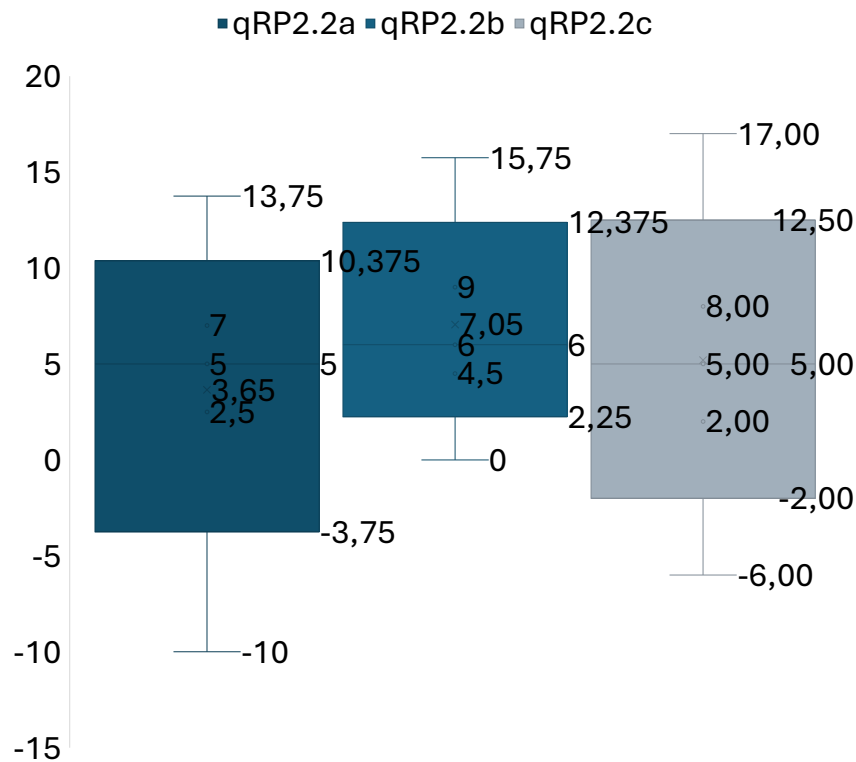
Retail is highly competitive, profit margins are tight, and customers expect fast delivery [23]. As a result, processes must be efficient and cost-effective [20]. Automation plays a critical role.

Full automation means that order processing occurs without manual intervention. The client’s order would be automatically forwarded to the DropShipper for fulfillment. However, full automation introduces risks. The goal conflict is illustrated in Figure 10.

Balancing competing objectives is therefore essential. Typically, a trade-off exists between performance (achieved through automation) and reliability (ensured through control mechanisms). The classic project management triangle—time, cost, and quality—also applies here.

Cost considerations include storage and transportation. Higher inventory levels can improve delivery speed but increase costs. Time considerations involve manual tasks like inspection. Quality includes customer satisfaction and delivery performance.

One key challenge to full automation is handling exceptions. Examples include incorrect order data (e.g., fictitious clients), fulfillment failures (e.g., item damage), or data loss during transmission [30]. Such cases often require manual intervention and limit automation potential.



**Fig. 9.** The figure illustrates the distribution of respondents' assessments of IT requirements (ratings for qRP2.2 a–c). The variation in the survey results for qRP2.2a–c is presented as a box plot. Own illustration, created with Microsoft© Excel© [3] and Microsoft© PowerPoint© [4]

Common exception scenarios include:

- What if order data is incorrect? (e.g., orders for non-existent items or by fictitious customers)
- What if an order cannot be fulfilled? (e.g., due to damage during picking)
- What if order data is lost? (e.g., during transfer to logistics partners or confirmation loss)
- What if payment references are unassignable? (e.g., incorrect reference numbers)
- What if returns are faulty? (e.g., misrouted or incorrect items)

Furthermore, from a security perspective, full automation can be problematic. For instance, processing refunds before inspecting returned goods may enhance speed but reduce reliability. A trade-off between security and performance (i.e., speed) is therefore necessary.

