

Internet of Behavior – The Transformation of Customer Relationship Management in Logistics

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Abstract - The Internet of Behavior (IoB) is an evolution of the Internet of Things (IoT), which is already widely used in logistics. In addition to the technology and data aspect, IoB also includes behavioral science to track and analyze behavioral patterns. By using IoB, logistics companies can provide not only more reliable but also more flexible services, enabling better insight into customer behavior patterns and changing market conditions in real-time. The IoB can enable logistics companies to streamline Customer Relationship Management (CRM). In this paper, the authors research the potential of IoB to transform CRM in logistics. Therefore, the authors analyze the main features of IoB and current trends in logistics CRM. The focus of this paper is to analyze how the application of IoB could transform logistics CRM (from the aspect of predictive services, automation, CRM processes, CRM software and security strategies).

Key words – Internet of Behavior; Customer Relationship Management; logistics, transformation

I. INTRODUCTION

Logistics companies are increasingly challenged by both demanding customers and the technology improvements and breakthroughs. It is expected of logistics companies to easily adapt to customers' needs to provide personalized services for individual customers. There is a trend of a hyper-personalization of logistics services and the use of disruptive technologies [1].

Quality of customer experience directly impacts the logistics companies' business. Therefore, logistics companies should continuously develop and adopt Customer Relationship Management (CRM) digital solutions [2]. The CRM solution is usually a system that automates and generates customer data about all customer-related activities [3]. In the logistics sector, CRM solutions assist numerous business functions: quote and orders management, rate synchronization, load management, fleet management, warehousing management, sales and marketing management, risk management, reporting, etc [4]. The global CRM market

size was estimated at USD 58.82 billion in 2022 and it is expected to grow at a compounded annual growth rate (CAGR) of 13.9% up to 2030 [5].

The Internet of Behavior (IoB) came into greater focus during the COVID-19 pandemic, when companies had to rethink the means of how they communicate with customers. The IoB provides detailed insight into useful information about customers' behaviors, interests, and preferences from the perspective of behavioral psychology. For example, Google and Facebook were among the first global companies which started to use behavioral data so that they can offer and display relevant advertisements and services to their users [6]. The IoB enabled companies not only to connect with their potential audience, but also to be able to track their behaviors. Additionally, technologies like Alexa, OK Google, and Siri are also programmed to study and interpret the data and user behavior i. e. to use the IoB [6].

The global IoB market was valued at USD 472.91 billion in 2022 and it is expected to reach USD 2,143.57 billion by 2030, growing at a CAGR of 20.79% by 2030 [7]. It is also estimated that 40% of people worldwide will be using at least one IoB application by 2025 [8]. This data points to the growing importance of IoB for CRM and logistics services.

In this paper, the authors will analyze the evolution of the IoB and its workflow in logistics operations. In addition, the authors will analyze the emerging trends that will influence and possibly even determine the future of CRM in logistics. The main goal of this paper is to analyze how the IoB can transform CRM and change the provision of logistics services. Therefore, in the 2nd section, the evolution of IoB is analyzed. In the 3rd section, new trends in logistics CRM are identified. In the 4th section, the main part of the paper, authors analyze how IoB could transform CRM in logistics.

II. EVOLUTION OF THE INTERNET OF BEHAVIOR (IOB)

The IoB encompasses the technological aspect of the Internet of Things (IoT) and aspects of behavioral science and psychology, with the aim of gaining deep insights into customer data, i.e., customer behavior, in order to develop better strategies for CRM [9].

The IoB transforms information about customer behavior into knowledge and autonomous decisions based on this knowledge, as presented in Figure 1 [10]. Therefore, the IoB workflow includes the following aspects [10]:

- behavioral tracking: using IoT devices to track users' behavior,
- data collection: collecting valuable data and preparing it for analysis,
- data analysis: using analytics and Machine Learning (ML) to obtain logical and structured information,
- identifying behavioral patterns: using behavioral science and Artificial intelligence (AI) algorithms to identify human behavioral patterns,
- decision-making and predictability: making decisions, predicting user behavior and influencing user behavior.

The IoB data is collected from various IoT sources: smartphones, tablets, PCs, sensors, wearables and embedded systems. These various data sources increase the amount of data collected, which is transformed into meaningful data for businesses using IoB [11].

Some pronounced shortcomings of IoB involve security and privacy issues. The IoB uses a large database about customers and the company, and there is a risk of cybercriminal or unethical use. While various data are collected about customers (e.g., their behavior, likes, and dislikes, etc.), they could assert their privacy rights [12].

