

CRM System as a Tool for Sustainable Development of Management Companies of the Housing and Communal Cluster*

Sergey P. Sterlyagov (0000-0002-2334-1559)^{1(*)}, Victor M. Patudin (0000-0003-3335-6233)², and Alexander S. Avdeev (0000-0002-2302-9688)³

¹ Altai State University, Barnaul, Russia
maksimow.sps@yandex.ru

² Research Center "Control Systems," Barnaul, Russia
system-m-pvm@yandex.ru

³ Altai State Technical University named after I. I. Polzunov, Barnaul, Russia
ishimael@bk.ru

Abstract. This paper focuses on designing tools for the sustainable development of management companies of housing and communal sector. The problem of applying the process approach to the management of apartment buildings is discussed in the example of the system of relationships between apartment building owners and management companies. The main business processes in a management company are highlighted. They make up the pool of business processes of the CRM system as a tool for customer focus and sustainable development of management companies. On the example of the business process of dispatching and emergency repair services of an apartment building, the technology of implementing a process approach to managing a pool of business processes in a CRM system is considered. When designing a mechanism for managing business processes in a CRM system for a management company, it is proposed to use processes and performance indicators of service management (ITSM) as a specialized option for implementing a process approach to management, which is widely used to manage services in IT companies. The authors developed proposals regarding methodological and technological approaches to solving the problem of creating a standard for a CRM system for client-oriented management companies following the new strategy to develop housing and communal services. Technical and instrumental solutions for the digitalization of business processes of a management company's CRM system are analyzed. The authors proposed to use a cloud-based implementation of information support for managing relations between management companies and owners of apartment buildings as a tool for sustainable development of management companies of the housing and communal cluster.

Keywords: Sustainable development · Housing and communal services · Process approach to management · Business process modeling · Process indicators · Cloud technologies · Web services · Management company

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1 Introduction

Features of the functioning of the modern market economy are associated with dynamism, uncertainty, and instability of the external environment surrounding the organization. Therefore, the issues of sustainable development of organizations in a modern market economy will always be the subject of scientific research (Evseeva, 2013).

In this case, process organizations are better “adapted to work” in such conditions than functional-hierarchical business structures. The development and analysis of the process model of the organization’s activities allow us to understand the flaws and optimize the company’s functional hierarchical system. In this case, we can talk about the design and use in the practice of process-oriented management subsystems of the organization.

The creation of a process model of an organization in a specific subject area is associated with the design of a hierarchical process network, a hierarchical process network management system based on the PDCA cycle (Deming cycle), and a hierarchical structure of indicators of business processes (Deming, 2011).

When creating a process model, a system of indicators is essential, allowing one to evaluate business processes from a quantitative and qualitative point of view. We defined the measurement points and a measurement procedure to apply the scorecard.

The process owner develops corrective actions by analyzing the causes, degree, and nature of deviation of actual indicators from their planned values. Based on this approach, self-organization (self-regulation) of the business process becomes achievable. As a result, the system of business process management is improved, taking into account the interests of consumers of services or products, which allows the company to obtain significant competitive advantages in the market and acquire sustainable development tools.

When developing a hierarchical system of business processes indicators of individual process organizations’ subsystems, it is advisable to follow the approaches of the authors of Balanced Scorecard (BSC). BSC concept and technology was proposed by R. S. Kaplan and D. P. Norton (2003).

The authors of the concept proposed an original tool for implementing the strategy – a hierarchical system of interrelated indicators of strategic orientation to assess the company’s performance. The customer-centric metrics group is critical in creating additional competitive advantages and sustainable development (Kaplan & Norton, 2003).

Since 2005, the housing sector in Russia was in a permanent state of development amid contradictory government policies, the absence of long-term and predictable rules for regulating the housing sector, conflicting technical norms and rules in the housing sector, most of which require the use of fundamentally different approaches, corresponding modern management structures, and modern technological solutions, including digital ones.

Housing and communal clusters in such conditions are considered the basis for increasing the management system’s efficiency of housing and public utilities

[HPU] (Morozov, 2006; Patudin, Tselishchev & Yurtaykin, 2010; Sutyagina & Sutyagina, 2018).

