

Data Exploration as a Trigger for Customer Relationship Management

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Abstract

Today's research shows a significant increase in the role of data exploration in the management of organizations. Despite the great importance of this problem, in the scientific literature on the subject, too little attention is paid to research presenting the benefits that organizations can derive from data mining methods and techniques in customer relationship management. This paper aims to identify the essence of customer relationship management systems and the most important methods and techniques of data mining (data, text, web and graph mining), as well as to examine the key benefits that Knowledge Intensive Business Services (KIBS) can derive from their use. The research covered seven selected organizations representing the KIBS sector. The collected extensive research material allowed to answer following questions: what methods do organizations use to collect information, what types of data are most often the subject of data analysis, what techniques are used for data mining, and what benefits organizations and their customers derive from data mining.

Keywords: Data Exploration, Customer Relationship Management, Data Mining

1. Introduction

In recent years, the conducted scientific research has indicated an increase in the importance of data exploration in organizations. More often, instead of classic, static reporting, organizations reach for methods and tools that enable the discovery of new knowledge related to, e.g., forecasting socio-economic phenomena, detecting fraud, researching customer behavior, or analyzing product profitability [1]. The ability to use professional knowledge, resulting from employing advanced technologies focused on data exploration and analysis, is considered one of the most significant factors in creating a competitive advantage [2]. Many researchers recognize the importance of data mining tools in improving customer relationship [3,4,5]. They are said to help respond quickly to customers' ever-changing needs and offer progressively personalized products and services.

Despite the first signals indicating a large role of data mining tools in managing organizations, there is little research devoted to the benefits and values that organizations derive from data analysis and mining in customer relationship management as well as ways to reach various, valuable sources of information about customers. There is a clear research gap in this area.

The theoretical aim of this study is to explore the knowledge about the core of customer relationship management and identify the most important methods and techniques of data mining and their possible use in customer relationship management. On the other hand, the utilitarian goal is to analyze the benefits that Knowledge Intensive Business Service (KIBS) can derive from data mining in customer relationship management. The implementation of research objectives defined in this way required the use of various methods, in particular, a critical review of the literature and conducting in-depth interviews. In the first part of the article, the idea of Customer Relationship Management (CRM) and the most important types of analyses used in CRM are presented synthetically. Next, various data mining techniques and their potential use by organizations are reviewed. Subsequently, the purpose of the empirical research, the

research method used, and the most important results and conclusions from the research are discussed. The research covered seven selected organizations representing the KIBS sector, i.e., the sector involving the intensive use of advanced technologies, specialized skills, and professional knowledge. The collected extensive research material allowed us to answer, among others, the following questions: what methods do organizations use to collect information about their customers, what types of data are most often the subject of data analysis, what techniques are used for data mining, and what benefits organizations and their customers derive from using data mining. The final part of the article presents the most important results and output of the conducted research. Some limitations of the research tool used are indicated and further directions of work in the undertaken subject are outlined.

2. Literature review

2.1. Customer Relationship Management issue

The origins of Customer Relationship Management (CRM) are strongly associated with the management concept of relational marketing [6]. The relational marketing orientation focuses on building, developing, and maintaining long-term relationships with customers, and other stakeholders [7,8]. It is an integrated effort to identify, build up and maintain a network with individual customers for the mutual benefit of both sides [9]. The key to acquiring and maintaining customers is to understand their preferences and to prepare a customized offer [10, 11]. In turn, CRM is a connection between relational marketing and management theories and approaches [7]. It concerns managing relationships between a firm and its customers with its all various contacts, interactive processes, and communication elements [8].

Although the roots and the CRM idea come from relational marketing, CRM has had a very technical connotation [12, 13]. Data warehouses, online analytical processing techniques, and data exploration, data mining techniques belong to the key technologies that are used to build CRM systems. Employment of the above techniques in CRM systems can facilitate customer data collection, thus supporting customer service, sales, and marketing by providing up-to-date customer information and knowledge. The systems are also implemented to reduce the power of some staff groups, particularly sales staff and sales agents [14]. The adoption of CRM systems leads to redesigning of customer-oriented processes, similar to the effect that ERP systems have had on production-oriented processes [15]. According to [16], CRM is defined as the building of a customer-oriented culture by which a strategy is created for acquiring, enhancing the profitability of, and retaining customers, that is enabled by an IT application for achieving mutual benefits for both the organization and the customers.

