

Supply Chain Management for Digital Enterprise, Psychological Aspect of Adaptation

Vladimir F. Ukolov¹, Valentin Y. Afanasyev²

¹*"Management of a digital enterprise in the fuel and energy complex" of the Peoples' Friendship university of Russia*

²*Department of Economics and Management of the Fuel and Energy Complex of the State University of Management*

Abstract- Information inaccuracy can adversely affect supply chain performances by lack of inventories, delay in delivery times, lost sales and decreased customer satisfaction. The article deals with the little-studied scientific problem of the psychological aspect of digital enterprise management in the fuel and energy complex and its high-tech enterprises. The purpose of this study, described in the article, is to develop the approaches to the use of digital enterprise personnel psychological management, which allows it to become value-oriented, adaptive to virtual technologies, psychologically resistant to changes and effective in supply chain management. The study used the methods of situational, structural and dynamic analysis, which provided the opportunity to study the psychology of digital enterprise management, to trace its changes in time, space and in close relationship with other phenomena. They used the systematic approach during the evaluation of digital enterprise management psychology. The study allowed to obtain scientific and practical results and conclusions. It noted that despite the revolutionary development of information technologies at digital enterprises and the increasing use of the virtual environment during the work with information, a person remains the main subject of activity. His subconscious is the deep layers of human existence, more and more involved in the processes of digitalization. However, this should not happen spontaneously. The subconscious mind can be edited by the employee himself and, with the help of special methods and techniques, be maintained at enterprises via psychological management in such a way that the digitalization processes do not conflict with the main value orientations of an individual, society and a state. The use of value-oriented psychology of management at digital enterprises of the fuel and energy sector will increase their stability, will enrich the culture of digital production and will improve the key performance of supply chain indicators significantly through the use of a psychological factor.

Keywords- *digitalization; supply chain management, psychological management of a digital enterprise; staff stereotypes and values; the RFID*

1. Introduction

Radio frequency identification technology is a remarkable business tool for many aspects of business including Supply Chain Management (SCM). RFID is a growing technology that enables close cooperation of the supply chain partners by real-time information visibility. The urgency of the problem is determined by

the fact that at the present stage of the global development, the world has entered the phase of new relation development in the digital economy format [19]. The personnel of the digital enterprises of the fuel and energy sector began to work in the virtual environment characterized by special psychological relations, the management of which requires the development of practice-oriented psychological management. If earlier the problems consisted in technical and technological issues of digitalization, now they are moving to the psychological plane [14], and on the plane of cultural transformation in the digital environment[13].

Until recent period, the classical psychology making the basis of enterprise management did not encourage the research in the framework of virtual, digital psychology. Thus, the personnel of digital enterprises and the management they use have not received an adequate psychological equipment, although this trend of psychological science development is recognized as relevant [5]. Nowadays, the modern psychology of digital enterprise management, adequate to the virtual challenges of globalization, is developing abroad and begins its development in Russia. Developing on the virtuality paradigm [9], it requires scientific and practical understanding [8 10], the development and practical approbation.

The proper effect of the digital enterprise functioning within the fuel and energy sector is achieved only if the value guidelines of the personnel and the organization are psychologically compatible, interconnected and focused primarily on the achievement of the highest goals of the people's spiritual culture. The economy of the fuel and energy sector and the psychological management of digital enterprises are only the means of the highest goal achievement within the spiritual culture of people, also through the successes conditioned by digitalization.

Another important reason for taking into account during the development of modern psychology of digital enterprise management, embedded in the subconscious sphere of people, is that the fuel and energy sector, as an economic system, and its digital enterprises in all their diversity, are nature-oriented. The peculiarity of the personnel psychology from the fuel and energy sector is conditioned by the fact that its subconscious sphere is based on the feeling of dependence on the natural resource and environmental conditions of life activity. This dependence is fundamental in the formation of the psychological portrait of the digital enterprise staff within the fuel and energy sector. It affects the formation of an

adequate psychological portrait of society and its reaction to the environment natural state changes concerning the activity of the population endowed with the psychology of the natural person.

The active use of digital technologies in the work of the fuel and energy sector leads to the changes affecting the way people interact with each other, and with the surrounding real and virtual world. Digital companies change the rules of competition by activity sectors [17], there are the issues of artificial intelligence technology introduction [18]. They change system of cultural experience development in production as a whole, the traditional ways of thinking and the classical psychology of management.

