

Evaluation of the manager work outcomes in a transport company in the context of digitalization

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Abstract. The authors study the process of digitalization in an organization, the impact on the competitiveness of personnel and leaders of organizations. The purpose of the study is to increase the competitiveness of managers who acquire competencies and new knowledge in the digitalization process. The paper highlights the elements of changes that digitalization brings to the organization. Research methods: systemic and structural-functional analysis, questioning, interviewing, expert assessments, statistical analysis, production experiment, timing and photography of working time. The information base of the study is public reports of leading transport companies; branch scientific and technical literature; materials of international, branch, territorial conferences, symposiums and seminars; results of application of author's developments. Result: digitalization provides unhindered access to knowledge, cost reduction and greater interdisciplinarity, which is an obligation in external conditions of the society development.

Keywords: personnel, digitalization, competitiveness, competence, manager, organization

1 Introduction

The digitalization process requires a completely different mindset, high availability of resources for investment and digital transformation purposes, as well as various competencies that the existing workforce possesses. Such reasons lead to the emergence of various training initiatives for the workforce and consumers seeking to develop digital competencies that are crucial not only in the context of work and employment, but also in the application of services and the organization of professional and private life [1, 2]. Thus, how do we investigate such a complex phenomenon, the consequences of which are not yet fully known to societies, in order to truly comprehend what the digitalization process and related concepts leads to and what changes it causes.

However, the transition to new professions faces some issues, since there is a huge need for retraining and training throughout life, and everyone, due to various reasons (age, gender, region of residence, quality of life), will certainly not be able to make the transition [3]. Predictions are supported by data from the World Economic Forum (2016), since between 2016 and 2021 more than 35 % of the skills identified in 2016 as significant for work are replaced.

We highlight the elements of change that digitalization brings to paperless organizations to indicate its specific opportunities:

1. Improved performance
2. Economic efficiency
3. Increased security

4. Improved information retention
5. Disaster recovery
6. Saving space
7. Staying competitive
8. Environmental friendly
9. Digital transformation

Document digitization is the first step in digitization in the context of operational processes. Microsoft (2018) projects that digital transformation will contribute more than \$1 trillion to Asia-Pacific GDP by 2021, highlighting artificial intelligence as the main catalyst for further growth. However, the integration of artificial intelligence into society is improbable without the digitization and digital transformation of organizations, and the economy and society [4, 5]. Leading organizations in the field of digital transformation highlight digital competence and cybersecurity as a critical digitalization challenge [6]. Data processing capabilities in the context of using advanced analytics tools that allow organizations to quickly and efficiently respond to a rapidly changing marketplace is often highlighted as a problem. Digitalization provides unobstructed access to knowledge, reduced costs and greater interdisciplinarity, which is also a need as trends indicate that younger generations will, on average, perform many different occupations than generations in the 20th century [7, 8].

Result. Consider the changes that occur during digitalization in a transport company. The outcomes are presented in Fig. 1.