Today's customers want to be active players in the market, they wish to maintain an open dialogue with various firms, have some impact on sales strategies, and shape public opinion. Social media provide customers with these opportunities (17). Social media include such social tools and online services as Facebook, Twitter, LinkedIn, YouTube, blogs, wikis, and traditional and video sites. They enable different people to communicate, create, and share various content, as well as to search and connect with different people of similar interests and opinions [18, 19]. The popularization of social media means that customers can influence public opinion, and share their satisfaction (or dissatisfaction) with products and services purchased. They can also be more effectively involved in the process of planning and designing products and services. This situation creates completely new tasks for marketing and public relations departments [20].

2.2. Types of analyses in Customer Relationship Management

The most frequently used analyses in customer relationship management include [21]: customer profitability, customer value over time, customer segmentation and profiling, market basket analysis, customer loyalty and migration analysis, analysis of customer behaviors, and fraud detection.

Customer profitability

The high saturation of the market for products and services, high-activity advertising, and promotion mean that customers are acquired with increasing effort and resources. It turns out that it is more important to maintain and increase the profitability of existing customers than constantly acquire new ones. Identifying the most profitable customers is the first step in this direction [22]. Analytical systems provide answers to such questions as: why are some customers profitable and others not?

Customer time value

For many organizations, customer profitability is not the only measure of customer assessment. The customer may have the potential to buy profitable products in the future and be a source of reference for the organization for more profitable customers [23]. The Life Time Value (LTV) is regarded as a more useful measure. LTV is an analysis of the total value of the customer that takes into account the full history of contacts and benefits expected in the future. As part of this analysis, it is therefore determined not only who is currently the most valuable customer, but also how customer value changes over time, and what needs to be done to increase it.

Customer segmentation and profiling

A crucial condition for today's organization's success is the ability to accurately identify the recipients of the products and services offered and the formulation of the offer in such a way that the customer could feel the personalized approach [24]. Customer segmentation is one of the basic functions of analytical CRM. It involves identifying customer groups with similar characteristics, behaving in a similar way, or buying similar products. Customer segmentation and profiling are based on grouping customers into certain homogeneous groups (segments) that share common attributes.

Market Basket Analysis

Market Basket Analysis (MBA) provides knowledge about which services or products should be sold together in sets, and which set to recommend to which customer [25]. The MBA enables determining customer preferences, understanding how to choose products, and purposing which products sell best in each store. This information can be used to adapt the range of goods to the requirements of most customers, better shelving, preparation of promotional activities, and advertising campaigns.

Customer loyalty and migration analysis

Customer loyalty is one of the most important issues under strong competitive conditions, small product diversity as well as low costs of switching to another supplier. The ability to predict customer transition to competition (Survival Time Analysis) proves to be very useful. It enables the firm to take preventive measures, forecast sales levels, assess the total value of the customer (i.e., expected revenue generated by the customer throughout the entire period of contact with the firm), or modify the offer accordingly [26].

Customer behavior analysis

Not only does the customer behavior analysis allow us to explain current customer behaviors, but also to predict their future response (e.g., to subsequent promotions). It is also used to identify situations that create opportunities for the customer to accept an additional offer (e.g., birthdays, holidays). Typically, the following types of analyses are distinguished [27]: purchase propensity analysis (knowledge of products that the customer is likely to buy), next purchase (predicting which products or services the customer will buy next), product similarity analysis (knowing which products or services the customer will buy combined with others), models of price elasticity and dynamic

prices (determining the optimal price level for a given product in relation to a given segment).

Fraud detection

The problem of fraud is present in many industries, especially in banking, insurance, telecommunications, and in companies that use different loyalty systems. It entails significant financial losses, deteriorates the image of the organization, and causes a decrease in customer confidence. Until now, methods based on expert knowledge have been the most popular fraud detection methods. However, the growing number of transactions and ever-changing fraud techniques mean that it has become necessary to support expert knowledge with knowledge obtained using advanced data mining methods. They make it possible to quickly find behavior patterns that suggest fraud (suspicious transfers, orders, and other illegal activities directed against the firm), as well as to search for connections between persons involved in dishonest activities [28].

2.3. Data exploration techniques

The complex nature of data resources concerning customers requires the use of advanced techniques for data exploration. They refer mainly to data mining, text mining, web mining, graph mining, network analysis, machine learning, deep learning, neural networks, genetic algorithms, spatial analysis, and search-based applications. These techniques impact the quality of decision-making, personalization of products and services as well as the enhancement of business processes, and customer relationship management [6], [29].

