

ASSESSMENT OF THE LEVEL OF INFORMATION INTEGRATION IN CRM SYSTEMS FOR SMES FOR THE NEEDS OF OMNICHANNEL RETAILING

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Abstract

The basic theoretical omnichannel paradigm is full information integration of all retail channels. The authors try to answer the following research question: to what extent are modern CRM systems adapted to support omnichannel retailing in the range of information flow? The article aims to identify and evaluate conduct practices related to the acquisition, storage and sharing of information in CRM system retail channels from the perspective of possibilities offered by this class of software.

The research was conducted using a survey method. The subject of the study are customer relationship management (CRM) systems for small and medium-sized enterprises (SMEs). The research entity are logistic companies that use CRM class software for multi-channel distribution. The result of the research is the assessment of the usability of CRM systems in terms of business needs posed by global competition in the field of multi-channel distribution. The authors point to the need to develop CRM systems in terms of their systemic and functional integration with business partners in the supply chain.

Due to the large number of CRM systems available on the software market, the article focuses only on systems dedicated to SMEs. The results of the study include conclusions for designers and distributors of CRM systems regarding omnichannel information features of their IT applications. The authors' next research intention is to carry out similar research on CRM systems for large enterprises (analysis of similarities and differences).

Key words: omnichannel, information integration, customer relationship management (CRM) system, small and medium enterprises (SMEs), surveys

1. INTRODUCTION

The stream of information in the logistics chain is, next to the stream of goods, the essence of the functioning of logistics. Information precedes, accompanies and ends the flow of goods. In today's modern logistics, due to the large and rapid changeability of many conditions of running a business, the importance and role of information is crucial. Having current and accurate information about what is happening in the logistics chain is the main determinant of success on the market.

In terms of information management, integration is a key issue. Information integration allows to obtain full knowledge about the state of facts in one place. Thanks to integration, undesirable phenomena such as inconsistency, obsolescence, inaccuracy or other errors in data that serve as the basis for creating information or knowledge on a given topic are eliminated.

One of the new forms of sales - omnichannel - has the information integration of all sales channels embedded in the theoretical assumptions of its concept. The authors of the article decided to verify the functioning of this paradigm in practice - try to answer the question: to what extent are modern customer relationship management (CRM) systems adapted to support omnichannel sales in terms of information flow? The aim of the article is to identify and evaluate the practices related to the acquisition, storage and sharing of information in the sales channels of CRM systems in terms of the possibilities offered by this class of software.

Due to the wide range of CRM systems available on the market, the authors of the article focused their attention only on systems dedicated to small and medium-sized enterprises (SMEs). The research task was carried out using the survey method. The subjects of the study were both users and producers (distributors) of CRM software.

The structure of the article is as follows: section 1 - introduction (research background, aim of the article), section 2 - literature review (methodology, bibliographic analyses); section 3 - analysis of the survey research (methodology, company profile, analysis of survey results); section 4 - final conclusions (summary, research limitations, directions for future research).

2. LITERATURE REVIEW BASED ON SCOPUS DATABASE

2.1. Methodology of literature analysis

A systematic literature review was carried out in June 2020 on the basis of the Scopus database of scientific articles (selection criterion: leading database of journals in the discipline of management and quality science, represented by the authors of the article). The analysis of the literature consisted in searching for selected characteristic words and phrases in three places: title, abstract and keywords. The conducted literature search is quantitative and qualitative in nature. The aim of the quantitative analysis was to identify the number of publications in each thematic scope. The aim of the qualitative analysis was to identify the type of thematic threads undertaken by

individual researchers. Both analyses are supplemented by short, complementary bibliometric reports based on the statistics offered by the Scopus database.

2.2. Monothematic analyses

Among 5,059,582 publications devoted to **information**, those related in some way to **integration** (narrowed search) number only 452,217. Direct search for the phrase **information integration** led to the identification of 163,300 publications devoted strictly to this issue (3.23% of the total number of articles).

Among 5,056 publications on the subject of **CRM systems**, those related in some way to **SMEs** (narrowed search) number only 156. Direct search for the phrase **CRM systems for SMEs** led to the identification of 78 publications devoted strictly to this issue (1.54% of the total number of articles).

Among 303 publications devoted to **omnichannel**, those related in some way to **retailing** (narrowed search) number as many as 222. Direct search for the phrase **omnichannel retailing** led to the identification of 106 publications devoted strictly to this issue (34.98% of the total number of articles).

As for the number of articles in the literature search, it does not raise any objections. The gradation of publications on a given topic is related to the time of functioning of a given concept in scientific consciousness, which directly translates into the accumulated output in a given topic. CRM or omnichannel systems, as relatively new concepts in relation to the subject of information, have a more modest output. A certain curiosity is a niche of thematic threads within general issues, observed in the case of information and CRM systems (low percentages). One can try to explain this by the fact that in a wider set there may be more thematic areas, hence the interests may be more spread out and diversified. In the case of omnichannel, we can see quite significant correspondence with retailing issues (1/3 of all the publications).

2.3. Multithematic analyses

Among 163,300 publications on information integration, those related in some way to CRM systems for SMEs (narrowed search) number only 52. Among 78 publications devoted to CRM systems for SMEs, those related in some way to information integration (narrowed search) number as many as 26. Direct search for the phrase **information integration CRM systems for SMEs** led to the identification of only 7 publications devoted strictly to this issue.

