

Artículo de investigación

Intelligent CRM systems of transport companies**Интеллектуальные CRM-системы транспортных компаний**

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Truong Thanh Trung¹⁶⁶**Abstract**

High technological efficiency and the use of intelligent systems are the main internal factors in the evolution of the transport company. Transportation companies are introducing digital infrastructure, trying to achieve practical results by focusing on customer demand, such as actively using Customer Relationship Management and holding on to the customer, increasing their loyalty. But there are problems in activating such systems because of their heterogeneity and non-systemic approach to their use. A system analysis is needed, which is the main purpose of this article. This problem is discussed in this article for highly competitive transport (logistics) business. The capabilities and impact of the transport company's customer relationship management systems in the cloud are analyzed. The method of organization and regulation of business processes oriented to relations with clients, creation and development of cloud business infrastructure is proposed. The evolutionary cycle of the transport system in cloud infrastructure is described. A comprehensive multiplicative transportation efficiency model similar to the Allen model has been built and described how to use it to evaluate system self-regulation. The results of the work can become a methodological basis for solving practical problems of business processes of transport systems and their transfer to cloud infrastructure.

Key words: relationship, client, management, CRM, transport, company, evolution, intellectualization.

Аннотация

Высокая технологическая эффективность и использование интеллектуальных систем являются основными внутренними факторами эволюции транспортной компании. Транспортные компании внедряют цифровую инфраструктуру, стараясь добиться практических результатов, ориентируясь на спрос клиентов, например, активно используя Управление отношениями с клиентами и держа за клиента, повышая его лояльность. Но есть проблемы с активацией таких систем из-за их неоднородности и несистемного подхода к их использованию. Необходим системный анализ, который является основной целью данной статьи. Эта проблема обсуждается в данной статье для высококонкурентного транспортного (логистического) бизнеса. Анализируются возможности и влияние систем управления взаимоотношениями с клиентами транспортной компании в облаке. Предложен метод организации и регулирования бизнес-процессов, ориентированных на отношения с клиентами, создание и развитие облачной бизнес-инфраструктуры. Описан эволюционный цикл транспортной системы в облачной инфраструктуре. Создана комплексная мультипликативная модель эффективности транспортировки, аналогичная модели Аллена, и описано, как использовать ее для оценки саморегулирования системы. Результаты работы могут стать методической основой для решения практических задач бизнес-процессов транспортных систем и их перевода в облачную инфраструктуру.

Ключевые слова: взаимоотношения, клиент, менеджмент, CRM, транспорт, компания, эволюция, интеллектуализация.

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Introduction

The growing use of intelligent systems in logistics leads to the need to study the business processes and evolutionary capabilities of a transport company. So they implement digital infrastructure by trying to achieve results by focusing on customer demand, such as actively using Customer Relationship Management (CRM) and holding on to the customer, increasing their loyalty. Companies implement CRM systems of different types and capacities. But there are many problems in activating such systems because of their heterogeneity and non-systemic approach to updating them. After all, transport (logistics) business is heavily loaded and competitive.

System methods should be used, such as analysis and synthesis, composition and decomposition, structuring and restructuring, statistical and expert evaluation, procedures for scaling and classifying fuzzy information, data tracking and analysis tools, etc. These methods, as well as economic and mathematical modeling, are the main tools of this study.

CRM is a new marketing strategy focused on improving individual relationships with customers of their loyalty, activation and retention in the "sphere of influence" of business installations of the business entity (Zikmund, 2003).

The exact definition of CRM systems isn't yet available (Amelin, 2014) and it's likely impossible and not as relevant.

CRM is operational, analytical and collaboration system. In the Russia is the most used the Customer Relationship Management System: SugarCRM, 1C: CRM Standard, ASoftCRM, MonitorCRM, ZohoCRM, SalesforceCRM, AmoCRM, TeamlabCRM, 1C-Bitrix, SalesExpertCRM, FreshOfficeCRM, etc. (Catalogue, 2019)

For small transport businesses, CRM systems are simply irreplaceable. Small cash flows minimize stock and investment opportunities, and there is high competition in the market. Therefore, there's a growing need for optimization and analysis of logistics and effective management of the company. CRM systems significantly improve the efficiency of consumer interactions in small business. Large business without the deployment of such systems will not be successful.

Based on the study of typical CRM systems in logistics, transport business, the work offers a method of regulating business processes, focused on cloud infrastructure and supporting the evolutionary cycle of the transport system. An integral multiplicative model similar to Allen's production model is also proposed. It can be used to predict the production capabilities and evolutionary potential of a company. It's discussed how to use it to assess the self-regulation of the system and solve practical problems.

