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Содержание

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Information Technology Tools to Improve Urban Life. iKomek Experience

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Key words and phrases: iKomek; information technology; urban population; urban services; concept.

Abstract. According to the UN forecasts, by 2050 the share of the world's urban population will be 68 %. With the growth of cities, as well as urban residents, information technology is increasingly being introduced. At such rates of urbanization, the burden placed on urban services is often too high. To solve this problem, the iKomek concept began to be implemented. The purpose of the article is to reveal the use of iKomek digital technologies, to improve the life of the city. The objectives of the article include consideration of the features of iKomek digital technologies, what technologies it provides, how the iKomek concept is applied in Kazakhstan and how successful it is. The research hypothesis consists of a developed technological algorithm for processing requests through the contact center 109 or alternative sources from where the applications from residents come from, and are registered in the service manager. The research method of the article is the method of theoretical and practical analysis. The results are achieved by developing the author's algorithms of information business processes, which were introduced in iKomek company in order to increase the efficiency of the company and solve the urgent problems of residents of the city. The developed architecture of role-based interaction with the iKomek information system of queries is a highly effective service mechanism for residents, providing quick and high-quality resolution of their requests and problems.

Since the beginning of the 21st century, the urban environment has been undergoing fundamental changes, which are largely related to the penetration of information technology into everyday life. Today's cities, in search of sustainability and resource optimization, aim to become smart cities where integrated IT solutions transform them into smarter, more efficient and comfortable places to live [1].

The application of information technology tools in the city life represents an urban environment where the information technologies and networks are actively used to manage and optimize infrastructure and improve the quality of life of citizens. Such cities use sensors, networks,

analytics, and other IT solutions to manage transportation, energy supply, utilities, health, safety and many other aspects of city life [2].

This practice seeks to achieve the following objectives [5].

1. Improvement of the citizens' life: integration of IT solutions contributes to improving living comfort, ensuring accessibility of urban services and reducing the negative impact of the urban environment on health.

2. Effective management: seek to optimize resource management, including transportation, energy, water supply and waste management.

3. Environmental impact mitigation: the use of modern IT solutions helps to reduce emissions and optimize energy use, which leads to a reduction of the urban ecological footprint.

In this article, we will look at exactly how information technology is changing the urban environment and what benefits it brings to the quality of life in cities. The specific cases and trends in the development of the application of information technology tools in improving city life will be discussed, as well as the challenges they face.

The research methods are: a case study method, a method of theoretical and practical analysis, a method of comparative analysis.

Digital technologies are firmly embedded in the capital's life activities and primarily perform the task of ensuring the safety of citizens.

A unique project in the city is the establishment of the "iKOMEK109" monitoring and operational response center [3]. It has become the real eyes and ears of the city - the center ensures the security of the city in a round-the-clock mode, unites call-centers of utility companies and allows to process appeals and suggestions of residents. And all this due to the fact that 21,781 CCTV cameras from all over the city are displayed here and operators can see where and what is going on.

The cameras mainly cover the mass gathering locations. These are shopping malls, mosques, major bus stops, train stations. Meanwhile, during the winter period operators through the city video surveillance system revealed the facts of untimely snow removal, water flooding during rains and floods. These issues were quickly worked out with the city utilities. The operators through GPS-monitoring and video surveillance systems coordinate the work of specialized machinery for sanitary cleaning of the city, which makes it possible to reduce motor vehicles idle time, reduce vehicle mileage and, consequently, fuel and repair costs.

Despite the outwardly complex structure of the contact center, the meaning of iKOMEK109 can be expressed literally in one phrase: to respond to all calls and appeals from city residents. It is referred to the so-called non-emergency calls, i.e. citizens' appeals related to the activities of public utilities, public transportation, poor quality of work of employees and healthcare professionals. However, as we explore the contact center, we will see that iKOMEK109 concept has a much wider functionality, up to the provision of assistance in emergency cases, emergencies, social disadvantage of citizens.

The project concept is based on the experience of such countries as Korea, United Arab Emirates, USA, UK. The structure of American contact centers, the famous 911 service, the Kazakh analog is 109 has proved to be the best suited for implementation in Kazakhstan.