The psychological management of a digital enterprise, passing the stage of formation, is based on the idea of management subject psyche heterogeneity, used in the form of independent, non-reducible component set. The psychological management is based on a new virtual psychology that has theoretical models, experimental technologies, an own sphere of their constant practical application and improvement [6].

The psychology of digital enterprise management arises there in its economic and social activities, where the interaction of the relationship subjects is mediated by electronic data carriers. It characterizes the psychological phenomena that are available for observation, generated by people ideas about this activity, and uses them in management. The staff of a digital organization has psychological attitudes and guidelines to the work in the digital environment of the virtual space, based on the values of people and state.

The personnel of a digital enterprise within the fuel and energy sector is the object of psychological management in fact, since it uses information technology and acts as a subject of virtual interaction. Therefore, a digital enterprise should apply the psychological tools of personnel management using information technologies in all spheres of its activity: production, exchange, business processes, marketing, in the interaction with customers.

The subject of management psychology activity for digital enterprises within the fuel and energy sector should be such aspects as the psychological components of staff activities working in a virtual digital environment; the models, the stereotypes and the target attitudes of personnel behavior regarding the activities in which the interaction of subjects is mediated by electronic information carriers; communication and communication process of digital enterprise personnel in a virtual environment; the psychological relationships of staff that affect the state of the organization business climate; the process of the digital enterprise personnel socialization in conditions when its interaction between themselves and society is mediated by electronic information carriers.

In practice, virtual reality interacts with the reality that generates it in the activities of digital enterprises, such as the interaction of real and virtual sectors of the economy.

Working in the digital environment, the personnel of an enterprise falls on a certain, short time, exhausted

by the performance of specific functions in the environment that is not standard for it, which goes beyond the conditions of ordinary activities. The moment of transition from real activity to virtual one is the event for the staff, which is always experienced as unusual, unconventionally controlled by will and consciousness. In such cases, staff needs to instill the sense of ability to adapt to the transition from the real environment of activity in the virtual one, without the loss of time and psychological equilibrium. The psychologically adaptive staff of a digital enterprise with the necessary skills to adapt to a changing environment experiences a virtual event as a pleasant, energizing, creatively interesting one in the process of upcoming activities.

The basis of psychological management should be the spiritual values of people, affecting the development of the digital culture of managers and all personnel implementing decisions [3]. Digital culture has an impact on the set of emerging sustainable socio-psychological traits and personality traits. On its basis, the adoption or non-acceptance of certain stereotypes of behavior in the digital environment of enterprises within the fuel and energy sector and the consolidation of various habits of network communication and the work with specialized information take place [7].

The study showed that the diversity of behavioral psychologies is conditioned by the diversity of economic systems. The amount of economic systems is equal to behavioral psychologies with the features appropriate to them. In this regard, the choice of management systems that fully takes into account the psychological characteristics and value reference points of enterprise personnel operation at fuel and energy sector is of fundamental importance. Without taking into account the totality of interrelated psychological factors, the development of effective mechanisms for the management of digital enterprises becomes impossible. The enterprises of the fuel and energy sector develop the personnel with psychological attitudes to the activities in a virtual environment generated by human psyche, combined with work in reality and a new system of psychological relations is being built that requires the use of effective management mechanisms.

2. Literature Review

Primary purpose of supply chain management (SCM) is effectively integrating the information and material flows within the demands and supply processes between suppliers and end customers, including manufacturers, distributors, retailers, and any other enterprises within the extended supply chain, with the special goal of adding value to the customer. Russia has adopted the Industry 4.0 Program, which is being systematically implemented in the real sector of the economy, taking into account its prospects and development opportunities. This requires special attention to the psychological adaptation of its employees to the conditions of digitalization, the use of management technologies of psychological management [11].

The problem under consideration has received some attention in foreign and domestic literature. Foreign scientists, conducting a philosophical study of virtual reality, focus on the changes in man and society that occur under the influence of virtualization, without a deep plunging into the psychological factors of change and their use in management. So, for example, the book by B. Fogg [20] analyzes the psychology of communication in virtual reality. In research carried out by Italian and Spanish experts Riva et al., Banos et al. [1], [12] the attempt was made to develop a virtual environment conducive to the development of specific emotions in a person. However, we could not find any scientific research directly revealing the problems of psychological management use in personnel management working in a virtual and real environment at digital enterprises.

