Digital Transformation of Monotowns: Prospects and Opportunities

Nadezhda T. Avramchikova¹, Sergey D. Proskurnin², Liliya V. Erigina¹ and Maria N. Chuvashova³

¹Reshetnev Siberian State University of Science and Technology, Krasnoyarsk, Russian Federation
²Administration Closed Administrative-territorial Formation of Zheleznogorsk, Zheleznogorsk, Krasnoyarsk Territory, Russian Federation
³Siberian Federal University, Krasnoyarsk, Russian Federation

Keywords: Monotowns (One-Industry Towns), Digital Transformation, Living Standards Quality, Business Environment, Digital Management.

Abstract. The article devotes to the substantiation of a progressive influence of the city digital transformation on the quality of citizens life. In addition, this article defines the specifics of monotowns (single-industry towns), the features of their digitalization and the main directions of digital transformation. Authors differentiate the elements of the digital transformation directions. The positive influence of the digital transformation on an investment climate, motivation of entrepreneurship, as well as increasing the efficiency of the labor market and economic security is justified too. As a part of the study the main tasks of the development and implementation of the "Digital Municipality" are defined and recognized on the example Closed administrative-territorial formation (CATF) of Zheleznogorsk in Krasnoyarsk territory. The scheme of a digital municipality is developed and presented. In conclusion, in the future expanding the range of portal services and increasing the number of its users can give an economic effect that ensures the growth of the territory investment attractiveness and the strengthening of economic connection between enterprises. The authors conclude that the digital transformation of the monotowns (single-industry towns), the development of new institutions in a public self-government and modern information technologies permits to form an integrated and active local community that can solve the strategic development tasks of its territory.

1. Introduction

The development of the information society creates a total information, which information and communication technologies invade in all spheres of public relations. The increasing role of information and knowledge in society becomes a trend of the civilization development. In modern time a society based on the "digital economy" is being formed. From the technological point of view, rapid and ubiquitous dissemination of the modern information and communication is considered as the next stage of scientific and technological progress.

A special feature of the scientific and technological revolution has influence with the fundamental types of human activity: production, processing and transmission of information. That leads to fundamental social transformations in the field of economics, politics, culture, changes in people's consciousness and the emergence of a new post-industrial type of society. The decisive factor in the socio-economic development of society is the transition from the "natural-material economy" to the "knowledge economy", for which reason the role of information in solving almost all the tasks of the world community increases. This is proof that the scientific and technological revolution is gradually turning into an intellectual and informational one. Herewith information becomes not only a subject of communication, but also a profitable commodity, an effective modern means of organizing and managing social production, science, culture, education and social and economic development of both societies as whole and individual urban zones (cities or towns).
2. The Impact of Digital Transformations on the Economy and Citizens Lifestyle

The digitizing changes the shape and structure of the economies of countries and entire regions. Some professions disappear and others arise. The purchasing power of people increases. Intra-industry competition is growing, markets are expanding, and industries competitiveness of some countries in the world markets is increasing, which contributes to the growth of the national economies. Economic entities achieve great results and receive tangible economic benefits; these economic entities are actively exploring the digital technologies and opportunities, also new methods and tools. Digitalization transforms the social paradigm of people's lives. It opens up broad opportunities for obtaining new knowledge, expanding the horizons, learning new professions and raising qualifications. In this case, new social elevators arise [1]. The geographic horizons of opportunities are expanding. Through comfortable cities, efficient state institutions and affordable state and municipal services, the living conditions of citizens are improved. The economy of the territories focused on innovation and research attracts the qualified personal. In its turn, the qualified personal is a key resource of digital economy and has several advantages [2].

Such territories include mono towns or single-industry towns; the specificity feature is closely connected with a single enterprise or group of enterprises that are closely integrated with each other. The digital transformation of mono towns (single-industry towns) offers them a number of perspectives and opportunities.

A monotown or single-industry city is a settlement which economic activity is closely connected with a single enterprise or group of closely integrated enterprises. The term “monotowns” is applied by cities, which located on the territory of the USSR.

Usually from ten thousand to one hundred thousand people live in mono towns. Much of them were built from scratch at the same time with the plant complex. The city-forming enterprises of many mono towns belonged to the military-industrial complex, such mono towns had the status of closed administrative-territorial formations. The city-forming enterprises of lots of monotowns ceased to be in demand, which resulted in an unfavorable social situation in such mono towns after the USSR collapse, first the problem to increase the number of unemployed. Order No. 1398-p of the Government of the Russian Federation of July 29, 2014 approved the official list of monotowns of Russia, numbering 313 items [3].

The media reported that Dmitry Medvedev (head of the Russian government) in September 2014 announced the creation of the monotowns development fund, whose tasks would be to finance transport and utilities infrastructure, as well as attract investment [4].