An essential link in the HPU is the companies managing apartment buildings [AB]. Focusing on consumers' interests in the management of AB allows one to improve the quality of HPU and provide competitive advantages to management companies that have chosen this scenario of sustainable development.

The use of specialized software providing information support for client-oriented mechanisms of interaction between management organizations and owners of apartment buildings in AB is becoming one of the priority areas for the development of digitalization of this housing and communal cluster.

2 Materials and Methods

The study's methodological basis is a systematic analysis of the problems of reforming the HPU system in the context of the digitalization of society and digital transformation of the HPU as an essential component of a safe and comfortable living environment (Silin & Astratova, 2017), (Digital McKinsey Expert Team, 2017). The strategy for the development of housing and communal services in the Russian Federation up to 2035 [Strategy 2035] was used as one of the reference sources (Association "Housing and Public Utilities and Urban Environment," 2020). The authors analyzed systemic and process approaches to organizing the management of interactions between utility providers (resource supplying organizations), housing services (management companies), and owners of apartment buildings.

The works of E. Deming (2011); M. Hammer and D. M. Champy (2011); C. Wasson (2006); and Russian specialists in this area, Yu. Adler and W. Shper (2019); V. V. Repin and V. G. Eliferov (2013) are devoted to the fundamental issues of the process approach to management.

The works of Y. Gong and M. Janssen (2012); F. M. Maggi, C. Di Francescomarino, M. Dumas, and C. Ghidini (2014); A. I. Sukhorukov and D. V. Kapanadze (2019) are of interest from the point of view of practical application.

The features of using the process approach to management in the housing sector are considered in the works of O. V. Buresh and N. S. Safonov (2014), V. I. Rylkov, L. B. Zelentsov, and K. V. Zhernevsky (2014).

The issues of managing the quality of services in general and HPU, in particular, are considered in the works of E. M. Bialetskaya, I. Yu. Kvyatkovskaya, and V. F. Shurshev (2011); H. C. Rampersad (2004), and a collective monograph edited by Ya. P. Silin and G. V. Astratova (2017).

The authors used their experience in developing software solutions to support the business processes of HPU management companies over the past ten years, acquired through constant interaction with economic entities in the HPU sector, executive bodies of state power, and state control and supervisory bodies regulating and controlling the functioning and reforming of HPU (Bogdanova, Ilinykh, Patudin & Podolskaya, 2006; Patudin & Tselishchev, 2009; Patudin & Sterlyagov, 2013).

The sites of management companies of the Altai Krai, members of ASRO "Union of Housing and Communal Services of the Altai Krai," were used as a test

site.

The conducted theoretical studies and the gained experience led the authors to the conclusion that there is insufficient coverage of the issues of applying the process approach to managing the sustainable development of management organizations.

The process approach to managing AB is the basis of the standards for a new generation of activities of managing companies as client-oriented organizations.

A high-quality solution to standardization issues based on a process approach to management in modern conditions is impossible without the use of information technologies and, first of all, cloud IT solutions, which fully correspond to the concept of a service-oriented architecture, which allows one to fully ensure the client-orientedness of business processes of companies managing AB (Galbraith, 2005; Losev, 2008; Gulakova, Panin & Rebyazina 2016).

In this regard, we can assert the theoretical and practical importance of the work.

3 Results and Discussion

3.1 Process Approach to Management as the Basis of Customer Focus of Organizations Managing AB

The Housing Code of the Russian Federation, federal laws, and by-laws determine the general framework for the rules of AB management. The rules for maintaining the common property in AB are formulated in decree No. 491 (August 13, 2006) (Government of the Russian Federation, 2006). The minimum list of services and works is outlined in Decree of the Government of the Russian Federation No. 290 [Decree No. 290] (April 3, 2013) (Government of the Russian Federation, 2018b). The need to use standards in the implementation of activities for the management of apartment buildings is determined by Decree No. 416 (May 15, 2013) (Government of the Russian Federation, 2013). The adoption of Decree No. 331 (March 27, 2018) (Government of the Russian Federation, 2018a) introduced a unified standard for AB management. However, this decree is of a framework nature. The term “standard” implies greater detail in management procedures.