These publications date back to 2010-2019: 2011 and 2012 - 2 each; 2010, 2014 and 2019 - 1 each. They are mainly conference papers - 6 out of 7 publications. They are located primarily in the area of Computer Science (7), less often in Decision Sciences (2). Apart from individual articles, attention should be paid to: nationality - Hungary, institutions - Debreceni Egyetem, individuals - M. Herdon - 2 publications in each of the statistics. It is surprising that apart from the Magro & Goy's publication, cited 10 times, other publications do not have any citations.

The first article discusses challenges and pitfalls of designing a Cross-Cloud DevOps stack for an app-based extension platform of a Customer Relationship

Management (CRM) system – open source software solutions play a critical role for the SMEs (Schork et al., 2019). The second article proposes an SME market research as well as a way to analyze open source products by licensees, activity and interfaces - a market analysis in the SME area is needed to understand if SMEs already use such enterprise systems; the open source systems have to be compared in different ways to receive the best combination of these products (Althaler & Steinbacher, 2014). The third article attempts to identify the systemic aspects of the use of CRM tools for the integration of distributed processes organization - presents the requirements and restrictions for the virtualization of access to technical resources, technology and information in the so-called 'Cloud' as a way to reduce costly IT investments especially in the SME-class organizations (Skopinski & Zaskorski, 2012). The fourth article is the proposal of O-CREAM-v2, a core reference ontology for the CRM domain, specifically targeted to Small and Medium Sized Enterprises (SMEs) - ontology for the CRM domain has to account for both particulars and information about them (Magro & Goy, 2012). The fifth article presents a web-based CRM system that could be accessible from anywhere at any time and follows a number of security standards in order to ensure reliable access to information - small and medium companies (SMEs) require a CRM solution that is more flexible and easily adaptable to their demands (Vachkova & Gourova, 2011). The sixth article studied the Open Source Information and Communication Technology (ICT) solutions and tools that can be applied by Small and Medium-sized Enterprises (SMEs) - pointed out other key information and proposed an adequate solution system that uses open source solutions for SMEs through the development of a prototype based on a Digital Business Ecosystem (DBE) concept (Herdon et al., 2011). The seventh article describes digital ecosystems relying on a technological infrastructure to mediate the formalization of knowledge in SME networks, the creation of software services, and different type of interactions between SMEs - prototypes can help in building these cooperative information systems (Herdon et al., 2010).

To sum up, in the context of CRM systems dedicated to SMEs, the subject of the above-mentioned publications focuses mainly on open source solutions, universal access to the Internet and technologies using the cloud.

Among 163,300 publications devoted to information integration, those related in some way to omnichannel retailing (narrowed search) number only 42. Among 106 publications devoted to omnichannel retailing, those related in some way to information integration (narrowed search) number as many as 62. Direct search for the phrase **information integration omnichannel retailing** led to the identification of only 7 publications devoted strictly to this issue.

These publications come from the years 2014-2020: 2020 - 2; 2014, 2016, 2017, 2018 and 2019 - 1 each. They are mainly articles - 4 out of 7 publications. They are located primarily in the areas of Business, Management and Accounting (4), Computer Science (3), and Engineering (2). There are no distinguishing institutions or individual authors in the statistics. Only as for nationality, the United States attracts attention with 2 publications. Apart from the publications from 2020, all the others have already been cited - here Piotrowicz & Cuthbertson stands out in particular, with an outstanding number of 177 citations, also, but to a much lesser extent: Mirsch et al. - 25, Caro & Sadr - 19, Wiener et al. - 13.

The first article investigates the impact of omni-channel characteristics on customer satisfaction in the context of today's retailing - integrated promotion and integrated information access are found to be significant, whereas other constructs are not (Lee, 2020). The second article gives a global overview of the digital transformation and channel integration of free-market electricity retailers in Spain from a consumer's perspective - an overall lack of multichannel and omnichannel strategies reveal shortcomings in the availability of communication channels with customers (Chaparro-Peláez et al., 2020). The third article notes that under omnichannel retailing consumers can learn about products through channels that differ from those used to purchase them - the Internet of Things (IoT) can play a fundamental role in channel integration, but requires a sophisticated inventory and supply chain operation (Caro & Sadr, 2019). The fourth article is an empirical investigation of the synergies and tensions that arise from coexisting online and offline business models (BMs) as well as the factors that influence the emergence of such synergies and tensions - by uncovering both the benefits and the complexity of running online and offline BMs in parallel, the study contributes to the theoretical understanding of omnichannel businesses, and provides managers with practical guidance on how to design, integrate, and manage their dual BMs successfully (Wiener et al., 2018). The fifth article notes that the management of both physical and mobile channels requires the actual integration of all the processes of planning and execution in order to optimize performances - the integration of all these analyses and the correct evaluation of the defined set of KPIs may represent a useful system for supporting fashion companies in the strategic decision making process (Martino et al., 2017). The sixth article seeks to eliminate ambiguities regarding the term omnichannel management, because many channel management approaches coexist in practice, and in research, terms to describe different concepts are used without clear distinctions - it creates a common basis to fully understand the omnichannel management (Mirsch et al., 2016). The seventh article presents the results of focus group discussions on the role of information technology in retail, new business models, and the future role of traditional stores as e-commerce advances - key issues include the need for channel integration, the impact of mobile technologies, the growing role of social media, the need to respond to diverse customer requirements, and finally, supply chain redesign (Piotrowicz & Cuthbertson, 2014).