Having started with centralization of call processing on the 109 line, iKOMEK109 has laid the foundation for future integration with the 112 line, with the "emergency" part of citizens' requests. All instructions have already been prescribed and a database has been established for the implementation of the project. Currently, a pilot launch is underway [4].

The organization has a three-tiered model for handling requests. Intelligent Contact Center 109 operators are the first line of call intake. The vast majority of calls the operator is able to

solve directly during the call, thanks to an extensive knowledge base, which is regularly updated. The database stores information on the activities of government departments and public utilities of the city: background information, data on planned and preventive works of public utilities - the list goes on and on. But if for whatever reason, the problem cannot be solved immediately, for example, you have no hot water, and on base no work is scheduled in the area, the operators transfer the request to the Department of Monitoring and Coordination of Life Support, i.e. to the second line.

The officers of this department are engaged in the real investigation – find out the reasons for failures, dialog with the competent services. Each case is tracked separately; statistics are maintained that clearly distinguish the status of the issue: resolved issues, unresolved issues and work not fully completed [6].

Once the problem is identified, the second line operators transfer the incident to the directly responsible organization, i.e. the third line. These may be municipality departments or district local authorities, public utilities, elevator companies, bus fleets, etc. The results of the incidents are obligatorily sent to the initiator of the request, thus, each person who applies to the city center iKOMEK109 receives feedback in the form of information about the work performed.

Now let's consider the communication channels. In addition to traditional phone calls, iKOMEK109 accepts and processes requests via all common social networks and messengers (Facebook, Telegram, WhatsApp), mobile application with the same name, akimat website. There is even a special account that monitors popular groups in social networks to record the complaints of citizens.

In addition to working with the public through calls and the Internet, iKOMEK109 monitors life in the capital through six thousand cameras installed throughout the city. These are cameras from the Sergek system, Korkemtelecom, as well as from agencies of the Ministry of Internal Affairs, private and public companies. The picture from the cameras is displayed on the screens of observers dealing with data analysis.

Most often cameras are used to record minor offenses, but there are also cases when video can solve serious crimes. Together with iKOMEK109 officers, police officers work with the cameras - they can dispatch the nearest patrol to the scene.

People can contact the contact center for numerous issues: health care, education, and public transportation. Any sent request goes into a system from which nothing can be deleted. The requests can only be closed once the resident has confirmed that their issue has been resolved. All responsible organizations are connected to this system and the Akim of the city also has access to it [7].

The questions are categorized by level of criticality, gaining a certain status. In addition, each issue has its own timeline and time to fix the problem. For example, if a resident reports an open manhole, the area must be fenced off within three hours and the manhole must be closed within 24 hours. We assume that a person is stuck in an elevator. Within 20 minutes, he/she should have help, if the problem is not solved in time, the situation becomes an emergency.

In the course of five years of operational experience with the call processing system, we have developed and optimized the architecture of role interaction with this system. This architecture relies on the definition of three key roles which cover a wide range of operations, ensuring the efficient functioning of the call handling system. The operator, inspector and performer - each plays an important role in ensuring prompt response to residents' requests and efficient processing of appeals. Based on this architecture, detailed interaction mechanisms have been developed for each of these roles, which gives a clear picture of their functional responsibilities and interrelationships.