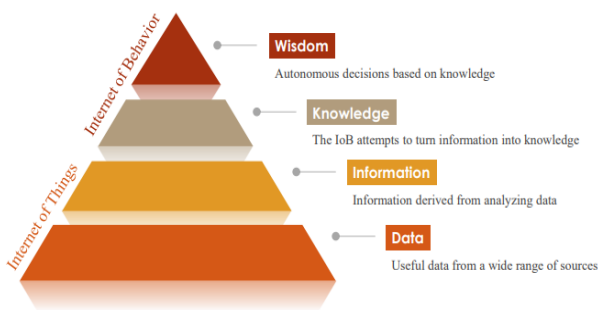


Figure 1. The IoB concept

Despite some shortcomings, the IoB offers more benefits: definition of customer behavior patterns; detailed information about all steps of the customer's journey; notifications and alerts for customers and service providers; predictability of customer behavior and actions; optimization of CRM [13].

III. NEW TRENDS IN LOGISTICS CRM

CRM is the combination of practices, strategies, and technologies that companies use to manage and analyze customer interactions and data [14]. Recently, logistics companies have changed the way they interact with their customers under the influence of technological advances and customer demands. As a result, the quality of customer experience, the accuracy of the information, and transparency are leading to changes in CRM. There are four major challenges that determine the future of CRM in logistics [15], [16]:

- Customer experience: customers are demanding continuous improvement of their experience and personalization, i.e., customized services offered by logistics companies.
- Technological breakthroughs: increased use of technology is inevitable. In the future, CRM will need to integrate various technologies (e.g., voice processing, chatbots, robot process automation, and facial recognition) to develop predictive and real-time solutions for customers.
- Logistics startups: technologies are enabling new business models that focus on one or more aspects of customer service. As a result, startups are introducing new business models based on the use of advanced technologies and they are having an impact on reshaping the existing business models of logistics companies.
- Redefining collaboration: the logistics market consists of different services and different companies providing them, making the service process complex. In order to meet customer requirements, collaboration is expected to increase in the context of digitally networked logistics (data sharing, cooperative freight planning, end-to-end visibility, etc.).

These aspects are evident in the survey conducted by Zendesk (producer of CRM software) on the experiences of 97,000 customers from the transport and logistics sector. The survey results have shown the following [17]:

- 60% of the customers have increased their customer experience expectations in recent years;
- 92% of the customers said they would invest in services from a company that knows the details of their transactions, so they do not have to repeat the process;
- 90% of the customers claim they would spend more on services from companies that offer personalized services;

- 89% of customers prefer companies that offer services online using dedicated customer portals.

The conducted survey shows that customers prefer to work with transport and logistics companies that understand their needs and priorities, i.e., know their behavior patterns. As for the companies, the survey showed that 64% of the companies that responded to their customers' expectations were able to grow their business and retain their customers [17].

IV. IOB AS A TRANSFORMATION FACTOR OF CRM IN LOGISTICS

The previously elaborated changes that are already taking place and will intensify in the future indicate that IoB could be one of the transforming factors of CRM in logistics. Considering that IoB integrates technology, customers, and behavioral science, it has the potential to provide useful inputs to bring about the transformation of CRM in logistics services. The IoB has the potential to become the Enabler of Experience (EoE) in logistics services. The “Experience Enabler Scorecard” identifies the technology and/or strategy strengths and weaknesses to determine if they're able to create digital services and content with an outstanding experience for customers [18]. The IoB could transform CRM in logistics as follows [19], [20]:

- CRM predictive services and automation,
- Redesign of the CRM processes,
- CRM software redevelopment,
- CRM security strategies.

The IoB enables logistics companies to efficiently control customers' behavior and provide ‘predictive services’ for the customers. The IoB links data from various IoT sources to provide insight into the customer's individual service process – complete “customer journey”. Logistics companies can then use CRM to create smaller segments of their customer or individuals. This enables logistics companies to offer personalized services, shorter lead times, lower inventory costs, lower shipping costs, fewer delays, etc.

The bottom line is that the highest transformative effect exerted on CRM by IoB is its' automation – a self-adaptive system that provides personalized services with no or minimal human intervention [21]. CRM automation refers to the ability of a CRM system to automate repetitive, manual tasks to streamline work and improve the customer experience [22]. For example, if a customer uses a logistics cargo platform and obtains a quote and books a freight space, the CRM system can use the IoB behavioral pattern to offer a service that fits the customer (type of container, route, price, etc.) without the need for human intervention.