Data mining

Data mining activities constitute an interactive process aimed at analyzing large databases, with the purpose of extracting information and knowledge that may prove accurate and potentially useful for knowledge workers involved in decision-making and problem-solving [30]. Data mining activities can be subdivided into two major investigation streams, according to the main purpose of the analysis: interpretation and prediction [31]. The purpose of interpretation is to identify regular patterns in the data and to express them through rules and criteria that can be easily understood by experts in the application domain. The purpose of prediction is to anticipate the value that a random variable will assume in the future or to estimate the likelihood of future events.

Text mining

Text mining is used to discover the dominant patterns of word usage and patterns of relationships between words or documents that come from various sources such as mail communication, financial documents, internet papers as well as data coming from social networks [29], [32]. In particular, text mining is used in [33] relationship identification, detecting subjectivity, generating abstracts, and information synthesis.

Web mining

The analysis of data obtained from the World Wide Web is called Web mining [3]. Web mining is used to process and analyze unstructured web content, based on XML, Internet protocol (HTTP, SMTP), and APIs (application programming interface). It enables developers to integrate diverse content from different web-enabled systems. Web mining may comprise [34]: (a) content mining, which concerns the analysis of documents published on the web and websites; (b) user mining, which concerns the analysis of user behaviors consisting of analyzing network traffic and ways the users behave; (c) structure mining, the subject of analyses are interrelationships between various objects on the web (e.g., websites).

Graph mining

Graph mining can be defined as a set of methods for facilitating the detection of interesting associations within the analyzed graph structure. According to Rehman et al. [34], graph mining techniques have been categorized into three main groups: graph clustering, graph classification, and sub-graph mining. The main task of graph clustering is a grouping of vertices of the graph into clusters taking into consideration the edge structure of the graph in such a way that there should be many edges within each cluster and relatively few between clusters. The graph clusters are formed based on some similarities in the underlying structured data graph.

Network analysis

One of the most used network analyses type is social media mining (SMM). SMM is the process of representing, analyzing, and extracting actionable patterns from social media data. Social Media Mining introduces basic concepts and principal algorithms suitable for investigating massive social media data. It discusses theories and methodologies from different disciplines such as computer science, data mining, machine learning, social network analysis, network science, sociology, ethnography, statistics, optimization, and mathematics. It encompasses the tools to formally represent, measure, model, and mine meaningful patterns from large-scale social media data [35].

Machine learning

Machine learning is a process of using computers to imitate a person to acquire skills through learning. Machine learning is trained through extensive data and algorithms that allow machines to own the ability to predict management trends and make decisions in the process of analyzing and optimizing the operating management of Big Data [36]. Machine learning can build models from mass data or discover various relationships implied in the observed data according to the specific needs of users.

Spatial analysis

Any kind of object or structure may be related to a geospatial location, such as buildings, roads, places, bridges, or rivers. The content of spatial data can be the value of point height, road length, polygon area, building volume, and imagery pixel, also the string of geographical name and annotation, and further the graphics, images, multimedia, relationships, and autocorrelation [37]. Spatial data mining is a process of discovering interesting and previously unknown, but potentially useful, patterns from large spatial datasets.

3. Research method

The empirical goal of this study was to identify the benefits derived from the use of data mining in customer relationship management by the KIBS sector. Representatives of seven organizations representing the KIBS sector were invited to participate in the study. The research was conducted using an in-depth interview in January 2023. In-depth interviews are recommended for researching poorly recognized issues, mainly when the purpose of the research is to answer how and why questions [38, 39]. The goal of this research is to collect detailed and perceived experiences of data exploration benefits and value for CRM. Therefore, in-depth surveys are considered an appropriate method for this research.

For this study, the organizations participating in this study are marked A, B, C, D, E, F, and G, respectively. As mentioned earlier, these organizations represent the KIBS sector, i.e., a sector in which the development of products and services requires the transfer of a high level of knowledge, competence, and IT technology. The organizations chosen for this study were carefully selected based on factors such as their reputation and market position and their use of CRM systems and data mining techniques. Similarly, the individuals who participated in the interviews were selected by their respective organizations' management for their expertise and insider knowledge in the fields of

CRM and data mining. A synthetic description of the organizations engaged in the study is presented in Table 1.