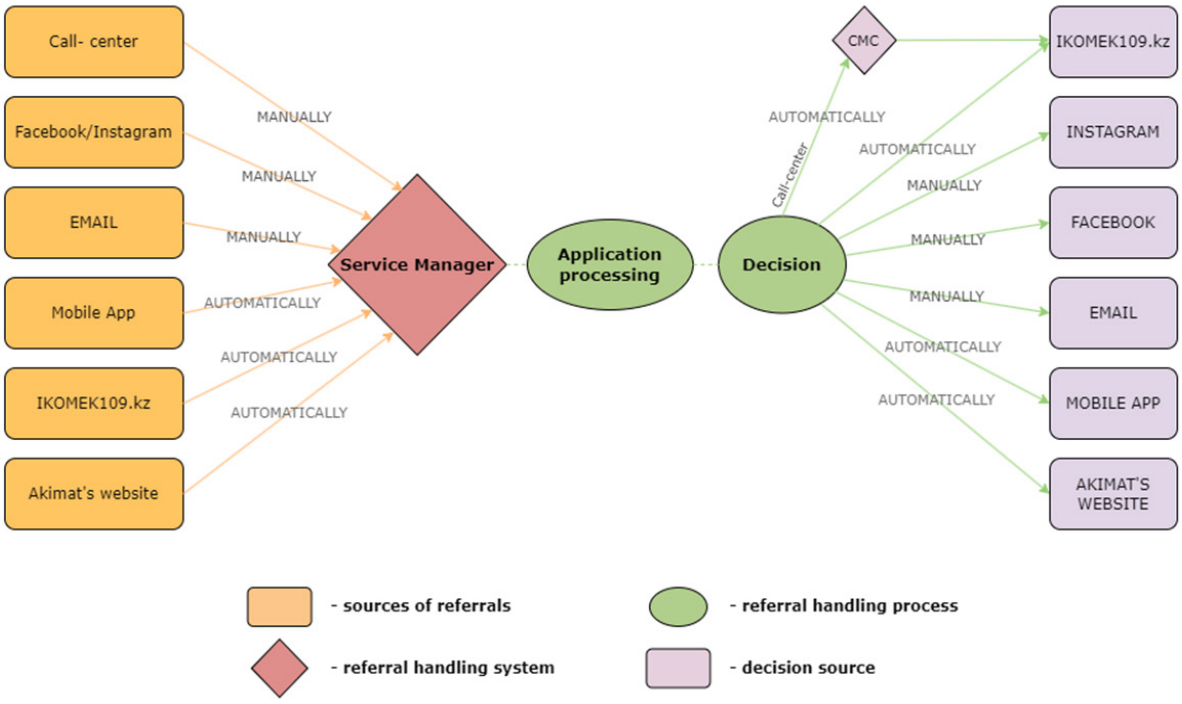

Fig. 1. Algorithm for processing requests

The schematically developed technological algorithm for processing of requests is shown in Fig. 1. Through the 109 contact center or alternative sources, calls from residents are received and logged in the service manager. Within the service, requests go through various stages of processing, a resident will then be notified of the resolution of the problem in the same manner in which the request was made.

The above drawing describes the algorithm of business processes that have been developed and implemented in iKomek, an information technology company, that is, this is what we believe is the author's development to increase the efficiency of the company and solve the pressing problems of residents and the city.

Below is the developed information mechanism illustrating the process of operator's actions at the workplace (Fig. 2):

There are 74 operators in the center, with even more working during rush hour. It took quite some time to analyze the city and understand when rush hour events occur. For example, rush hour in the winter occurs at 6 and 11 a.m., when residents call to inquire about school cancellations.

Every day the contact center receives from 5,000 to 14,000 calls. On average, one operator handles 250-300 calls per day. The frequency of referrals depends on the season and weather conditions. The contact center operators can provide answers to more than 1,300 services from the first call. There are specific standards for handling residents' requests: 16 seconds to answer a call, 10 minutes to respond to a social media inquiry and a maximum of 7 days to review and provide a query response.

The inspector occupying a key position in ensuring communication and interaction between citizens, city bodies, departments and local authorities, plays an important role. The inspector's job is not only to monitor the quality of the work, but also strictly supervising the process of task completion and resolving possible problems that hinder the effective resolution of requests and