Summing up, in the context of omnichannel sales, the subject of the above-mentioned publications focuses mainly on the concept and tools of information management, proposing specific methods and executive instruments that can be implemented in business.

Among 78 publications devoted to the subject of CRM systems for SMEs, there are none related in some way to omnichannel retailing (narrowed search). Among 106 publications devoted to omnichannel retailing, those are also none related in some way to CRM systems for SMEs (narrowed search). Direct search for the phrase **CRM systems for SME omnichannel retailing** did not lead to the identification of any publications devoted strictly to this issue, confirming the importance of the previous facts. Also, the most narrowly specialized literature search - **information integration CRM systems for SME omnichannel retailing** - did not lead to the identification of a single publication on the topic in question.

2.3. Summary of literature analysis

Some minor detailed differences in the search results could appear if it was decided to meticulously analyze all the ways of recording words (omnichannel vs omni-channel; hyphenated or not) or phrases (CRM systems vs customer relationship management systems; full phrases vs abbreviations). The authors checked these aspects. The differences that appeared (increase/decrease in the number of publications) were small. For the sake of clarity of the literature analysis, it was decided to adopt only one recording form.

To sum up, information integration has already been undertaken both in the context of CRM systems for SMEs and omnichannel retailing. In both cases, however, the scale of this phenomenon is very small (7 articles each). Relationships between CRM systems for SMEs and omnichannel retailing were not found in publications. These facts are also confirmed in the authors' earlier publications (Domański & Wojciechowski, 2020; Domański & Filipiak, 2019). Therefore, the issues discussed in this article can be viewed as original and innovative. The implementation of the research (empirical part of the article) will contribute to filling the gap in the current state of scientific knowledge.

3. ANALYSIS OF THE SURVEY RESULTS

3.1. Methodology of the survey research implementation

Regardless of the scope of the research, it is advisable to carry out a reliable verification of the obtained data and information. The number of logistics enterprises using CRM systems makes it impossible to verify most of them, therefore the proposed research methodology should include a statistically developed research sample that will guarantee the representativeness of the results. Statistical tools are used to define a typical research sample, which guarantee a specific level of representativeness.

The first very important issue is the appropriate selection of the statistical distribution for the analyses. Taking into account the specificity of the TSL industry and the scope of logistics processes carried out, it can be assumed that the normal distribution should be used in the tests. This is confirmed by the analyses published in the scientific literature (Blanchard et al., 1990; Dunn et al., 1994; Garver & Mentzer, 1999; Näslund, 2002; Iannoni & Morabito, 2006; Engblom et al., 2012; Krzyzaniak, 2017) on the use of statistical tools in the optimization of logistics processes.

Assuming a normal distribution for the TSL industry, a representative research sample should be determined on the basis of the following formula:

$$N_{\min} = \frac{N_P(\alpha^2 \times f(1-f))}{N_P \times e^2 + \alpha^2 \times f(1-f)}$$

where:

N_{\min} - minimum sample size,

N_p - size of the population from which the sample is taken,

α - confidence level for the results, the value of the result relative to the entire population in the normal distribution for the assumed significance level,

f - fraction size,

e - assumed maximum error.

Confidence level: This indicator shows how confident we can be in the results obtained: $\alpha = 0.95$ means 95%.

Fraction size: If it is possible to estimate the value of the presence of the tested feature in the population, it should be included in the study (e.g. if the tested feature is present in 60% of the population, then 0.6 should be given). Where this value is unknown, 0.5 should be given.

Maximum error: The maximum error tells us what "correction" we should apply to the result obtained. In other words, when we assume an error of 0.05 (5%), then assuming an error of 5%, the true result may vary by +/- 5%.

According to the theory of estimation in operations research, the minimum research sample that guarantees the representativeness of results is the number $n=30$. The confidence level should not be less than 85% and the maximum error should not be greater than 18% (Balakrishnan & Basu, 1996). For this reason, the following was adopted as the minimum value for the methodology developed in this article:

- confidence level 95%,
- maximum error 15%.

Table 1 shows the minimum size of the research sample, taking into account the change in the maximum error rate while maintaining a constant confidence level of 95%.

Table 1. Identification of the minimum size of the research sample

Population	30	50	100	200	300	400	500	1000	2000	5000	>10000
Maximum error											
5%	28	44	79	132	168	196	217	278	322	357	370
10%	23	33	49	65	73	77	81	88	92	94	95
15%	18	23	30	35	37	39	39	41	42	42	43

Source: own research

This analysis shows that assuming the maximum error at the level of 15%, the research sample in the size of 43 enterprises should be seen as representative.

For the purposes of this article, a survey was carried out on a sample of 45 logistics enterprises operating in the TSL industry throughout Poland. The aim of the study was to show how a given functionality of CRM systems affects the flow of information between business partners in the supply chain.

The survey was conducted in the first half of 2020. The survey sheet consisted of 15 questions, including open and closed questions - single and multiple choice.