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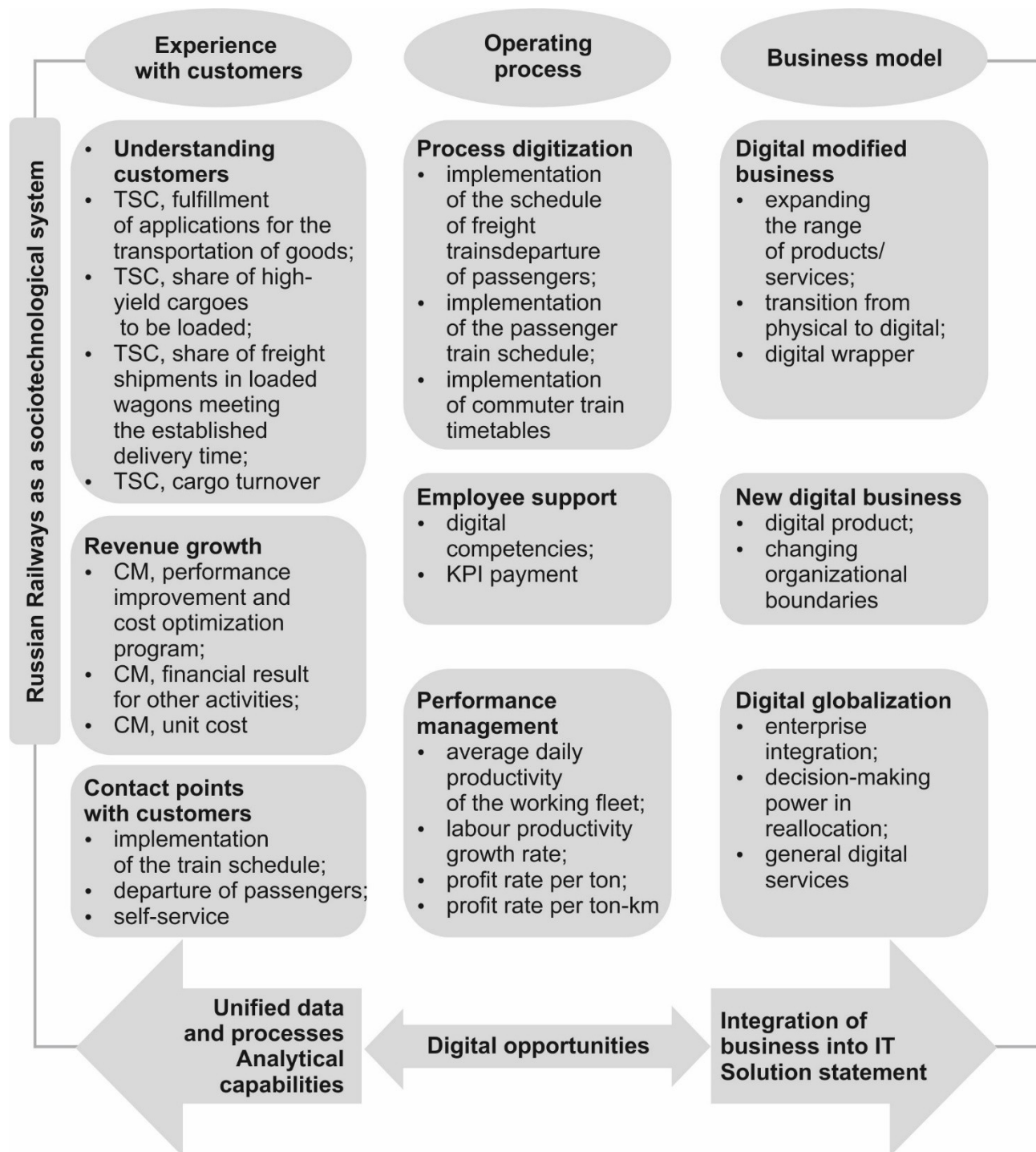


Fig. 1. Scheme for the digitalization implementation in a transport company

2 Characteristic features of the executives' work in a transport company

The main contemporary features for the transport company development are the following:

1. Economy globalization.
2. Increasing need for innovation.
3. Need to ensure a balance of interests and responsibilities of the enterprise subjects: state, capital owner, employee.

Under these conditions, traditional approaches to the management of labour activity, based on the theories of rational economic behavior and classical management,

demonstrate their insufficient effectiveness for ensuring the sustainable development of enterprises [9].

The processes taking place in economy are transforming conditions for the transport company functioning and exacerbate the need for a corresponding transformation of internal environment, and, primarily, for changing the activities of executives at all levels of management: from senior workers and foremen to the top management [10].

In accordance with modern concepts of labour economics, a transport company is a socio-economic system; its purpose is to realize the interests of basic state subjects – capital owners, employees and society needs.

3 Methodical approach

The purpose of working out a system of key indicators is to assess the performance of a number of functions in the field of corporate and technological cooperation by managers for achieving annual medium and long-term parameters; monitor the implementation of strategic measures and projects by structural divisions to develop the market potential of Russian Railways in the region, and increase the competitiveness of railway transport in the passenger and freight traffic markets.

Management levels in the organizational structures of Russian Railways are derived from fundamental functions of organizational design. The responsibility assigned to a manager directly depends on his level in management. Thus, in the organizational structure of Russian Railways, corporate managers are responsible for decisions made at operational and linear levels; managers of the operational level are responsible for the implementation of individual purposes within the functional and structural unit; linear level managers are responsible for the implementation of the functions of the linear unit. Based on the distribution of functions and responsibilities at each level from the organizational management structures that have developed in Russian Railways, the mathematical condition for evaluating the work of managers is determined, which is described by the following formula:

$$\sum_{i=1}^n K 1_i + \sum_{i=1}^n K 2_i + \sum_{i=1}^n K 3_i + \sum_{j=1}^m O 1_j + \sum_{j=1}^m O 2_j + \sum_{j=1}^m O$$