Theoretical foundations

The concept of CRM usage should be long-term. Then the obtained data in the form of a structured database with information about each client of the transport enterprise will become its great advantage. The enterprise will get advantages before the big companies, opportunities to recommend to the consumer timely necessary transport service.

There are also difficulties: all customer data should be updated in time, the process of analysis and collection of information should continue all time, for example, predictive analytics should be carried out (Abbott, 2014). It's based on transport's resources and will allow you to choose the best logistics solutions. Only with this approach can the transport company succeed with CRM.

For the automation of the transport company, CRM is a modern quality and effective service tool. It's continuously and dynamically improved, often and by many criteria tested in various fields, not just transport. CRM-system adequately implements the goals of automation of business processes of transport companies (Leschev, 2016).

CRM-oriented business strategy of transport enterprise allows coordinating work and efforts of management and employees to optimally take advantage of the following basic processes:

- 1) conclusion of individual transactions;
- 2) cost reduction;
- 3) improvement of management efficiency;
- 4) targeted planning and implementation of effective marketing plans and shares;
- 5) increasing customer loyalty;
- 6) planning sales, working time, inventory;

- 7) re-engineering of interactions with clients;
- 8) deal management;
- 9) activation of cloud resources, analytical packages and analytics, etc.

CRM is used both internally (for example, operators and dispatchers) and externally (insurance and advertising companies, travel agencies, etc.).

Methodology

Now analysts say not even about CRM-technology, but about CRM-methodology, model or platform of interactions with the client of the transport company. It's focused on consumer demand. A more complete request is taken into account, which increases conversion capabilities of the offered product, service of the transport company.

The CRM-systems life cycle is realized by stages:

- 1) data collection - active (web questionnaire) or passive (activity capture on the websites themselves);
- 2) filtering and analysis of data, segmentation and categorization by interaction with clients of the transport company;
- 3) interaction and feedback with clients when implementing the needs of the company's client;
- 4) adjustment, adaptation of the relationships according to the capabilities that are activated by the CRM system.

During the transition of corporate clients to "cloud", to network technologies (Dikaiakos, 2009), cloud computing and marketing business processes are evolves. The cloud version of CRM - CCRM evolves also (Belyatskaya, 2015).

The transition to CCRM not only expands the capabilities of transport and infological communications, but also evolves infrastructure. Transport enterprise business procedures are developed with the help of corporate networks (intranet) and Internet, web analytics and web marketing. The user, the corporate client of the transport company can activate the personal system and get the necessary information from the cloud, using cloud resources.

Due to the diversity of CCRM cloud capabilities and resources (Kulikova, 2018); it's important to

effectively choose "your" system, under "your" customers and under "your" transport business infrastructure-

Transport enterprises are able to increase profits by means of CCRM systems by implementing an individual approach to any customer, mainly class B2B, B2C, P2B, B2P, M2M, etc.

In the work used traditional system methods (analysis, synthesis, decomposition, modeling, etc.) and technologies of system research based on fuzzy relationships and sets, neural network, situational modeling, etc. Cloud technologies, as well as cloud logistics of the transport company, digital infrastructure of CRM-systems have been applied. These methods are necessary because of the heterogeneity of transport systems.

Also applied is the Allen-type manufacturing function method, which we use to assess the evolutionary potential of a company. The method of regulating business processes oriented to CRM systems of the full cycle of the transport system has been used.

In addition to these methods, standard methods of mathematical statistics were used - analysis of regressions, corelations, factor connections, rejection of rough and erroneous data, etc.

The use of such a wide range of different methods (system, subject-oriented, technology-oriented) is carried out at different hierarchical levels of research - empirical (collection of Big Data data), generalizing (Data Mining) and theoretical (model, system-analytical, mathematical).

Application of various analytical tools gives guarantees for relevant conclusions, solutions, segmentation and individualization of approach to clients. Standardizing simplifies the administration and quality control of customer service. A centralized storage database facilitates business process analysis and improvement.

All methods are used in a comprehensive manner, taking into account their importance for self-regulation of the system, solving practical problems of transport business.

Results and discussion

Achieving the attractiveness of the transport services business becomes a serious target. The CCRM system and the digital infrastructure it creates (or the digital upgrades) allows you to meet your objectives as well as many of their

subtasks. For example, using social-network, virtual-professional, and even gaming web communities.

By activating virtual CRM (VCRM - Virtual CRM), the enterprise is able to interactively update not only physical, but also virtual connections, channels and customer bases. It becomes possible to respond to requests of each client individually and relevant for long-term relations (Shatalov, 2017).