#### 4.4 Introducing Automated Processes in DropShipment

The options for responding to challenges in practice are diverse. Possible scenarios include, for example, hybrid forms of the business model [5, p. 24] or gradual/test-based implementation scenarios (pilot operations, see explanation of Rühmann [1, Duration: 0:50 - 1:12]), although other strategies to mitigate challenges are also conceivable. Appropriate countermeasures should be defined individually in the implementation project with regard to the specific challenges. Furthermore, regular monitoring of the risk situation surrounding the dropshipping business and the redefinition of countermeasures is required.

The findings in Section 4.2 illustrate that business-related planning must precede IT implementation via system integration. The project requires the involvement of software



**Fig. 10.** Representation of the interrelation between time, cost, and quality objectives in the context of the drop shipping business. Regarding goal conflicts, see also the work by [16] and [2, p. 338]. Own illustration, adapted from [2, p. 338], created with Microsoft® PowerPoint® [4]

developers and technical analyses to evaluate the potential of existing APIs (qRP2.2b). The following maps the initiative to the traditional steps of software development projects.

According to classical software engineering approaches, the introduction of a DropShipment model requires efforts across the areas of *Requirements Engineering*, *Organization*, *Planning*, *Design*, *Implementation*, *Quality Assurance*, and *Deployment*.

As part of **Requirements Engineering**, the first step involves analyzing project objectives and identifying the interests of the involved stakeholders. A *SWOT analysis* can help plan the distribution of risks among the participants. An *investment appraisal* should also be conducted during the requirements phase to inform the project decision.

Kuhlen's findings show that initiatives such as implementing system integrations for process automation must overcome various challenges, such as "requirement-related challenges", "software structure challenges", and different types of "organizational challenges" [12, p. 5153]. A key to overcoming many of these challenges lies in a proper understanding of customer requirements [12]. Applying a target process analysis can assist in requirements analysis [13]. For developing integration solutions for process automation in the context of DropShipping processes, analyzing stakeholders and defining the process flow play a decisive role, particularly in determining which actor assumes which responsibilities [13, 14]. In some cases, 3D modeling of requirements can also positively influence the understanding of the process flow and promote the development of innovative business solutions (cf. [15]).

Based on existing procedural descriptions, the process of target process modeling can be facilitated through the use of artificial intelligence methods [24]. The generation of

process models is possible for both as-is and to-be descriptions [24]. In this regard, it is recommended that particularly complex individual elements in the generated process models be subjected to review [24].

When DropShippers offer their shipping services to multiple partners, developing automated integration solutions becomes a standard task. To simplify their work and reduce costs, such scenarios should explore the potential of *code generation* [10]. In these cases, DropShippers could be comparable to platform providers, offering further cost advantages and opportunities for standardization [11].

To achieve the goals associated with DropShipment, **planning and organization** are required. Agreements with partners must be established and formalized. Signing *Service Level Agreements (SLAs)* is customary [28, p. 246]. On the organizational level, service levels must be defined, and penalties must be enforced if these are not met. In addition to standard time and budget plans, the design of the DropShipment model must be planned, including process standardization, deployment, and data flow. From a planning standpoint, standardizing processes is advisable, particularly if one partner serves multiple others.

Conducting a *target process analysis* during Requirements Engineering is recommended [13]. A more detailed process definition is carried out during **Design**. Innovative technologies, such as artificial intelligence, may be included to address risks. For instance, AI could enable a higher degree of automation while still allowing flexible responses to exceptional risk scenarios. A potential use case is the accelerated refund process for trusted customers during return handling. Due to the pattern recognition capabilities of AI algorithms, employees can be relieved from time-consuming manual checks. For example, if an AI algorithm verifies whether orders come from trusted customers, further automation up to fully automated order approvals becomes conceivable. As illustrated in Figure 10, each additional level of automation potentially entails risks that may be mitigated through the use of AI. This requires thorough training of the applied AI algorithm in advance. It is also recommended that employees monitor the operation of the AI solution and regularly review the reasons behind AI decisions to allow immediate intervention in case of errors, as explained by Rühmann [1, Duration: 3:59 – 4:24].

In terms of **Implementation**, the IT systems of the participating partners must be integrated. During implementation, proven IT integration strategies should be employed. The use of a central integration platform, such as an ESB, is recommended [21, p. 1976 f.]. This approach offers advantages over direct connections, such as improved monitoring and scalability. Such platforms facilitate monitoring and improve scalability.