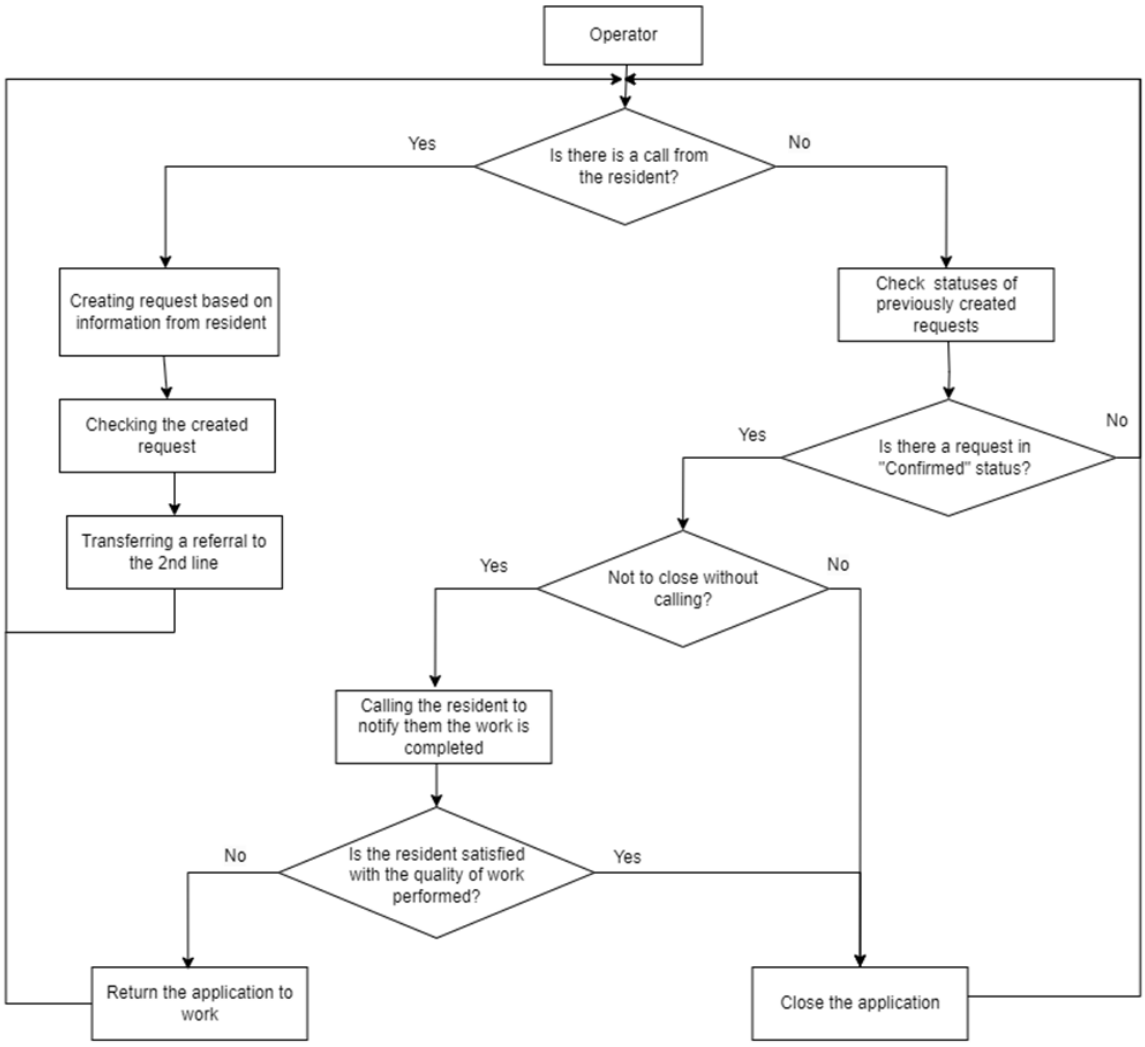

Fig. 2. Information mechanism demonstrating the process of operator actions within the framework of request processing

appeals.

The inspector acts as a facilitator, ensuring the smooth running of the request management system and maintaining high standards of accountability and efficiency in all aspects of the operation. Below is a developed information mechanism illustrating the inspector's work process, his/her role in controlling and coordinating the processing of requests (Fig. 3).

The performers in the context of a complaint handling system represent the key players responsible for resolving the municipal problems, complaints and incidents. These performers may include a variety of city and municipal services, departments and local authorities. Each of them has its own unique area of responsibility and area of expertise within which they accept and process residents' requests. Each request is assigned a strictly defined deadline, which the executors are obliged to comply with, ensuring an effective and timely solution to the problems and needs of residents.

For which reason, an information mechanism was also developed, describing in detail the actions of executors within the system of processing appeals (Fig. 4).