Nevertheless, the uniqueness of Decree No. 331 is associated with a new trend set by the Russian Government aimed at creating client-oriented management companies. In this case, we are talking about using the paradigm of a customer-oriented process approach to management for designing a quality management system for management companies.

Decree No. 331 formulates the basic requirements for the emergency dispatch service system [EDSS] as a customer-oriented business process of a management company. Examples of customer-oriented indicators of the EDSS business process are given. However, to use the provisions of Decree No. 331 in practice, more detailed design and regulation of the EDSS business process using special business modeling tools, an expansion of the list of indicators, and the development and implementation of algorithms for assessing business process indicators based on IT solutions for the digitalization of the business process is required.

The infological model of the EDSS and its software implementation should underlie the EDSS standard of a management company. In their early works, the authors considered the business model of the EDSS and business process indicators that can be used to analyze and control the business process based on the Deming cycle (Bogdanova, Ilinykh, Patudin & Podolskaya 2006).

It should be noted that the EDSS business process is an essential component of the system of relations between the owners of AB premises with a management company [CRM system].

To increase the efficiency of the housing stock and ensure the proper quality of HPU, it is necessary to consider the problem of applying a process approach to the development of an integrated model for managing the relationship of owners of AB with management companies to create a CRM system for a management company as a tool for its sustainable development.

We can distinguish the following processes of interaction between a management company and the owners of the AB:

1. The business process of organizing and holding a general meeting of owners of AB premises;
2. The business process of dispatching and emergency repair services for owners of AB premises;
3. The business process of charging payments for HPU.
4. The business process of transferring the readings of individual metering devices about the consumed utility resources by the AB owners.
5. The business process of managing accounts receivable of AB owners.
6. The business process of planning, monitoring, and assessing the quality of maintenance and current repairs of the AB common property following the requirements of Decree No. 290.
7. The business process of information interaction between a management company and the AB owners (accounting and tracking requests from the AB owners on the maintenance and current repair of AB, decisions of the general meeting of AB owners, etc.).

The development of a CRM system standard for a management company is associated with the creation of models and regulations for business processes of interaction between a management company and the AB owners, the development of a system of indicators of business processes and algorithms for determining indicators, digitalization of business processes of a CRM system, digitalization of a business process management of CRM systems based on indicators.

To develop a CRM system standard for a management company, it is advisable to use a service management model (ITSM) based on the ITIL library (ITIL Foundation, 2019), which is widely used in IT to manage CRM systems of IT companies. ITSM is a specialized version of the implementation of the process approach to management in the IT-sphere.

The use of the ITSM concept in the housing sector can be found in the work of V. I. Rylkov, L. B. Zelentsov & K. V. Zhernevsky (2010). However, the authors considered only the general principles of ITIL application in the housing sector. In subsequent works, the application of ITIL was continued on the example of creating and using WEB-services for resource supplying organizations. Since 2013, the work has not received further development.

The changes in HPU legislation over the past seven years, the development of Strategy 2035 (Association “Housing and Public Utilities and Urban Environment,” 2020), and the emergence of a wide range of mobile applications and cloud tools for the digitalization of the housing and communal services sector justify the need for further development of this area of research.

The key elements of the ITSM model, given in ITIL, can be applied without significant changes in managing AB.

For example, the management of the EDSS business process can be described by three processes:

- incident management (restoring the normal provision of housing and communal services);
- problem management (ensuring the stability of service delivery);
- service level management (ensuring and improving quality).

ITIL defines such a concept as Key Performance Indicators (KPI). KPI is an indicator of the enterprise’s activities that help the company achieve strategic and tactical (operational) goals. KPI can be used to quantify management objectives (ITIL Foundation, 2019; Parmenter, 2015). Thus, the use of KPIs as metrics allows one to control processes consistent with the principles of the process approach. Using the actual data of the indicators and their limitations, the EDSS business process can be analyzed and, if necessary, adjusted.