## 5 Threats to validity

This study presents the results of a survey. The findings aim to support the implementation of DropShipment business models. However, certain limitations apply, which preclude any guaranteed validity of the findings presented.

The significance of the results from surveys qRP1, qRP2.1, and qRP2.2 is limited due to the small sample size. The results are based on the assessments of a maximum of 19 participants, all of whom are dual students of computer science or business informatics at the bachelor's level. Consequently, the conclusions drawn from the survey are not necessarily representative. It can be assumed that this small, homogeneous group may evaluate the importance of specific aspects differently from how they would be assessed by a broader audience. To achieve representative findings, it would be advisable to extend the survey.

The results presented in this study may serve as initial guidance for the implementation of automated DropShipment processes. In particular, the identified fields of action and

the—albeit not necessarily representative—assessments of their importance may facilitate the planning of implementation projects. Before incorporating these findings into planning activities, however, their validity must be verified. It is important to emphasize that such validation must occur in all cases. Even if further studies were to provide representative results, their validity would always need to be examined in the context of the specific conditions of the company in which automated drop shipping processes are to be implemented. Individual company characteristics may require that the focus of attention be adjusted when introducing automated processes.

## 6 Conclusion

However, full process automation comes with increased risk. Therefore, the design of a DropShipment business model requires a careful evaluation of the cost-benefit aspects of automation. The present study is based on a survey conducted among dual Bachelor students. As part of the survey, 19 to 21 dual bachelor’s students in the field of computer science / business informatics were asked for their assessments. The majority of these students have no prior knowledge in the area of drop shipping. Consequently, the results of the survey reflect the respondents’ spontaneous assessments after they received an introduction to the topic. The findings related to qRP1 suggest that the importance of the DropShipment business model is likely to increase in the future.

An assessment of the benefit-cost ratio of action areas for implementing automated DropShipment processes shows that using artificial intelligence is particularly promising (qRP2.1c). Additionally, agreeing on suitable service levels offers relatively high benefits with comparatively low effort to ensure business quality (qRP2.1b). While conducting a comprehensive requirements analysis involves significant effort, it is also expected to yield considerable benefits (qRP2.1a).

To implement DropShipment, it is recommended to (1) assess the economic viability of the investment, (2) design the business model based on the results of this analysis, (3) develop the IT integration in line with the business model configuration, and (4) continuously pursue process standardization to further reduce costs. Due to the critical role of IT integration in achieving process automation in DropShipment, the implementation of a DropShipment business model requires the involvement of software developers (qRP2.2c).

In future studies, the impact of artificial intelligence on changes within the supply chain should also be examined in the context of the present analysis of the drop shipment business model.

## 7 Acknowledgement

Parts of the present study were initially intended to be included in [Kuhlen, David (2026): “Reference Model of the DropShipment Business”. In: Hurst, William (ed.): 2026 the 12th International Conference on Information Management (ICIM2026). Springer Nature Switzerland AG. (=LNCS). (in press)], but were not published there, in the work “Reference Model of the DropShipment Business” at Springer Nature, see [14]. The present study contains additional descriptions and new material.