3.2. Profile of the surveyed enterprises

Basic information on the surveyed enterprises is presented in Table 2.

Table 2. Basic information on the surveyed enterprises

Characteristics	Responses (%)
1. Number of employees hired by the enterprise:	
· fewer than 10 employees	28.89%
· from 10 to 49 employees	42.22%
· from 50 to 250 employees	28.89%
2. Length of time of running a business:	
· up to 1 year	6.67%
· from 1 to 3 years	24.44%
· from 4 to 7 years	28.89%
· from 8 to 15 years	20.00%
· over 15 years	20.00%
3. Business capital:	
· Polish enterprise (no foreign capital)	46.67%
· foreign enterprise (exclusively foreign capital)	17.78%
· mixed enterprise (Polish and foreign capital)	35.56%
4. Market served:	
· local (gmina, powiat - Polish equivalents of municipality and county)	8.89%
· regional (up to 5 voivodeships - provinces)	15.56%
· national (6 voivodships and more)	37.78%
· European (continent)	31.11%
· global (two continents and more)	6.67%

Source: own research

This distribution should be considered representative not only because it takes into account the statistical assumptions of the research sample, but also in terms of the distinguished characteristics of the enterprises participating in the research.

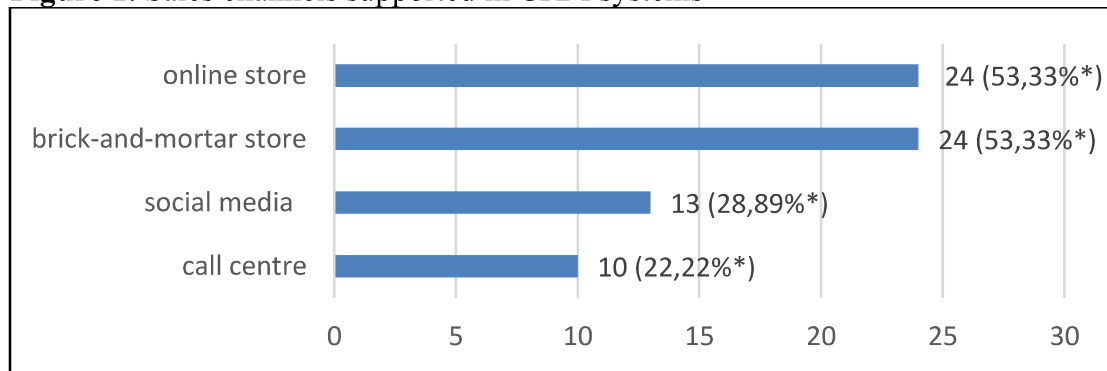
3.3. Analysis of the survey results

One of the main issues of the research in the aspect of multi-channel distribution processes were: assessment of the degree of use of CRM systems in business practice, evaluation of the scope of their functionality and identification of problems related to

the system integration of business partners in the supply chain. Figures 1 to 9 show the detailed results of the survey carried out among 45 logistics enterprises that use CRM systems in their business activities.

The first question (Figure 1) concerned the possibility of operating various sales channels in the CRM system. The analysis shows that CRM systems are most often used to support brick-and-mortar and online stores (53.3% of responses each). The distribution also shows that online stores are on a par with brick-and-mortar ones, so the size of the e-commerce market does not differ from the traditional market.

Figure 1. Sales channels supported in CRM systems

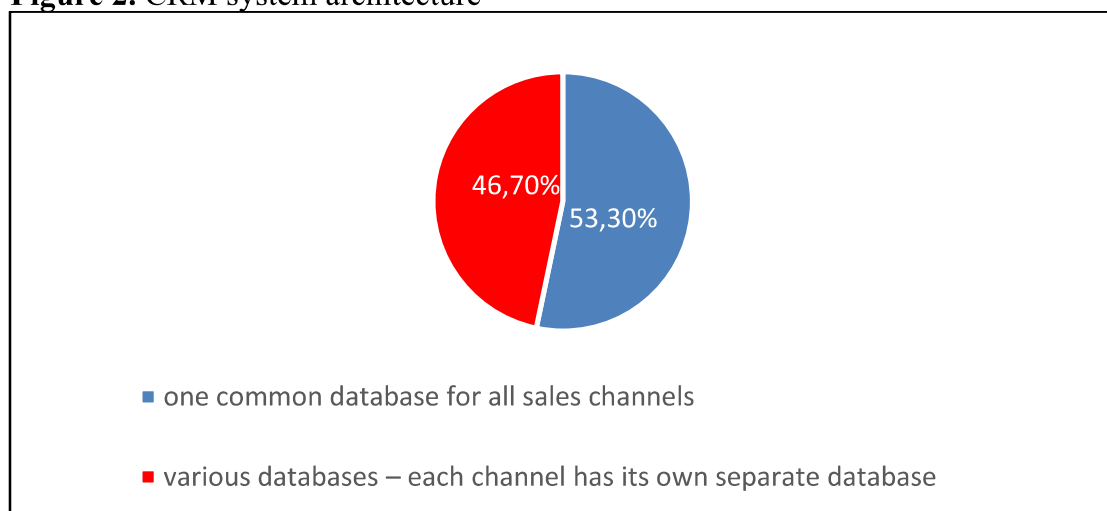


* Possibility to choose more than one response

Source: own research

Another issue studied was the architecture of CRM systems (Figure 2). Most of the respondents (53.3%) use one common database, regardless of the number of sales channels. Nevertheless, as many as 46.7% of the respondents have separate databases for individual sales channels. Such a situation may result from the company's development and the lack of anticipation of the need to support various sales channels at the initial stage of creating a company. This makes it necessary to maintain several databases and generates costs associated with it, which is certainly not an optimum solution.