Table 1. Distribution of responders

Acronym	Organization	Responder's position
A	Multinational consulting corporation	Head of CRM department in Poland
B	Medium software enterprise	Manager of the software testing team
C	Large software enterprise	Project manager in strategic risk management team
D	Bank	Manager of the data science team
E	Multinational consulting corporation	Head of R&D department
F	Large software enterprise	Manager of the data exploration team
G	Multinational software corporation	Head of the project management service department

In-depth interviews were organized in the form of virtual meetings. In total, 10 interactive meetings were arranged aimed at free discussion, unrestricted exchange of ideas, and giving honest answers.

The discussion and interviews with respondents focused on six groups of issues, in particular, questions were asked:

Q1. What methods are used in your organization to gather information about your customers?

Q2. What type of data is analyzed in your organization to improve customer relationship management?

Q3. What techniques are used in your organization for data exploration to improve customer relationship management?

Q4. What data analysis methods are used in your organization?

Q5. How the organization benefits from data exploration analysis?

Q6. How do the organization's customers benefit from data exploration analysis?

The collected research material was subject to a thorough analysis, employing narrative analysis techniques, methods of association, deduction, and inference.

4. Findings

In-depth interviews with selected organizations allowed us to collect extensive research material, which was subjected to detailed analysis and verification. For this study, the obtained research results were presented from the perspective of six issues.

Q1. What methods are used in your organization to gather information about your customers?

The research results showed that all the surveyed organizations attach great importance to collecting data about their customers. They are aware that they should systematically create professional repositories of knowledge about their customers (both existing and future). Direct meetings with contractors and individual customers, as well as customer service satisfaction surveys and mailing analysis, are the basic source of information in customer relationship management. Organization "C" identified two key data sources for its industry from the perspective of improving customer relationship management. These include (a) data provided directly by customers (e.g., existing customer needs, their experiences, and technologies used) and (b) the information acquired during direct conversations with subcontractors. The respondents were aware that the information obtained during such direct conversations may be subjective. Nevertheless, it is never ignored and even the most controversial customer statements are carefully analyzed. In general, it was admitted that the information collected during direct conversations with customers or contractors is extremely helpful in designing future services and improving cooperation and communication with them.

Respondents from organization "B" emphasized that although direct communication with the customer is important, they harvest a lot of data about customers from direct observation of their behavior. It was pointed out that customers may deliberately try to hide some facts and not want to share them. However, it often happens that customers do not have the appropriate knowledge and skills to articulate their needs in a clear and

precise way. The observations of the respondents from organization “G” were largely consistent with the opinions of the respondents from organization “B.” However, it was emphasized that there is great difficulty in conducting effective observation of customer behavior. All organizations stated that they attach great importance to the transparency of their activities, ethical behavior, and respect for the rights of their clients. It was also admitted that work in large KIBS organizations is based on projects and teamwork. Teams consist of various employees who come from different countries and regions and often represent different organizational cultures. This can cause some misunderstandings and disruptions in communication and cooperation.

Organization “A” indicated that it often acquires data on its clients from external sources, e.g., from social media. The organization tracks traffic on its own fan pages and studies the popularity of hashtags on Twitter. According to respondents, such information is useful in measuring the effectiveness of marketing campaigns and designing future services and products. According to organizations “D” and “F,” the methods of collecting customer data differ depending on the organization’s operating model (B2C or B2B). In organization “D,” due to the greater share of individual customers, more emphasis is placed on extracting data from customer service systems and tracking customer activity in networks and social media. Meetings and in-depth interviews are less frequently used.

All surveyed organizations admitted that they regard CRM systems are a key tool for collecting and analyzing customer data. However, despite the widespread use of these systems in organizations, there is still the problem of poor data quality, which translates into unsatisfactory data reporting. It was emphasized that sometimes the data entered into the system are outdated, imprecise, and even contradictory. It also happens that they are entered into the system with a certain delay. Therefore, the standardization of data recording and ensuring the consistency and integrity of data are the key elements determining the quality of reporting and analyses obtained from CRM systems.

Q2. What type of data is analyzed in your organization to improve customer relationship management?