If we assume that:

$$\sum_{i=1}^n K 1_i + \sum_{i=1}^n K 2_i + \sum_{i=1}^n K 3_i = \sum_{i=1}^n K_i,$$

then formula (1) can be simplified to:

$$\sum_{i=1}^n K_i + \sum_{j=1}^m O_j + \sum_{l=1}^k L_l = 1. (2)$$

$$\sum_{i=1}^n K_i + \sum_{j=1}^m OI_j + \sum_{j=1}^m OII_j + \sum_{l=1}^k L_l = 1.$$

$$VK = \frac{PK}{PK + PO 1 + PO 2 + PL}, (3)$$

$$VO 1 = \frac{PO 1}{PK + PO 1 + PO 2 + PL}, (4)$$

$$VO 2 = \frac{PO 2}{PK + PO 1 + PO 2 + PL}, (5)$$

$$VL = \frac{PL}{PK + PO 1 + PO 2 + PL}, (6)$$

According to formulas (3)–(6), the weight of each level is:

$$VK = \frac{750}{750 + 576 + 525 + 336} = \frac{750}{2187} = 0,35,$$

$$VO 1 = \frac{576}{750 + 576 + 525 + 336} = \frac{576}{2187} = 0,26,$$

$$VO 2 = \frac{525}{750 + 576 + 525 + 336} = \frac{525}{2187} = 0,24,$$

$$VL = \frac{336}{750 + 576 + 525 + 336} = \frac{336}{2187} = 0,15.$$

According to the obtained assessment, corporate level managers contribute about 40 % to the total amount of income, OI operational level personnel – about 25 %, OII sublevel operational level personnel – about 20 % and linear level personnel – about 15 %, which in total gives 100 %. Then:

$$\sum_{i=1}^n K_i = 0,4 (7);$$

$$\sum_{j=1}^m OI_j = 0,25 (8);$$

$$\sum_{j=1}^m OII_j = 0,2 (9);$$

$$\sum_{l=1}^k L_l = 0,15 (10).$$

Contribution of the management corporate level of PK is:

$$PK = NK_m \times NK_s (11),$$

where NK_m – number of corporate level managers; NK_s – number of subordinates among managers and the corporate level of management.

$$PK = 2 \times 375 = 750.$$

The contribution of the first sublevel of operational management PO1 is:

$$PO 1 = NO 1_m \times NO 1_s (12),$$

where $NO 1_m$ – number of managers of the first sublevel of the operational management level,

$NO 1_s$ – number of subordinates of managers of the first sublevel of the operational level of management.

$$PO 1 = 3 \times 192 = 576.$$

The contribution of the first sublevel of the operational control level PO2 is:

$$PO 2 = NO 2_m \times NO 2_s (13),$$

where $NO 2_m$ – number of managers of the first sublevel of the operational management level; $NO 2_s$ – number of subordinates of managers of the first sublevel of the operational level of management.

$$PO 2 = 15 \times 35 = 525.$$

The contribution of the PL linear control level PL is:

$$PL = NL_m \times NL_s (14),$$

where NL_m – number of corporate level managers; NL_s – number of subordinates of managers of the corporate management level.

$$PL = 42 \times 8 = 336.$$

After determining the contribution of each level, we define their weight as the ratio of the contribution of each level to the sum of all contributions of the levels (Table 1–3).

Table1. Recommended key performance indicators for the manager work outcomes of a transport company in the context of digitalization (highest level)

KPI indicators			
Corporate level			
Revenue from external orders for	Availability of a KPI system and	Growth rate of	Growth value of net

locomotive traction; rental of rolling stock.	permanent adaptation of its indicators to the conditions of external and internal business environment	economic added value, %	assets of an enterprise, %
Share of intellectual labour in a transport company	Profit (gross, from sales, net). Profitability (according to gross profit, profit from sales, net profit). Average salary. Average headcount, etc.		
Implementation level of corporate programs	Number of applied innovations	Number of multifunctional digitalization projects	Digitalization Level
Criterion 1 – 0.2	Criterion 1 – 0.1	Criterion 1 – 0.3	Criterion 1 – 0.2

Table 2. Evaluation of the manager work outcomes (average level)

Linear level			
Passenger turnover	Safety level of train traffic	Plot length	Warnings of train speed limit
Number of the unit personnel operating due to the KPI system	Delivery volume from the first presentation of products manufactured according to the technological chain	Release of working capital as an acceleration result of their turnover, rub.	Number of applied technologies that meet the requirements of modern production
Criterion 1 – 0.8	Criterion 1 – 0.1	Criterion 1 + 0.2	Criterion 1 – 2

Table 3. Indicators for assessing the labour activity of managers by management levels (competence-based approach)