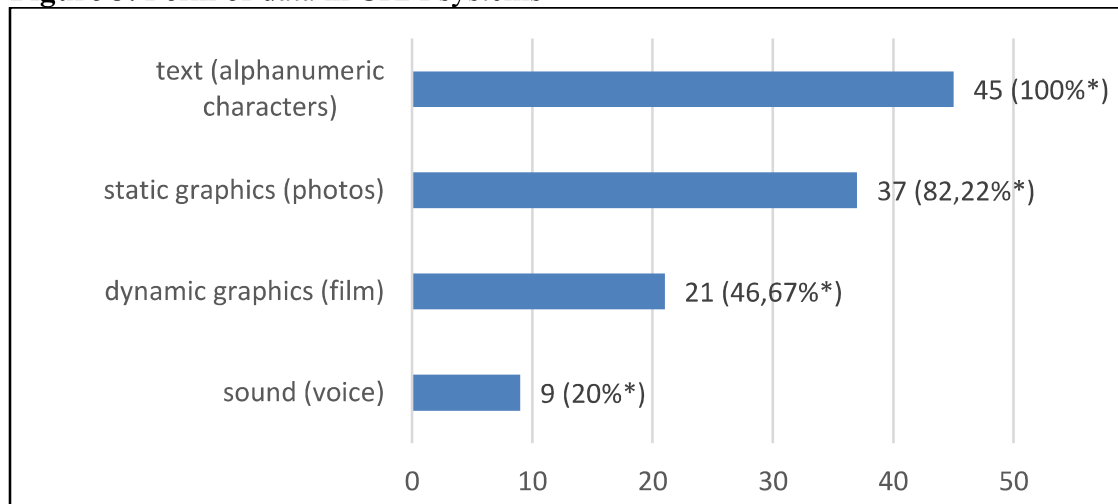
Figure 2. CRM system architecture



Source: own research

The next element was to check the form of data in the CRM system (Figure 3). All systems used by the respondents have text (alphanumeric) fields. In 82.2% of CRM systems it is possible to place and review photos, and in 46.7% of them it is also possible to present data in the form of a film. Thanks to such solutions, CRM systems make it possible to store complete data in one place (e.g. the entire history of a given customer order is in one place, despite different forms of data).

Figure 3. Form of data in CRM systems

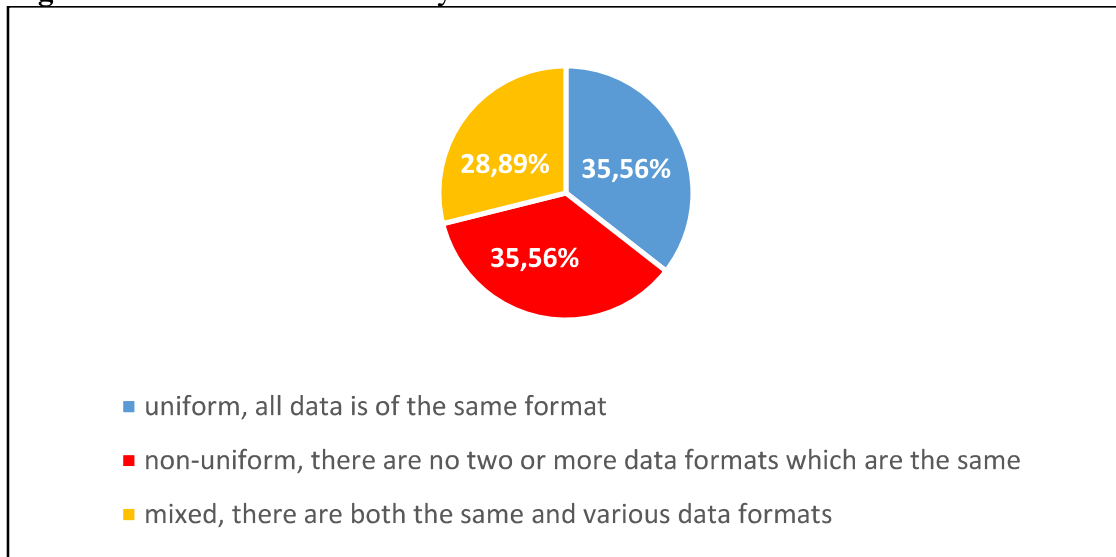


* Possibility to choose more than one response
Source: own research

The next question was to clarify the previous issue regarding the form of data. The respondents' task was to indicate whether the CRM system enables the use of all forms of data for each sales channel. More than half (55.6%) answered this question in the affirmative. This is a key aspect in terms of information consistency and synergy.

The next examined issue (Figure 4) concerned the data format of the CRM system used. It can be stated that the distribution of responses is even, i.e. there are systems with a uniform and non-uniform data format (35.6%). A slightly worse proportion is recorded for the mixed variant (28.9%). The observed significant non-uniformity of data (64.5%) entails the necessity of their conversion, which may result in distortions in the range of information exchange.