The conducted research shows that transactional and operational data are the most frequently used types of data. Respondents emphasized that these data are relatively easy to obtain and collect. CRM systems enable effective storage of this type of data. Organizations “A,” “C,” “D,” “E,” and “G” stressed that they place a high value on collecting historical data. In their opinion, such data are an extremely valuable source of knowledge. Their exploration enables a better understanding of customer needs and their future behavior. Organizations “B” and “F” stressed the importance of data acquired from external sources, especially on new trends in technologies. These data are mainly used to predict future customer interests in high-tech services. Relying on the recommendations driven by such analyses, managers and decision-makers can better manage human resources and the budget for research and development. Organizations “C” and “D” admitted that they collect and analyze a lot of data from the business environment and the market. The purpose of such research is to discover emerging markets and opportunities to introduce new products there. Customer data are also harvested from third-party reports and social media. Organization “E” stressed that it attaches great importance to data exemplifying various practices and activities of competing companies. Therefore, this organization creates various benchmarking databases that help improve the efficiency of the services provided.

Q3. What techniques are used in your organization for data exploration to improve customer relationship management?

The research shows that the KIBS sector, although it has extensive knowledge of advanced data mining tools, uses them to a limited extent. It was emphasized that advanced data mining techniques require appropriate budgets, creating large data repositories, and having a high level of digital competence, also among rank-and-file employees.

Almost all organizations confirmed that the most commonly employed data mining techniques are text mining, data mining, and network mining. In general, they are used to uncover links between operational data (e.g., regarding payments), track customer activity on social media, and study market trends. Organization “D” was the only one to

state that it uses a whole range of data mining techniques, including machine learning and spatial analytics. Organization “C” admitted that tasks related to data mining are outsourced to external companies. Thanks to this, the process is faster and requires fewer financial and human resources. The external company provides reports and draws preliminary conclusions from data mining. All surveyed organizations admitted that the use of outsourcing services in data analysis and exploration requires great care in the field of data anonymization. Organizations admitted that in the near future, they should make more efforts to more effectively use the potential of data mining techniques.

Q4. What data analysis methods are used in your organization?

The conducted research showed that the key methods of data analysis used by organizations include: customer profitability analysis, customer time value analysis, customer segmentation and profiling, and market basket analysis. Each surveyed organization uses these methods. Among the less frequently employed analyses, the respondents pointed to the analysis of customer behavior (A, B, C, D, F), fraud detection (D, F), and the analysis of customer loyalty and migration (C, D).

Q5. How the organization benefits from data exploration analysis?

The research results allowed us to identify a set of the most important benefits for the organization resulting from data mining adoption. Most often, it was pointed out that thanks to the use of customer segmentation and profiling, organizations can better tailor their services to customer needs. Thanks to data mining, organization “E” managed to smoothen and shorten the process of communication with the client. Organizations “C” and “B” emphasized the importance of data mining in human resource management. Proper HR service translated into increased customer satisfaction and loyalty. Thanks to the recommendations derived from data mining, organizations were able to create task teams that responded to customer needs faster and more effectively. In turn, thanks to data mining techniques, organization “C” managed to acquire a larger number of new customers and more accurately assess the risks of cooperation with them. Respondents confirmed that data mining contributed to efficiency gains in sales channels. Organizations “A” and “F” emphasized that data mining made it possible to track better the profitability of marketing campaigns and the level of customer satisfaction with the services provided. Data mining enabled better targeting of services, improved efficiency of sales channels, increased sales, and faster modification of the sales offer. Organization “A” indicated that data mining was mainly used to package sales services and bundling. This contributed to efficiency gains in sales channels. Like most of the surveyed organizations, organization “D” emphasized the advantages of customer segmentation and profiling. Thanks to this, this organization was able to make a quick assessment of its customers’ profitability and loyalty and take appropriate decisions on this basis.

Q6. How do the organization’s customers benefit from data exploration analysis?

Respondents emphasized that the benefits that organizations derive from data mining are largely the same as the benefits for customers. Data mining is a tool that not only encourages organizations to design progressively innovative products but also draws customers into closer cooperation with organizations. In the opinion of all respondents, data mining creates space for the development of more effective communication, faster learning about new products and the company’s offer, better customer service, and more rational decisions related to purchases and payments.

Most organizations (“A,” “B,” “E”, “F,” “G”) confirmed that the process of communication with the customer has significantly improved thanks to data mining. The time for testing and implementing services or products has been shortened. According to organizations “D” and “F,” data mining has contributed to improving the quality of services provided, reducing errors, mainly at the stage of orders and service implementation. Organizations “C” and “A” confirmed that data mining is an important creator of new products and services for the client.