The developed architecture of role-based interaction with iKomek's request processing infor-

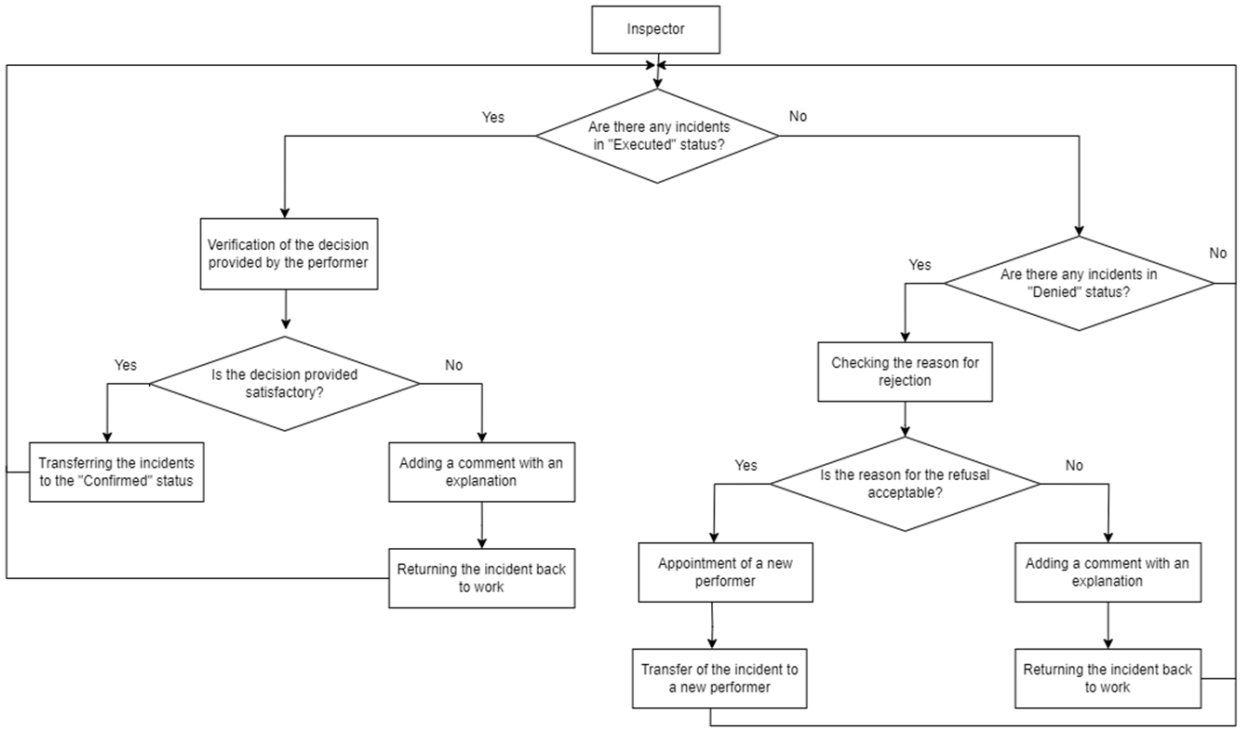

Fig. 3. Information mechanism demonstrating the inspector's process for handling requests

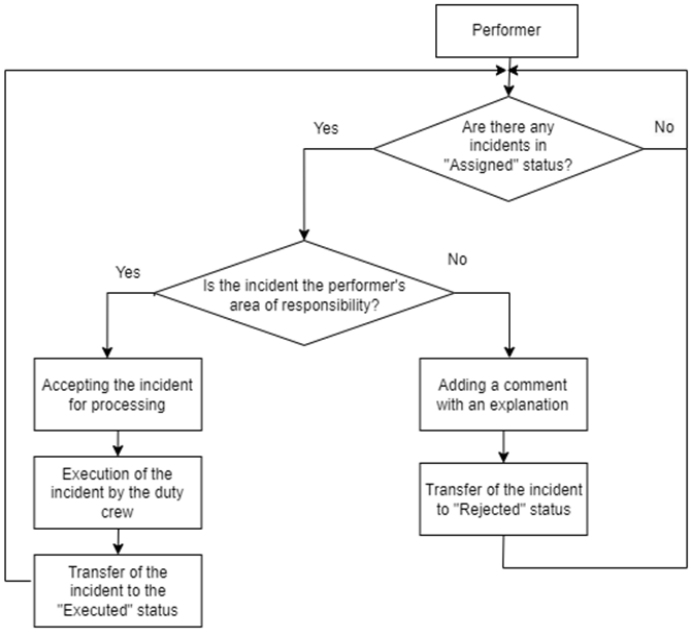

Fig. 4. Information mechanism demonstrating the process of performer's actions within the framework of request processing