Economic growth. The digital economy is breaking the usual patterns of industry markets. It increases the competitiveness of their participants. Thus, a digitalization determines the growth prospects of enterprises, industries and local economies as a whole. The appearance of digital players in the market for commodities and services has already changed the face of entire industries such as a tourism, telecommunications, printing, passenger transport, in particular taxi services. The digital transformation is one of the main factors of global economic growth. This economic forecasting is connected with not only an effect of existing process automating but also with the introduction of fundamentally new, breakthrough business models and technologies. Industry 4.0 technologies, such as 3D printing, robotization, the Internet of things, etc.

The growth of the purchasing power of the population. The development of the digital economy also leads to an increase in the purchasing power of the population, because digital platforms and marketplaces create intense price competition. The appearance of mobile applications not only permit to buy commodities on the best price, but also better to know its characteristics, including reviews of real users, and compare your choice with other options. This in turn forces competing vendors and manufacturers to provide high quality products and services and lower prices. Finally, many digital companies have begun to offer free services, such as, for example, GPS navigation, for which they had to pay earlier.

Labor market. The threat of job cuts compensate by increased efficiency in the labor market. Experts in the digital technologies and economics agree with the coming decades automation will significantly influence on the labor market. The digital technologies have a more positive effect on
the labor market. For example, the digital platforms create new job opportunities. It helps to develop additional skills and especially for people who previously did not have such opportunities due to social or geographical limitations. The new professions connected with digitalization and high-paying jobs appear. There are new professions connected with digitalization and highly paid jobs.

According to the UN and the Federal State Statistics Service forecasts, the number of working-age population will decline in the next two decades in Russia. The automation process will help to mitigate the negative effects of this phenomenon. In such conditions, “digital” frames are a strategic asset. Its shortage inevitably leads to a slowdown in the growth rate of both the digital economy and the country's economy as a whole. Thus, the state priority of Russia is a necessary number of the qualified specialists in the digital technologies and this task will have to be accomplished with the help of a modern, high-quality education system.

**Life quality.** The appearance of the digital technologies and services in everyday life can significantly improve the population life quality and reduce the social inequality due to different income levels or living in remote parts of the country (Russia).

First, the digital technologies serve as a mechanism for social elevators. It contributes to the social and financial involvement of the population and increase the availability, quality and convenience of receiving services in such important areas as medicine, education, municipal and public services, culture.

Secondly, the digital technologies permit to create comfortable life and safe cities. It optimizes an energy consumption, avoid traffic jams and accidents, use convenient and reliable urban transport, navigate with augmented reality, make purchases at prices that are more favorable and more fully participate in a public life.

The digital technologies make it possible to determine where new infrastructure is required and how to maintain it cheaper and more efficiently. As a result, with the same budget, city authorities can provide citizens with more comfortable living conditions. Thirdly, in the modern world, companies urgently need the qualified personnel.

The creation of a comfortable living environment is becoming a requirement for attracting the competitive specialists and employers, especially in the high-tech industries. In a modern time, a good quality of life is directly related improving the business climate and an economic growth.

**An improvement business and investment climate.** Application of the digital technology provides a significant improvement in the business and investment climate in a region. The following factors contribute to this increase the availability and efficiency of public services (registration of legal entities, certification and accreditation, obtaining permits, declaring and paying taxes, customs escort). The development of an ecosystem of business services (logistics services, mobile banking) and increase transparency of business conditions (electronic platforms for tenders and procurement, feedback portals) open up the new opportunities for small business development.

**Security: from citizen security to national security.** Security is another very important area of the digital technology and has several components.

The first factor is a public safety: reducing crime, preventing and eliminating fires and natural disasters. Secondly, this is a national security: the fight against terrorism and corruption, the protection of objects of the strategic importance, and the prevention of unlawful influence on the preferences of voters. The third, this is an economic security, which includes fraud prevention. Moreover, it is connected with cybersecurity and ensuring privacy (protecting systems from hacking to steal funds or obtain confidential information). The digital technologies will play a crucial role in ensuring environmental safety, in particular in the prevention of man-made disasters. It has to be noted that the task of ensuring the safety of people, companies and the state itself becomes impossible without a high level of development of the digital technologies and competitive specialists in the artificial intelligence field, machine learning and cryptography.

**The features of the digital transformation of monotowns.** In the conditions of the digital economy, the new opportunities are emerging in towns for a high quality of life, environment and culture, the creation of a resource-efficient model of an economic management, the formation of
new technological entrepreneurship ecosystems. Monotowns, which calls the Russian engineering centers, are locations of enterprises in the nuclear and space industries. For these monotowns are characterized by the high-tech specialization and high-quality infrastructure and these monotowns become the platforms for the implementation of the Russian digital economy program, declare and implement ambitious programs and experimental projects [7]. A digitalization provides opportunities to achieve savings or growth in incomes comparable to the effect of capital investments, which is especially significant for small and medium-sized towns in the context of the need for comprehensive modernization and stimulation of an innovative activity. The timing and effects of the digital transition will depend on the ability of this kind of towns to form new technological partnerships, create exemplary platforms for implementing market experiments, also to deploy the advanced digital infrastructure of the new generation.