## References

- [1] Ameln, L.: KI hilft beim Recruiting in Unternehmen – Interview Vanessa Rühmann, Kienbaum. Deutschlandfunk, Podcast Campus & Karriere, online available at: <https://www.deutschlandfunk.de/ki-hilft-beim-recruiting-in-unternehmen-interview-vanessa-ruehmann-kienbaum-100.html> (2025), Total duration: 7 minutes and 35 seconds
- [2] Atkinson, R.: Project management: cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria. *International Journal of Project Management* **17**(6), 337–342 (December 1999), elsevier Science Ltd and IPMA. DOI: 10.1016/S0263-7863(98)00069-6
- [3] Corporation, M.: Microsoft© Excel©. Office Home & Business 2019 (2019), version 2212
- [4] Corporation, M.: Microsoft© PowerPoint©. Office Home & Business 2019 (2019), version 2410
- [5] Danyil, V.: INTERNET TECHNOLOGIES AND THEIR INFLUENCE ON THE DEVELOPMENT OF INTERNATIONAL BUSINESS. Qualification paper for the master's degree, Sumy State University, Sumy, Ukraine (2024)
- [6] Davenport, T.H.: Process Innovation. Reengineering Work through Information Technology. Havard Business School Press, Boston, Massachusetts (1993), ernst & Young. ISBN: 0-87584-366-2
- [7] Hanani, G.Q.: The Impact of Online Gold Trade Using the Dropshipment System Based on Maqashid Syari'ah. *Al-Hurriyah: Jurnal Hukum Islam* **7**(1) (January-June 2022), DOI: 10.30983/alhurriyah.v7i1.5265
- [8] Keerthana, S., Apirajitha, P.S., Khanaghavalle, G.R., Deepika, N., Kiruthiga, E., Yuvaprabha, S.: Dropshipping Using Current Market Analysis. In: 2025 International Conference on Computing and Communication Technologies (ICCT). IEEE, Chennai, India (16-17 April 2025), DOI: 10.1109/ICCT63501.2025.11020522
- [9] Kim, N., Montreuil, B., Klibi, W.: Inventory availability commitment under uncertainty in a dropshipping supply chain. *European Journal of Operational Research* **302**(3), 1155–1174 (November 2022), eLSEVIER. DOI: 10.1016/j.ejor.2022.02.007
- [10] Kuhlen, D.: Contribution of Code Generation in Order to Save Process Costs in Software Development. *International Journal of Research Publication and Reviews (IJRPR)* **5**(7), 2385–2390 (July 2024), DOI: 10.55248/gengpi.5.0724.1814. ISSN: 2582-7421
- [11] Kuhlen, D.: Cost Potentials of Platforms for Software Engineering. *International Journal of Research Publication and Reviews (IJRPR)* **5**(7), 2380–2384 (July 2024), DOI: 10.55248/gengpi.5.0724.1815. ISSN: 2582-7421
- [12] Kuhlen, D.: Analysis of Challenges in Software Engineering and Recommendations for Project Management. *International Journal of Research Publication and Reviews (IJRPR)* **6**(3), 5149 – 5156 (March 2025), iSSN: 2582-7421. DOI: 10.55248/gengpi.6.0325.1238
- [13] Kuhlen, D.: Target Process Analyses for the Preparation of Software Projects. *International Journal of Research Publication and Reviews (IJRPR)* **6**(3), 4963 – 4970 (March 2025), iSSN: 2582-7421. DOI: 10.55248/gengpi.6.0325.1234
- [14] Kuhlen, D.: Reference Model of the DropShipment Business. In: Hurst, W. (ed.) 2026 the 12th International Conference on Information Management (ICIM2026). Lecture