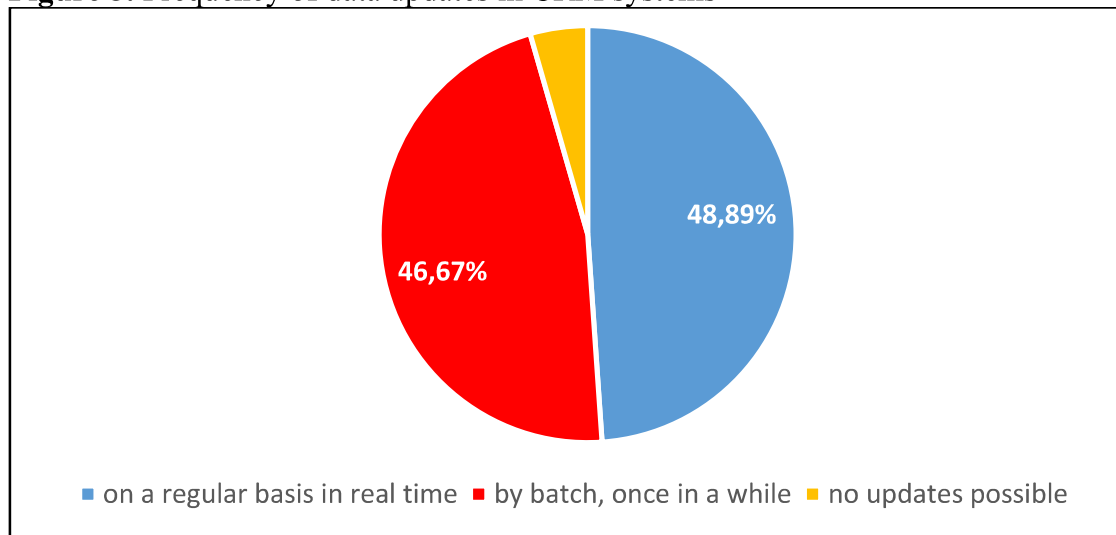
Figure 4. Data format in CRM systems



Source: own research

The frequency of data updates in the CRM system used is a very important element for decision-making by the users of a given system (Figure 5). Almost half of the respondents (48.9%) stated that the data in their systems is updated in real time, which is the most convenient solution. The other half of the respondents (46.7%) use systems in which data is updated from time to time. Thus, the current information in CRM systems is only partially present. Interestingly, there were also systems that cannot update data, but it was a negligible number.

Figure 5. Frequency of data updates in CRM systems

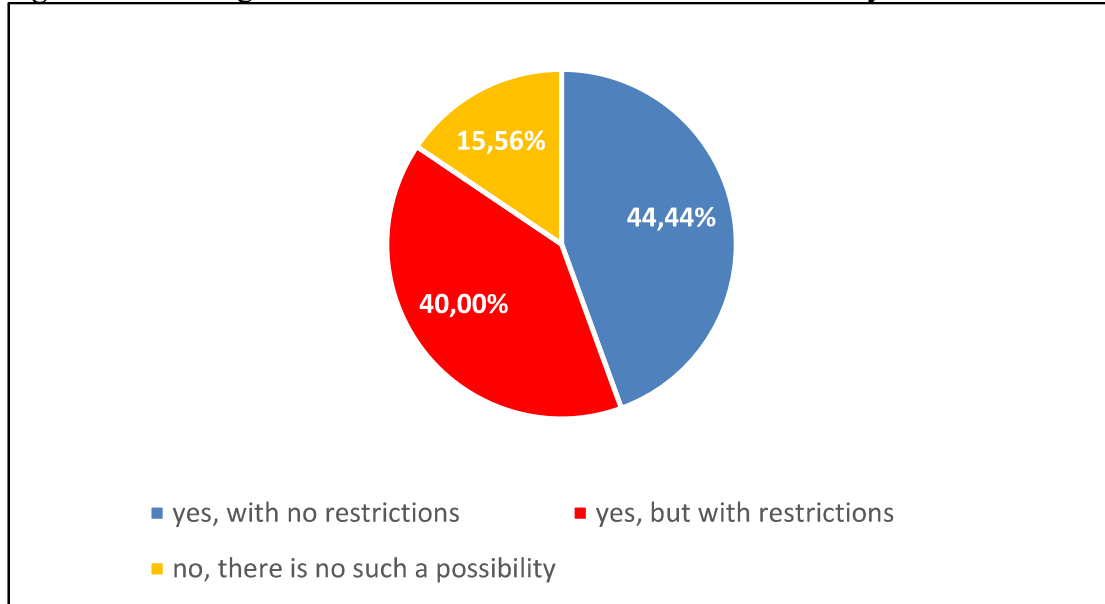


Source: own research

The analysis of the possibility of working on data from various sales channels in CRM systems (Figure 6) showed that 84.4% of the respondents can work simultaneously on data from various sales channels, of which almost 44.4% without any restrictions, and 40% with certain gaps and deficiencies. The percentage of CRM

systems (15.6%) that do not offer such a possibility is quite noticeable. Sharing data at the same time (55.6%) is still some operational problem to be solved.