Another goal of creating a CRM system for a management company is to stimulate the process of self-organization of AB owners, contributing to the sustainable development of a management company. In this regard, the process of holding a joint meeting of AB owners [JMO] is no less critical than the EDSS business process. The key indicators of this process are as follows: the number of issues of the meeting, the number of considered and pending issues, the number of owners participating in the meetings, the time of consideration of the issue. The list of indicators can be expanded.

The work on creating a model of CRM-system of a management company will be considered complete when a detailed business model and a system of indicators are developed for each business process of interaction between the management organization and the AB owners.

3.2 Digitalization of Business Processes of AB Management Based on Cloud Technology

In the narrow sense, digitalization is understood as a simple transformation of information into a digital form. In a broad sense, it refers to the massive transfer of information into digital form and creating global, highly efficient management systems, improving the economy’s efficiency and quality of life.

Following the Strategy 2035 (Association “Housing and Public Utilities and Urban Environment,” 2020), from 2021, it is planned to move from the departmental to the sectoral principle of a technical regulation to create complex sectoral collections of standards and requirements and sectoral certification and control systems.

Within the framework of the national program “Digital Economy of the Russian Federation,” the Ministry of Construction of Russia developed a departmental project, “Smart City” (Ministry of Construction of Russia, 2018).

The relevant activities are included in the passport of the national program Digital Economy.

The main objective of the Smart City project is to improve the efficiency of urban infrastructure management by ensuring the introduction of modern digital and engineering solutions that stimulate the development of the urban environment. The project also aims to increase the number of management companies that use automated dispatching and accounting systems for utility resources.

Management companies can now automate some business workflows using the best practices of IT companies. The solutions are ready to use if they meet the following criteria:

- payback at all stages of implementation;
- the ability to work with many geographically distributed objects, including a synchronized collection of information and management of objects;
- the use of primary measured data;
- the ability to check the reliability of the used data;
- the ability to bring reliable, current balances together;
- the integration of many object information systems;
- the openness of databases for third-party users;
- developers' understanding of industry tasks and readiness to shortly achieve industry-specific results;
- replication in related sectors of HPU.

Qualified developers who have achieved significant results should be involved in solving industry problems.

Nowadays, off-the-shelf software products are generally marketed as SaaS products (software as a service where customers are provided with products fully serviced by a provider). Given the qualification of personnel in the HPU, it is possible to outsource all complex calculations up to the transfer of intellectual functions. Such solutions will prove beneficial for small and medium-sized organizations.

We analyzed the software solutions existing in the AB management market. Such developments based on cloud-based IT solutions as *My Home*, *Burmistr.ru*, *Global*, *Domopult*, *Electronic House*, *SuperMKD* were considered. The results of the analysis of the full functionality are presented in Table 1.

Table 1. The comparative table of AB control automation products.

Typical service	Supplier companies	Technological platform
Transfer of indications of individual metering devices	My Home, Control Systems, Global, Electronic House, Dom Control	Web service Mobile app
Payment for HPU	My Home, Control Systems, Burmistr, Global, Dom Control, Domiland	Web service Mobile app
Billing history	My Home, Control Systems, Electronic House, Dom Control, Domiland	Web service Mobile app
Notification of updates in the house	My Home, Control Systems, Domopult,	Web service Mobile app

Electronic home, ASUS MKD, Domiland		
Work with debtors	Burmistr	Mobile app
VoIP (recording of conversations and their assignment to the application, free calls between employees)	Burmistr, Control systems, Domopult, Domiland	Mobile app
Online voting for general meetings of owners	Burmistr, Global, Domopult, ASUS MKD, House online, Domiland, SuperMKD	Web service Mobile app
Forum (a platform for communication between residents and a management company)	Burmistr, Global, Domopult	Web – service Mobile app
Personal Area	All	Web service Mobile app
Viewing the requests history	Global, Domiland	Web service Mobile app

Source: Compiled by the authors.

Separately, the systems of holding general meetings of AB owners were considered (Table 2).

Table 2. Comparative table of automation systems for the process of holding general meetings of AB owners.