- Notes in Computer Science (LNCS), Cham, Switzerland: Springer Nature Switzerland AG, University of Oxford, United Kingdom (March 27 - 29 2026), (*in press*)
- [15] Kuhlen, D., Speck, A.: Improved Business Analysis by Using 3D Models. In: Kaindl, H., Mannion, M., Maciaszek, L. (eds.) Proceedings of the 18th International Conference on Evaluation of Novel Approaches to Software Engineering (ENASE 2023). vol. 1, pp. 214–225. INSTICC, SCITEPRESS – Science and Technology Publications, Lda., Prague, Czech Republic (April 24-25 2023), DOI: 10.5220/0011989400003464. ISBN: 978-989-758-647-7. ISSN: 2184-4895
  - [16] van Lamsweerde, A., Darimont, R., Letier, E.: Managing Conflicts in Goal-Driven Requirements Engineering. IEEE Transactions on Software Engineering **24**(11), 908–926 (November 1998), DOI: 10.1109/32.730542
  - [17] Laseinde, O.: An assessment of dropshipping supply chain in the South African E-Retail Industry in the era of the 4IR. Masterthesis, University of Johannesburg (May 2023)
  - [18] Mandla, N.: Innovation Ideas for Enhancing E-Commerce Operations: Process Automation, Personalized Shopping, and Strategic Global Expansion Research Paper. Tech. rep., Department of Engineering Management, The University of Kansas (April 2023), pFS 802: Managing Teams and Leading People LEC, Dr. Lee C. Stuart
  - [19] Mentimeter AB Tulegatan 11 in SE-113 86 Stockholm Sweden: Mentimeter. URL:[www.mentimeter.com](http://www.mentimeter.com)
  - [20] Mostarac, K., Kavran, Z., Pišković, J.L.: Dropshipping Distribution Model in Supply Chain Management. In: Katalinic, B. (ed.) Proceedings of the 31st DAAAM International Symposium on Intelligent Manufacturing and Automation. p. 0144 – 0150. Vienna, Austria: DAAAM International, Mostar, BiH (October 21-24 2020), DOI: 10.2507/31st.daaam.proceedings.019
  - [21] Renaldi, F., Saepuloh, R.M., Maulidin, A.J., Bon, A.T.: Increasing Sales Online Through Integration Of Dropshipping System And Social Media. In: Proceedings of the 2nd African International Conference on Industrial Engineering and Operations Management. pp. 1974 – 1982. IEOM Society International, Harare, Zimbabwe (December 7-10 2020)
  - [22] Renon, M., dos Reis, J.G.M., Queiroz, K.V.: Comparative Analysis of Operational Models in Furniture and Decoration E-Commerce: Dropshipping Versus Fulfillment Based on Critical Parameters. Revista De Gestão E Secretariado **16**(8), 1–20 (August 2025), DOI: 10.7769/gesec.v16i8.5198
  - [23] Singh, G., Kaur, H., Singh, A.: Dropshipping in E-Commerece: A Perspective. In: Proceedings of the 2018 9th International Conference on E-business, Management and Economics (ICEME'18). pp. 7 – 14. Wilfrid Laurier University, New York, NY, United States: Association for Computing Machinery, Waterloo, ON, Canada (August 2 - 4 2018), DOI: 10.1145/3271972.3271993
  - [24] Speck, A., Windrich, M., Hesse, J., Sentz, M., Kuhlen, D., Stuht, T., Pulvermüller, E.: Generating formal Process Models and Decisions from Examination Rules in Natural Text with ChatGPT. In: Mannion, M., Mannisto, T., Maciaszek, L. (eds.) Proceedings of the 20th International Conference on Evaluation of Novel Approaches to Software Engineering (ENASE 2025). vol. 1, pp. 848 – 857. Setúbal, Portugal: SciTePress, Science and Technology Publications, Lda, Porto, Portugal (April 4-6 2025), iSBN: 978-989-758-742-9. DOI: 10.5220/0013481600003928
  - [25] Statista Market Insights: eCommerce: Market Insights. <https://de.statista.com/outlook/emo/ecommerce/weltweit?currency=EUR> (2024)
  - [26] Team, D.S.: Zero2Launch AI: Ultimate Dropshipping Automation Guide 2024. Online article, available at the following URL: <https://dropship-spy.com/blog/>



- `zero2launch-ai-ultimate-dropshipping-automation-guide-2024`, accessed 2025-12-19 (2025), october
- [27] (TUG), T.T.U.G.: TeX Live (2024), version 3.141592653-2.6-1.40.26
  - [28] Vellvé, F.J.S., Burgos, S.L.M.: Dropshipping in e-commerce: the Spanish case. *Esic Market Economics and Business Journal* **49**(2), 239 – 264 (May-August 2018), DOI: 10.7200/esicm.160.0492.1i
  - [29] Winiarski, J., Marcinkowski, B.: e-Commerce Websites and the Phenomenon of Dropshipping: Evaluation Criteria and Model. In: Themistocleous, M., Papadaki, M., Kamal, M.M. (eds.) *Information Systems. Proceedings of the 17th European, Mediterranean, and Middle Eastern Conference, EMCIS 2020*. pp. 289 – 300. *Lecture Notes in Business Information Processing (LNBIP, volume 402)*, Cham, Switzerland: Springer, Springer Nature Switzerland AG, Dubai, United Arab Emirates (November 25–26 2020), DOI: 10.1007/978-3-030-63396-7\_19
  - [30] Witkowski, K., Koralewska, M., Huk, K.: Logistics Models in E-Commerce. *Research Papers Faculty of Materials Science and Technology Slovak University of Technology* **28**(46), 90–97 (2020), DOI: 10.2478/rput-2020-0012
  - [31] Youderian, A., Hayes, M.: *The Ultimate Guide to Dropshipping*. Lulu Publishing Services (2013), copyright© Mark Hayes. ISBN: 978-1-4834-0182-9