The basic direction of the digital transformation of monotowns is:
- a definition of industries that receive that gives the new vector of development by digitizing the urban economy;
- to define of the new resources and areas of investment;
- a provision of a complex technological modernization of a monotown is based on advanced and digital technologies;
- to define of the potential and direction of cooperation projects on the digital transformation of a monotown.

The development of digitization basic direction of the urban environment requires an informatization of management technologies [9].


Zheleznogorsk as an engineering and technological center of the Krasnoyarsk region is significant for the development of the knowledge-intensive sector of the Russian economy, which will become a landmark platform for discussing the potential and development projects of Digital Cities. The main objectives of the development and implementation of the “Digital Municipality” are [10,11]:

1. Establishment of centers for monitoring urban control facilities (UCF). Improving the efficiency, cheapening of urban management processes, and accelerating management decision-making.
2. Development of mechanisms for effective direct digital interaction between any UCF. Improvement the efficiency of interaction, the reliability of information transmitted, the preservation of key information, visualization of interaction processes
3. Development of a single repository of information for sharing software and information between UCF. Reduction cost of information support activities, dependence on the import software, acceleration business processes, elimination the intermediate stages of data transfer and the unification of the entire information environment.
4. Security of an operation of the city through end-to-end monitoring of the processes in real time. The acceleration of decision-making on incidents, as well as the exclusion of the human factor.
5. Development of mechanisms for business information cooperation between the authorities and business through the implementation of services to introduce and discuss initiatives. Increasing the transparency of an interaction between government and business and the investment attractiveness of the town.
6. Development of a convenient digital environment for citizens, aggregation of all town information services in a single city information window. The improvement of an efficiency of services and meeting the needs of citizens, their involvement in the processes of the urban management and increase the index of trust in government.
7. Provide personalization of information through the implementation of flexible access control to data. Cheaper measures to protect information also control and monitoring of data access events. The general digital huge city or town management suggests the following [12]:
- a consistent view of the activities of the subjects of urban management, take into account using of resource provision, labor capital, data used;
- modeling of end-to-end (“cross-functional”) automated business processes that ensures the “seamless” interaction of departments and services of the subjects of urban management;
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- reduction of the process execution time due to the regulation and automation of the steps of the end-to-end processes, the introduction of temporary restrictions for the execution of the steps of the processes;
- control based on indicators, process performance is monitored by sets of process indicators that reflect process costs, execution time, and resource loading, thus facilitating the analysis and optimization of the process based on real values of the indicators.

In this way, the authors identified the main fields of digital transformation of a monotowns. This is a field of developing “digital municipality” and it consists of the following elements (tab. 1).

Table 1. The Main Directions of the Digital Transformation Monotown.

<table>
<thead>
<tr>
<th>Digitalization Directions</th>
<th>Digitalization Elements</th>
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<tbody>
<tr>
<td>Infrastructure of a town</td>
<td>1. Housing</td>
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<td></td>
<td>2. Water supply and sewage</td>
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<td>3. Power supply</td>
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<td>4. Heat supply</td>
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<td>5. Improvement and maintenance of the road network</td>
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<td>6. Passenger transport management (passenger urban and suburban transportation)</td>
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<tr>
<td>Urban environment</td>
<td>1. Urban planning</td>
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<td></td>
<td>2. Capital Construction Management</td>
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<td></td>
<td>3. Property Relations</td>
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<tr>
<td>Safe town</td>
<td>1. Unified dispatch service</td>
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<td></td>
<td>2. Interaction with the security agencies</td>
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<tr>
<td>Budget and tax policy</td>
<td>1. A local budget and interaction with the higher-level budgets.</td>
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<tr>
<td></td>
<td>3. The cooperation with federal structures and external participants.</td>
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<td></td>
<td>4. Management of tax policy and town development</td>
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<tr>
<td>Open municipality</td>
<td>1. Information portal</td>
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<td></td>
<td>2. Information technology in local government</td>
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<td></td>
<td>3. Public reception</td>
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<td>4. Staffing</td>
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<td>5. Electronic document flow</td>
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<td>6. Social card of the resident</td>
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A digital municipality can be created as a result of a combination of some institutions of the public self-government, non-profit social nets and systems that provides the provision of municipal services in an electronic form. The digital municipality scheme is presented by a fig. 1.

In the digital municipality model presented in this scheme, the municipal economy is structured according to a functional principle. This permit to ensure the ideological, socio-political and economic connections between separate district and micro regions. The digital municipal community must access points to external space to receive recognition among the majority of the population [9]. For example, such a communicator can become objects of the cultural space of the municipal community: libraries, museums, theaters, etc. The workers, who use the digital culture
technologies, will create conditions for residents to integrate into the community and have to access to the world social and cultural values.

![Digital Municipality Scheme]

Figure 1. Digital Municipality Scheme.

4. Conclusion

The digital transformation of mono towns, the development of new institutions of public self-government and modern information technologies will permit to form an integrated and active local community. This community set and solves the tasks of a strategic development of the territory. In the future, the expansion of the range of services of the portal and the increase in the number of its users can give an economic effect, ensuring the growth of the investment attractiveness of the territory and strengthening connections between economic districts.

References