mation system is a highly effective mechanism for serving residents, ensuring that their queries and problems are resolved promptly and with high quality. The role-based interaction schemes described above based on information technology platforms not only facilitate seamless communication between all parties involved, but can also serve as a model for other systems fo-

cused on interaction with society.

This author's innovative approach not only optimizes processes, but also contributes to overall efficiency and responsiveness.

Conclusion. On the basis of the iKomek Center the Project Office of the Astana Akimat controls the 5-year City Development Plan and over 400 projects. Currently, step-by-step work is underway to submit projects for public access on the Akimat's website astana.gov.kz. This suggests that residents and guests of the capital can already now be aware of up-to-date information about the infrastructure projects being implemented by the Akimat in various directions, such as urban planning, road and transportation infrastructure construction, community improvement portfolio and engineering infrastructure. For the rest of this year, as part of the next phase of data opening, the social block, including the areas of education and health care, will be presented to the public as part of the next phase of data opening. The presented public accessibility of the Astana Akimat Project Office makes the work of the governing body and city services of the capital absolutely transparent, and also demonstrates the openness of the authorities and readiness to make the capital a more comfortable and cozy city to live in together with the residents of the city.

It is also worth noting the complaints that are coming in – they are not criticisms of the management system, these are more suggestions that should be escalated to the city leadership level to generally improve the life of the community. Currently, all appeals are registered in a single system of registration of appeals, in which both operators and responsible executors work. The responsible officers write answers and attach answers directly in the system, which is integrated with chat-bots, the Akimat website for feedback from residents. The complex provides the city's management with a Control Panel, showing all appeals, sources of appeals, how many appeals are being executed, and how many are already in violation of the regulatory period. All requests are categorized by area of living, allowing management to see the most problematic areas and addresses in the city. The control panel allows the city management to keep under control the situation in the city, to draw conclusions about the work of the managers of departments and public utilities.

It is our belief that such information technology projects should be implemented, and we are confident that the experience of Astana city will be appreciated and applied in other cities of Kazakhstan. It is important that the public opinion will be heard. Ultimately, the overall satisfaction and activity of residents in solving urban problems will increase.

Therefore, currently the iKomek City Center is an institution for the permanent improvement and development of the life support of the city.

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Как применить инструменты информационных технологий в улучшении жизнедеятельности города. Опыт ikomek

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Ключевые слова и фразы: iKomek; городские службы; городское население; информационные технологии; концепция.

Аннотация. По прогнозам ООН, к 2050 г. доля городского населения в мире составит 68 %. С ростом городов, а соответственно и числа городских жителей, все активнее внедряются информационные технологии. При таких темпах урбанизации нагрузка, создаваемая на городские службы, зачастую оказывается слишком высокой. Для решения этой проблемы стала внедряться концепция iKomek. Цель статьи заключается в раскрытии использования цифровых технологий iKomek для улучшения жизнедеятельности города. В задачи статьи входит рассмотрение особенностей цифровых технологий iKomek, какие технологии она предусматривает, как концепция iKomek применяется в Казахстане и насколько она успешна. Гипотеза исследования состоит из разработанного технологичного алгоритма отработки обращений через контакт-центр 109 или альтернативных источников, откуда поступают обращения от жителей и регистрируются в сервис-менеджере. Методом исследования статьи является метод теоретического и практического анализа. Результаты достигнуты путем разработки авторских алгоритмов информационных бизнес-процессов,

которые были внедрены в компании iKomek в целях повышения эффективности компании и решения насущных проблем жителей города. Разработанная архитектура ролевого взаимодействия с информационной системой обработки запросов в iKomek представляет собой эффективный механизм обслуживания жителей, обеспечивая оперативное и высококачественное разрешение их запросов и проблем.

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