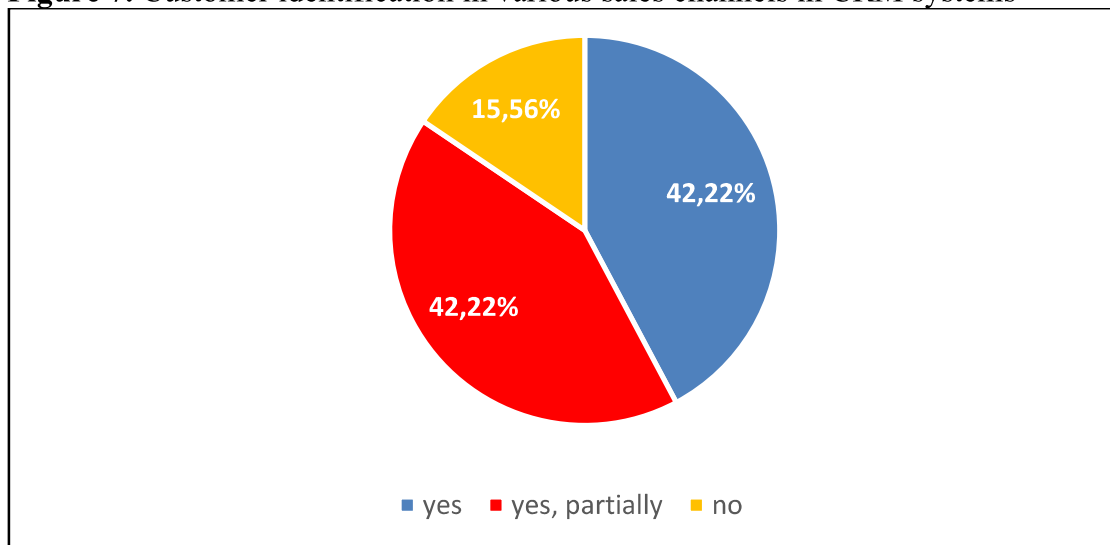
Figure 6. Working on data from various sales channels in CRM systems



Source: own research

Almost 84.5% of the respondents have the ability to identify the customer in various sales channels in the CRM systems used. However, half of them (42.2%) with limitations (Figure 7). Less than 16% of the respondents do not have such a possibility, which is quite a noticeable percentage. This issue (57.8%) is another operational problem to be solved.

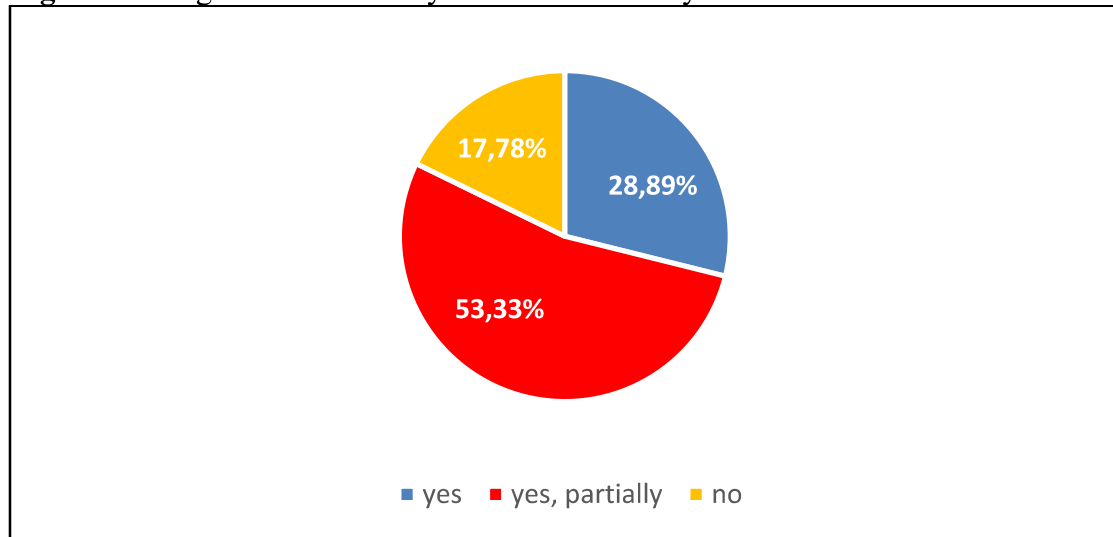
Figure 7. Customer identification in various sales channels in CRM systems



Source: own research

About 82% of the respondents indicated that their systems could be integrated with other IT systems (Figure 8), of which 53.3% only partially. Almost 18% of the respondents answered this question in the negative - a noticeable percentage of responses. The issue of the possibility of integration with other IT systems is very important (71.1%) as it enables the development of the company and the introduction of new dedicated solutions.