Another simple example is chatbots, which allow companies to automatically respond to questions about their services. There are some positive examples from companies that show IoB could be critical to transform and automate CRM. For example, Transmetrics' AI algorithms recognize patterns that can help predict

fluctuations in transportation demand and how customers could react. This enables logistics companies to respond immediately and offer their services more easily for their customers [23].

The data obtained from the IoB can be useful to show necessary changes in the CRM process, i.e., changes in the organization and human resources of logistics companies. Data that provides deep insights into customer behavior and activities can be an indication for logistics companies to redesign and improve the CRM process to fulfill customer expectations. Therefore, IoB data can indicate necessary changes in the CRM process, such as: training of employees on the company's CRM processes; education and training of employees to improve digital skills; possible hiring of behavioral psychology experts to properly analyze customers' activities and behaviors; introduction of new standards and regulations in the company; improving service strategies; reallocation of the budget to invest more in CRM solutions, etc.

It is apparent that the IoB deals with a wide range and quantity of data about customers collected through various sources and technologies. The CRM software should possess appropriate functions to cover all logistics companies' processes. Considering the functions of IoB, it is clear that CRM software should be re-engineered or improved.

Some shortcomings of CRM to fully realize the potential of IoB are the following: low customer satisfaction with user interface and options, lack of alerts and notifications for customers and companies, limited data capacity, limited reporting options, lack of integration with tracking tools, lack of technology solutions and integration with devices, lack of integration with application programming interfaces (APIs), no or weak remote access (e.g., mobile phones), etc. For example, the user interface is the customer's first contact with the CRM. The user interface consists of all the elements that users interact with the following: buttons to activate functions, text to read, graphics, sliders, text input areas, screen layout, transitions, etc. It is responsible for a large part of the user experience [24]. Customers need CRM applications that are rational and logical to navigate and make them feel like they are doing the activities they want to do. The ease or difficulty of interaction with user interface elements determines the user experience in e-logistics services [24].

It is expected that new security protocols and procedures will be introduced to make the use of IoB in CRM more secure. The IoB contains various data about the customers and the logistics company: emails, contact details, names, job titles, addresses, passwords, transaction totals, shipping routes, freight and transport vehicle movements, etc. The introduction of IoB makes data privacy and security more threatened. Customers' experience and behaviour will not be in favour of the logistics companies' digital initiatives if they feel security shortcomings. This will be particularly important in CRM automation. For example, in February 2022, logistics company Expeditors was the victim of a cyberattack that impacted its global operations chain, including customs,

freight, and distribution activities, causing customer shipments to stall and impact the quality of the customer experience [25].

The study, conducted by the Council of Supply Chain Management Professionals, found that 93% of shippers and 98% of 3PL logistics companies view data-driven decisions as crucial for their operations. The study shows that 'predictive service' is no longer an option, but a necessity to improve the customer experience in logistics services. It therefore shows that CRM automation is inevitable and points to the transformative role of IoB in CRM in logistics [23].

V. CONCLUSION

Disruptive technologies are transforming logistics service delivery. The Internet of Behavior, as an extension of the Internet of Things, enables real-time and detailed insight into customer activity and behavior in the delivery of logistics services. Therefore, the CRM of logistics companies is changing, and the IoB is becoming the transformative factor for CRM in logistics as an Enabler of Experience.

The IoB data serves as input for the CRM that logistics companies use to create personalized services. Therefore, IoB transforms the mass perspective of CRM into an individual perspective for each customer. The highest level is CRM automation, meaning that IoB data enable a level of predictability where logistics companies can offer self-created services with minimal human intervention. In addition, IoB-derived data could signal the need to improve CRM processes, i.e., the organizational and human resource aspects of the logistics company, to process large amounts of data and create personalized services for end customers.

Another aspect in which IoB is changing CRM, including logistics CRM, is software re-engineering, meaning the software functions should be adapted (e.g., data capacity, user interface, alerts and notifications) to follow the behavioral patterns of each customer in order to improve customer experience. The security aspect of CRM could change as IoB processes a large amount of customer and logistics company confidential data, and logistics companies should introduce new security features in CRM.

Recent research in the transportation and logistics industry shows the need for CRM transformation as customer experience and data-driven decisions are of paramount importance. Therefore, IoB has the potential to enable this transformation of CRM in logistics.

In terms of future research, there are a few possible directions. First, the aspects of CRM-logistics transformation could be thoroughly analyzed to gain a more detailed insight into the potential challenges of applying IoB in logistics CRM. In addition, it is possible to investigate whether there are other aspects that should be analyzed. Another direction for future research is to conduct a survey among logistics companies to analyze their capabilities for applying IoB and transforming CRM.

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