Table 2. Summary of findings

Subject	Most frequent answers	Insight
Methods used to gather data	<ul style="list-style-type: none"> • Face-to-face conversation • Data provided by the client 	<ul style="list-style-type: none"> • Qualitative data are more important than quantitative data • Direct communication with the client is of

	<ul style="list-style-type: none"> • Observation • Survey research • Social media tracking 	<p>the most importance</p> <ul style="list-style-type: none"> • A lot of work is put into structuring the data for its later use • CRM systems act as a database and allow for integration of data exploration activities.
Type of analyzed data	<ul style="list-style-type: none"> • Organizational data • Transactional data • Historical data • Market-specific data (e. trending technologies) 	<ul style="list-style-type: none"> • Organizations buy external reports or track social media trends to gather valuable insights about the market and trending technologies • CRM supports the data exploration process by automatically storing operational and transactional data • Selected organizations collect data issued by the competition to benchmark their operation
Techniques of data exploration	<ul style="list-style-type: none"> • Data mining • Text mining • Network mining 	<ul style="list-style-type: none"> • Implementation of data exploration techniques is limited – organizations provide such software for their clients but do not use it themselves. • More advanced data exploration techniques (e. machine learning) are outsourced and insight into such analysis is provided to the organization. • All data used in outsourced data exploration must be anonymized • Sophisticated data exploration techniques require sufficient funds, vast databases, and appropriate digital competences inside the organization. The organization often lacks enough data to financially justify spending on advanced data exploration.
Methods of data analysis	<ul style="list-style-type: none"> • Customer profitability analysis • Customer time value analysis • Customer segmentation and profiling • Market basket analysis 	<ul style="list-style-type: none"> • Among less frequently used analyses there are customer behavior analysis fraud detection customer loyalty and migration analysis.
Benefits for organization	<ul style="list-style-type: none"> • Better adjustment of services to customer requirements • Better understanding of customer expectations • Better anticipation of changes in the market • Improved effectiveness of sales channels • Improved customer profitability 	<ul style="list-style-type: none"> • Possibilities of adjusting the services to clients' needs is considered the biggest benefit of data exploration usage • Data exploration can be used to improve the HR processes, therefore indirectly influencing customer service.
Benefits for customers	<ul style="list-style-type: none"> • Improving the quality of the service provided • Offering new products and services • Shortening the waiting time for the service/delivery of the product • Better matching of the product to the customer's preferences 	<ul style="list-style-type: none"> • Data exploration can translate to a significant shortening of the communication process and eliminating errors and misunderstandings at the early stage.

5. Summary

The empirical goal of this study was primarily to identify the benefits that organizations derive from the use of data mining in customer relationship management. On the other hand, the utilitarian goal was to examine the level of use of data mining techniques in customer relationship management in the KIBS sector. The conducted research allowed us to formulate several conclusions and recommendations.

First, the research showed that for KIBS the most important sources of data on

customers are meetings with contractors, individual conversations with customers, reports illustrating the level of customer service satisfaction, and mailing analysis. It turns out that more and more often social media and benchmarking are becoming valuable sources of knowledge about customers.

Second, the most commonly used data mining techniques in the KIBS sector include data mining, text mining, and network mining. The conducted research shows that although organizations have relatively high knowledge about the possibilities offered by data mining tools, they use them all the time to a limited extent. Data mining is often outsourced to third parties.

Third, data mining is typically used for customer profitability analysis, customer time value research, customer segmentation and profiling, and market basket analysis.

Fourth, the most important benefits of using data mining include better matching of services to customer needs, more effective forecasting of market changes, more accurate prediction of customer and contractor behavior, improved communication with customers, shortening the service design chain, more effective human resource management, profitability research of customers and services provided.

Fifth, the KIBS sector is characterized by high turbulence and the proliferation of modern technologies, hence the constant need to verify the suitability of the services provided to the client. This makes data mining a key tool in managing such organizations, especially in managing customer relationships.

Analyzing the results of the conducted research, some limitations should be noted. The study was carried out on a small research group since it covered seven organizations from the KIBS sector. The surveyed organizations differed from each other, both in terms of size and the special nature of the services provided. The interviewed respondents had different roles in organizations, which could have resulted in different answers. It should also be emphasized that the answers obtained from the respondents are their individual feelings and have not been subjected to additional verification. Thus, the obtained research results do not allow for generalizations and certainly do not reflect the situation in the use of data mining in customer relationship management in the entire KIBS sector. In the future, it would be advisable to expand the research group as well as to conduct quantitative research using a questionnaire. Such research would contribute significantly to expanding knowledge on the relevance of data mining in customer relationship management in the KIBS sector.

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