For example (Hashem, 2015), by personalizing customer web pages (habits, preferences, wishes, etc.), you can consider hidden dependencies in big data (BigData, DataMining). Intelligent analysis (BI), transaction processing tools (TPS) and other tools are effective for each production-market situation.

BigData and DataMining are resources that transport companies use so far poorly, but they important for trend identification, applied analysis and forecasting. Hidden and useful connections for system analytics are at the heart of the business analytics needed by emerging transport companies. It will help to increase competitiveness in the transport services market. This increases the awareness of each client and the decision maker, reduces the "noise" in the system and allows the management of the transport company to adequately assess the system resources and capabilities:

- 1) types, capacities, budget, investment capacity and strategic requirements in CCRM;
- 2) marketing results and procedures, for example, demoveries and results of marketing actions, reverse links;
- 3) integrability of various services (therefore, increased usability of all information systems and processes);
- 4) adaptability and "mobility" of the service in real mode, directly with the client;
- 5) safety, security policy of services and communications;
- 6) infrastructure potential of transport enterprise;
- 7) evolutionary capabilities of the enterprise, its "flexibility", self-organization in a highly competitive logistics environment, survival and sustainability of its functioning;
- 8) training of personnel, their competence, necessity and program of improvement of professionalism, quality of transport and specialized services.

When you install CRM, unexpected risk situations can cause loss of some clients (even their data). Additional costs result from employee training. The license price depends on the chosen CRM (indefinite, for a certain period of time, purchase of software).

When implementing the CCRM system, evolutionary forecasting and modeling are needed (Kuzmin, 2017). It's possible to construct integrated, complex model of efficiency of transport transportations, using, for example, Allen's model (WeiBo, 2009):

$$y(x) = \prod_{i=1}^m \left(\sum_{j=1}^{k_i} \alpha_j x^{\beta_i} \right)^{\frac{\gamma_i}{\beta_i}},$$

where α_j - multiplicative coefficients, β_i - factor coefficients, γ_i - model self-regulation coefficients, x - investigated factor, $y(x)$ - investigated response to this factor. These parameters must be identified.

Digital logistics includes ensuring the rapid passage of goods across a large number of borders, creating conditions for the implementation of transport solutions, unification of logistics documents, and simplification of procedures when crossing borders, for example, in the framework of international road traffic. The operation of digital logistics is aimed at ensuring the comprehensive development, improvement and simplification of transport organization with the application of uniform legal and infrastructure conditions. Technical standards and tolerances are also being harmonized.

Transport infrastructure of logistics, like infological, cloud is transformed with the help of digital technologies. This creates completely new conditions for a more efficient transport business, for example, by reducing transportation tariffs, introducing intelligent CRM systems and virtual reality.

CCRM systems allow the transport company to implement strategies successful not only on ROI, ROA and other traditional indicators. Qualitative indicators are also used, in particular, on infrastructure assessment and management, reengineering and technologies, adaptability, sustainability, etc.

Cloud intelligent system is open for communication, allows to actively use advanced technologies and approaches (for example,

BYOD, neuro-marketing, BI, etc.). Service costs may be saved. Customer loyalty is dynamically increased, costs of attracting new ones are reduced, and their delay in further transport service is reduced.

In the long term, with automation, intellectual relations, revenues are growing; transport enterprises and their partner networks are evolving (Kaziev, 2018; *Lapidus and Topchiy, 2019*). See also (Catalog of CRM systems, 2019). In the digital infrastructure, the technological model of the transport enterprise, business processes are transformed as well. Network channels become additional communication channels of business relations with clients, suppliers, partners, business activity of the enterprise (Kaziev, 2018).

In this work we not only confirm such a system-wide conclusion, but also give a forecast model for assessing the evolutionary potential of the transport company, highlight its self-organization indicators.

For cloud business to succeed, you need:

- 1) a clear idea of activation of cloud resources;
- 2) results-oriented processes;
- 3) reasonable resource's base of the project;
- 4) originality, uniqueness of the project, ability to withstand fierce market competition;
- 5) openness, usefulness, relevance of services, business processes (investors will find it easier to choose such a project for financing), etc.

Business is interested in new customers. Incoming calls, requests (leads) are a priority in the task of deploying CRM systems. If the business works with customers periodically, it's important to have structured information about all transactions, from call to sale. The customer must always be informed.

Before implementing the CRM system, the transport company must identify its feasibility and analyze the available effective tools. The main difficulty of choosing - customer and sales data should be updated in real mode, and often "on the fly". This makes it difficult to analyse in depth the reasons and factors for increasing individual sales. Customer data may not be complete (or even unavailable).