Corporate level				
General coefficient	Value	Components (partial coefficients)	Value	Final value
Economic effect	0.21	Focus degree on the final result	0.21	0.21
Stay competitive	0.18	Organization skills	0.25	0.045
		Goal setting	0.22	0.0396
		Predicting outcomes of team's work	0.2	0.036
		Evaluation of team performance	0.18	0.0324
		Problem formulation	0.15	0.027
Direct material reward	0.17	Base salary	0.25	0.0425
		Incentive payments	0.22	0.0374
		Shareholding	0.2	0.034
		Additional payments (for example, for overtime work)	0.18	0.0306
		Recognition of services in cash	0.15	0.0255
Creative thinking potential	0.14	Sophisticated social policy	0.33	0.0462
		Adaptive privilege policy	0.34	0.0476
		Policy of intangible checks and incentives	0.33	0.0462
Improved information retention	0.2	Career advancement	0.28	0.0336
		Personal growth	0.25	0.03
		Professional training	0.23	0.0276
		Job security	0.24	0.03
Digital transformation	0.1	Variety of offers	0.22	0.0276
		Scientific complexity of the task	0.19	0.0288
		Research autonomy	0.18	0.022
		Offer effectiveness	0.18	0.019
		Effect scalability	0.19	0.019
Self-discipline	0.08	Self-discipline	0.08	0.08
Operational level				
General coefficient	Value	Components (partial coefficients)	Value	Final value
Focus degree on the final result	0.21	Focus degree on the final result	0.21	0.21
Economic efficiency	0.18	Management	0.25	0.045
		Organization reputation	0.22	0.0396
		Post, level (status)	0.2	0.036
		Working conditions	0.18	0.0324
		Corporate space	0.15	0.027
Stay competitive	0.17	Base salary	0.25	0.0425
		Incentive payments	0.22	0.0374
		Shareholding	0.2	0.034
		Additional payments (for example, for overtime work)	0.18	0.0306
		Recognition of services in cash	0.15	0.0255
Enhanced Security	0.13	Social benefits and allowances	0.33	0.0462
		Privilege	0.34	0.0476
		Non-monetary recognition of services	0.33	0.0462
Digital transformation	0.12	Career advancement	0.28	0.0336
		Personal growth	0.25	0.03
		Professional training	0.23	0.0276

		Job security	0.24	0.0288
Space saving	0.1	Diversity	0.22	0.022
		Difficulty	0.19	0.019
		Independence	0.18	0.018
		Meaningfulness	0.18	0.018
		Assessment from the side	0.19	0.019
Salary	0.08	Staff salary	0.08	0.08
Linear Level				
General coefficient	Value	Components (partial coefficients)	Value	Final value
Enhanced performance	0.21	Focus degree on the final result	0.21	0.21
Company affiliation	0.18	Management	0.25	0.045
		Organization reputation	0.22	0.0396
		Post, level (status)	0.2	0.036
		Working conditions	0.18	0.0324
		Corporate space	0.15	0.027
Direct material reward	0.17	Base salary	0.25	0.0425
		Incentive payments	0.22	0.0374
		Shareholding	0.2	0.034
		Additional payments (for example, for overtime work)	0.18	0.0306
		Recognition of services in cash	0.15	0.0255
Space saving	0.13	Social benefits and allowances	0.33	0.0462
		Privilege	0.34	0.0476
		Non-monetary recognition of services	0.33	0.0462
		Career advancement	0.28	0.0336
Stay competitive	0.12	Personal growth	0.25	0.03
		Professional training	0.23	0.0276
		Job security	0.24	0.0288
		Diversity	0.22	0.022
Digital transformation	0.1	Difficulty	0.19	0.019
		Independence	0.18	0.018
		Meaningfulness	0.18	0.018
		Assessment from the side	0.19	0.019
Staff salary	0.08	Staff salary	0.08	0.08

Manager competitiveness as a socio-economic phenomenon, subject to the universal law of development, has a dual nature: on the one hand, it is determined by the employee individual abilities and his attitudes (motivation), on the other hand, by characteristics of the internal and external environment of an enterprise.

4 Discussion of outcomes

Considering the conformity analysis of the assessment characteristics of the manager's work in a transport company under the conditions of digital economy, it is required to make appropriate changes to the procedure for the formation of labour indicators, since at present digitalization is not taken into account in the performance indicators of managers. The distribution of functions between individual posts is carried out on the basis of required crucial competencies for each position and the specifics of the economic activity type of an organization. The distribution rationality determines the efficiency of functional relationships [11, 12]. The incompleteness or absence of required functions, the presence of duplicated, and also those that do not correspond to certain positions complicate the sociotechnological system's work. On the one hand, the social elements of internal environment of the organization are characterized by complexity and versatility, on the other hand, there is always the possibility of analyzing their state, planning and changing. Therefore, the managerial impact on the social elements of the organization internal environment can be quite effective.

5 Conclusion

The scientific methodological approach has been developed, according to which ensuring competitiveness in the conditions of digitalization of innovative economy is achieved by increasing the dynamics of development and the efficiency of using managerial potential through the formation of a methodology for assessing the contribution of managers. It has been concluded that the proposed concept creates the basis for substantiating the criteria, methods, and methodological principles for assuring the competitiveness of enterprise executives in digital economy.

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