Name	Functionality	Benefits
Housing self-government system “Electronic House”	It provides three services. The first is to inform residents about events inside the house. The second is conducting a survey of the residents. The third is an electronic general meeting of homeowners in absentia	Owners can conduct various surveys and receive information about innovations in the house through applications, e-mail, or SMS
Automated system “Domskaner”	Voting, viewing information, and entering data. Online voting	The application works on all mobile devices, which allows one to manage housing and vote online
Software complex “Protocol”	The notification of the AB owners about the holding of the general meeting of the AB	Comprehensibility, accuracy; the program is easily customized for the register of owners; the possibility of an unlimited number of questions for voting; the data entry control mode is implemented; a prompt reflection of the total indicators of voting

Source: Developed by the authors.

Considering the current situation on the market of software platforms common in Russia, solutions based on 1C products, which fully implement the principles of service-oriented architecture, can be recommended as a software platform for cloud services for the CRM system of management companies.

The platform 1C: Enterprise 8 is a web service provider and a client of web services published by other providers.

It should be noted that the use of service-oriented architecture allows one to develop the information infrastructure of an organization, keeping in full the existing and actively used software solutions.

This is achieved through the advantages of using cloud technologies, including cost reduction at the implementation stage and high availability due to the support of a wide range of supported hardware and software platforms.

The access to information resources is received by specialists (employees) of HPU management companies, municipal administration, and AB owners. It is necessary to note the possibility of using mobile access to the functions of the EDSS, organizing and conducting JMO for responsible employees, and AB owners.

Considering the possibility of using popular messengers, we should talk about the development and use of specialized mobile applications to resolve issues of interaction between AB owners, management organizations, and resource supply organizations.

In 2006, a research center “Control Systems” was organized to develop and implement IT solutions for the digitalization of management companies in the Altai Krai.

Research Center “Control Systems” deals with creating automated information systems in AB management based on a service-oriented approach in the cloud.

The Research Center solved many digitalization tasks included in the Smart City standard and related to the activities of management companies.

Currently, the Research Center “Control Systems” offers a whole set of WEB-services for solving various problems of AB control, including:

- sm-center.ru – the main website of the Research Center “Control Systems,” which contains information on all IT services for management companies;
- 1caero.ru – configured and ready-to-use cloud solutions 1C;
- сайтыдляжкх.рф – a standard website of a management company with a personal office for the AB owner, corresponding to the requirements of the legislation and integrated with the GIS of HPU;
- загрузкавгисжкх.рф – the placement of information in the GIS of housing and communal services in the accounting program of a management company in automatic mode;
- мобильноежкх.рф – the mobile app for collecting payments, receiving readings, applications, etc.;
- кц24.рф – call center services;
- ркц24.рф – IT services of information and settlement centers of housing and communal services;
- электрожкх.рф – IT service for organizing EDSS following the requirements of Decree No. 331.

The IT solutions of the Research Center "Control Systems" are based on an integrated approach to the digitalization of the organization's managers.

4 Conclusion

The proposed approach to the creation of a CRM system for a management company in the form of a set of models of business processes for managing relationships between a management company and AB owners, a list of indicators for assessing the quality of their performance, cloud services for digitalizing business processes and managing business processes based on indicators allows organizing the activities of a management company as a customer-oriented organization with sustainable development prospects.

When designing a mechanism for managing business processes in a CRM system for a management company, it is advisable to use the processes and performance indicators of service management processes (ITSM) as a specialized version of the implementation of the process approach to management, which is widely used to manage services in IT companies.

The proposed approach can be used to develop standards for the activities of management organizations of a new generation, detailing the main business processes for solving the problems of AB management following the requirements of quality management.

The standards underlying the functioning of client-oriented information systems to support the activities of a management company will allow solving the problems of the digitalization of AB management even if management companies cannot ensure the activities of their EDSS. The outsourcing of a significant part of the functions of a management company is possible by creating cluster EDSS capable of taking over entire groups of small management companies for servicing due to the provision of standardized software solutions to support the management of the leading CRM processes.

The proposed cloud implementation of IT solutions of the Research Center "Control Systems" for the digitalization of the activities of management organizations can be used as a platform for software implementation of management of the main business processes of a CRM system using a pool of customer-oriented indicators of business processes.

The above should contribute to achieving the key goals of sustainable development of territories and the formation of a comfortable living environment.

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