The sales manager will no longer work "at his own discretion". As part of the transport company's strategy, they will together maintain a single customer base (from calls to cyclic orders), analyze statistics and implement tactical procedures to increase sales.

Thanks to CCRM, it's possible to move business processes of the transport company to another level, to use perfect solutions.

We need not only competence in the field of CCRM-systems, but also experience, heuristics. Evolutionary systems are projects that are used and executed for business efficiency. The results deteriorate, regardless of their possible stability. The results of the work under consideration, unlike the results of researchers of specific CRM-systems, are a system-methodological basis for system and IT analysts of the transport business.

Conclusions

CCRM - evolution of CRM: use, implementation, integration with the enterprise. The intelligent CRM system will allow not only to control, but also to make decisions on each customer (order) from the moment of the first interactions. Therefore, the conversion will increase, the "funnel of sales" will expand, and the smooth operation will improve.

The "simple client" becomes permanent, it's constantly in the "funnel of sales", and the CRM-system through special advertising (banners) "haunts" clients and on social-oriented networks. The profitability of the transport company will also increase. Reducing the cost of services and improving the service, together with improving the quality of system analysis, confidence in analytics allows small transport firms to develop in the market together with large companies. Managers get the predictive analytics much needed for forecasting and risk management.

Result of this system analysis can become a basis of development of systems of deep machine learning in the sphere of transport, transport service.

The modelling will allow analysis of more target and related factors affecting the transport services market, as well as access to detailed analytical data and reports. CCRM, intelligent systems are a powerful tool for parallel processing of information, complex calculations, including based on blockchain-technologies.

From storage, through intelligent processing, to analysis and decision-making. With less cost, more quickly and fully. By attracting each client and not letting him go.

References

- Abbott, D. (2014) *Applied predictive analytics: Principles and techniques for the professional data analyst*. -Indianapolis, John Wiley & Sons. - 456 p.
- Amelin, M. (2014) *Netocracy as a Tendency of Internet Business // One Year in Writing Collection of Proceedings*. -Minsk, pp.5-6.
- Bialatskaya, T. N., Amelin, M.A. (2015) *Analysis of intelligent information systems using the example with CRM ERP // Applied informatics, vol.10, №3(57), pp.12-23.*
- Catalog of CRM systems [Electronic Resource]. <http://crmonline.ru/software/> (date of appeal: 07.11.2019).
- Dikaiakos M, Pallis G, etc. (2009) *Cloud Computing-Distributed Internet Computing for IT and Scientific Research // IEEE Internet Computing, №9, p.18*
- Efficient Cloud CRM That Will Bring Your Business To The Next Level, <http://juliansherman.net/efficient-cloud-crm/#sthash.rKMajZSR.dpuf> (date of appeal: 04.11.2019).
- Hashem, I.A., Yaqoob, I., Anuar, N.B. et al. (2015) *The Rise of «Big Data» on Cloud Computing: Review and Open Research Issues // Information Systems, vol.47. - pp.98-115.*
- Kaziev, V.M., Alikayeva, M.V. & Kazieva, B.V. (2018) *Modeling the impact of investment business processes on the economic sustainability of the organization. Journal of the K.L. Khetagurov State University, №1, pp.116-120.*
- Kulikova, M.M., Isabekova, O.A (2018) *Relevance of CRM-systems implementation // Moscow Economic Journal. №4. -pp.599-605.*
- Kuzmin, E.V. (2017) *Modeling of business processes of the enterprise in the implementation of CRM-systems // Sphere of services: innovation and quality. -№28, pp.6-9.*
- Lapidus, A.A.; Topchiy, D.V. (2019). *Methods and variations of creating organizational and technological model of renovation objects. Revista de la Universidad del Zulia, 2019, N° 28, pp. 151-166.*
- Leschev, V.A. (2016) *Efficiency of CRM-system application // Young scientist. -2016, №12. pp165-168, https://moluch.ru/archive/116/31603/ (date of appeal: 04.11.2019).*
- Shatalov, M.A., Mychka, S.J. (2017) *To the issue of key problems of information support of management of the transport and logistics system of the enterprise//Scientific review. Economic Sciences, №2, pp.140-144.*
- WeiBo, Zh., Kaur, S. & Wei, J. (2009). *New development of organizational commitment: A critical review (1960—2009) // African Journal of Business Management, v.4(1), pp.12-20.*
- Zikmund, W. (2003) *Customer Relationship Management: Integrating Marketing Strategy and Information Technology. -Hoboken, John Wiley & Sons.*