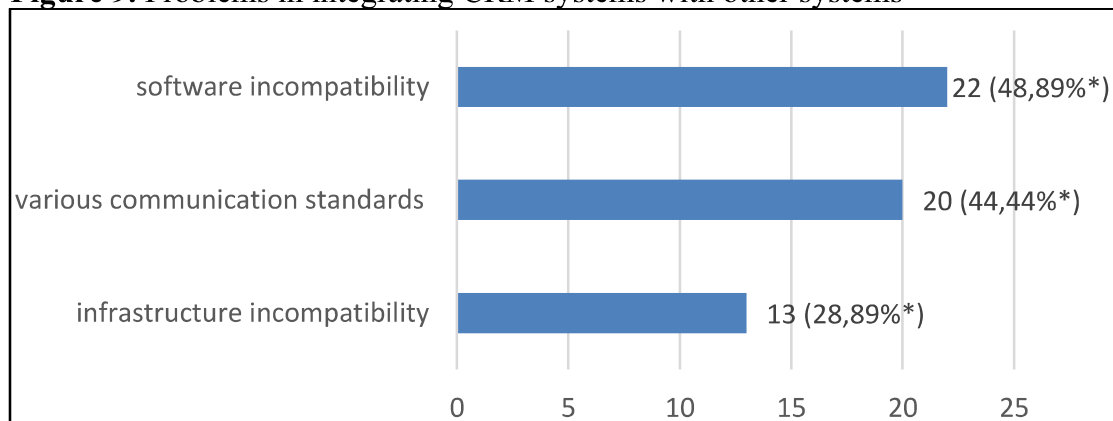
Figure 8. Integration of CRM systems with other systems



Source: own research

The biggest identified problem in the integration of CRM systems with other systems is software incompatibility (48.9%), followed by various communication standards (44.4%) - Figure 9. The aforementioned problems increase labour intensity during system integration, as well as the risk of unexpected problems arising during tests and launching applications. The recipe for these problems is the unification and standardization of hardware and software.

Figure 9. Problems in integrating CRM systems with other systems



* Possibility to choose more than one response

Source: own research

Summing up, the negative answers appearing in questions 5 to 9, in the order of a dozen or so percent, fall within the range of the measurement error adopted in the methodology (15%). They can therefore be ignored. In this case, the final picture of the Polish CRM market research is very optimistic.

The last stage of the research was to identify the degree of use of individual CRM systems that are available in the Polish IT services market. The detailed results of the analysis are presented in Table 3.

Table 3. Analysis of the use of CRM systems in Polish business practice

System name	Number of indications	Percentage
Sugester	5	11.11%
CSMART	4	8.89%
Autorski system	4	8.89%
LiveSpace	4	8.89%
Synergius CRM	4	8.89%
Pipedrive	3	6.67%
Entis	3	6.67%
Jelly CRM	2	4.44%
Firmao	2	4.44%
InFirma	2	4.44%
InStream	2	4.44%
ZOHO CRM	2	4.44%
Bitrix 24	1	2.22%
CRM Vision	1	2.22%
More7	1	2.22%
Infofast	1	2.22%
SAP CRM	1	2.22%
XPA Koops	1	2.22%
amo CRM	1	2.22%
Monday.com	1	2.22%

Source: own research

The present distribution of CRM systems used indicates a large variety of applied solutions. This indicates the problem of system integration both in the enterprise itself and in the entire supply chain. Companies tend to use CRM systems of a specific IT supplier (Sugester, CSMART, LiveSpace, Synergius CRM, Pipedrive, Entis), with a very high share of the tendency focused on the development of proprietary CRM systems, dedicated to the specific functional needs of enterprises and their processes. Customer expectations in terms of system functionality keep playing an increasingly

important role. In addition to standard requirements for all CRM systems, functional flexibility has an increasing influence on the choice of a solution.

4. CONCLUSION, LIMITATIONS AND FURTHER RESEARCH

The present article intended to analyze the issues of IT support for multi-channel distribution in the aspect of customer service. The level of customer service, as a key determinant of the efficiency of logistics processes, increasingly affects the digitization of the supply chain.

As far as the theoretical part of this article is concerned, the literature analysis carried out in it is limited only to the Scopus database. In other sources, the state of scientific knowledge might be greater. One of the future research intentions is to extend the literature search to cover new sources. Another intention, based on the results of the work on literature in this article, is a further in-depth analysis of the content of one set of terms in another, created by narrowing the search (indirect relationships) - this was not fully exploited in this article (no qualitative analysis of thematic threads).

The research part of this article focused on the identification of basic functional needs for CRM systems, problems with system integration and the analysis of the degree of application of the most popular CRM systems in Polish business practice. Due to the specificity of the TSL industry, taking into account the research methodology adopted in the article, it was concluded that the research population of 45 logistics companies meets the criteria of representativeness of the obtained results. The conducted research leads the authors to the conclusion that currently one of the key elements influencing the efficiency of logistics processes is the information integration of business partners in the supply chain. Taking into account the specific business needs of CRM system functionalities, the need to integrate them with other seemingly unrelated processes, which are also subject to digitization, should be noted. An important direction for further research will be an attempt to integrate CRM systems with the O2C (Order to Cash) solution, which will allow for full monitoring of not only the customer service process, but also the implementation of orders and making payments for their implementation. A separate issue that requires further research is the integration of various communication standards. The Institute of Logistics and Warehousing has been conducting research in this area for years (Osmolski et al., 2018; Debicki & Kolinski, 2019), but in the field of integration of logistics processes, and not customer service processes. Therefore, it is the direction for further research, both in terms of science and identification - the correlation between these processes, as well as in terms of practice and application - related to the possibilities of implementing the proposed solutions in enterprises.

5. ACKNOWLEDGMENT

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