Russian scientists study digital culture (Gnatyshina E.V. and Salamatov A.A. [3]), the changes in personal and public consciousness, analyze the development of digital technologies and speak about the future of new virtual psychology (Nestik T.A. [8]), make the predictions about the changes in psychology practice and science (Yurevich A.V., Zhuravlev A.L., Nestik T.A. [5]). In a broader psychological aspect, virtual reality is considered by the representative of Russian science, N.A. Nosov [9], who is the founder of psychological management. A number of modern researchers (Tolstoy T.O., Dmitrieva E.V., Lyadova N.I.) revealed the presence of specific, significant differences in the work of enterprises before digitalization and the digital enterprises of the modern economy [16]. As further research shows, these differences affect the psychology of digital enterprise personnel.

At the same time, scientific and practical issues related to the problems of working with personnel in a virtual and real environment, solved by the psychological management at the enterprises of the fuel and energy sector, have not received due attention yet both abroad and in Russia.

3. Materials and methods

To solve this production management problem, automated data acquisition is necessary in order to enable the flow of required information to everyone who needs them through integrated enterprise system and supply chain. Situational, structural and dynamic analysis was the leading method, which allowed to study the psychology of a digital enterprise management within the fuel and energy sector, the changes in time and space, in close connection with other phenomena. The systematic approach was applied during the evaluation of a digital enterprise psychology management state.

4. Results

Coordination, integration and particularly sharing information in real-time about resource constraints, plans and schedules with other supply chain members are very important. The practical use of digital psychology allows to improve the efficiency of

personnel management by activating the psychological factor, making it value-oriented, more adaptive and confident in work. Without taking into account the psychological factor, it is almost impossible to develop the effective mechanisms of a digital enterprise management.

The need to use the psychological tools of personnel management is conditioned by the fact that a digital enterprise has a special system of psychological relations, connected not only with its development as an organization, but also with the development of society as a whole. The digital enterprises of the fuel and energy sector, as a modern form of production organization, develop the personnel, with an appropriate behavioral psychology, which manifests itself not only in the process of its professional activity, but is also transferred to society, receiving cultural, value-oriented assessments from it and correcting a person psychological behavior.

In the future, within the conditions of accelerating digital changes at the enterprises of the fuel and energy sector and high uncertainty, psychological management technologies will be increasingly demanded, aimed at psychological support provision for the staff value and sense orientation [8].

The activity of the digital enterprise personnel is carried out at the junction of the usual, everyday, material and virtual psychological reality, which is generated by the human psyche. At that the consciousness, the subconscious and the will of the staff to their goal achievement are the reality related to the virtual being - the being of a special form, which has its own time, space and the laws of existence that are not fully understood yet. The management psychology of a digital enterprise, based on the people value orientations, should use the tools that constrain the erosion processes of the collective moral platform. Despite the total digitalization of the enterprises within the fuel and energy sector and a great demand for experts who can work better with the information in a virtual environment, it is necessary to preserve the core of the company intellectual potential. It should consolidate comprehensively developed personnel, with a stable psyche, capable of continuous development, the understanding of not only sectoral problems, but also a universal picture of the world, sensitive to the problems of being and possessing the skills of a researcher in relation to own professional activity [2].

5. Discussion

Let's consider the most important issues arising during the use of psychological management, as the relationship of management and management subject psychology; the channels of psychological impact on digital enterprise personnel; the psychological mechanisms of personnel socialization and the factors influencing their psychological behavior; psychological safety management of digital company personnel.

The relationship of management and a digital enterprise management subject psychology

The developed psychological type of an employee (a management subject) of a digital enterprise determines the use of psychologically specific management techniques. The management of a digital enterprise must adapt to the psychological type of a worker to whom it is directed. And, conversely, the psychological type of a worker, to whom the management is directed, must adapt to the management.

An important component of digital enterprise personnel management psychology is the establishment of influencing communication channels. Through the channels of influence, the information is provided that is necessary for personnel management on the psychological structure of workers, satisfying their professional needs at a digital enterprise. At that, the image of the management personnel wishes is important, formed on the basis of their special psychological attitude. Such a desire model is important for it, which would reflect the expected behavior of the subjects, which allows them to orient the psychological management accordingly.

5.1 The channels of psychological impact on digital enterprise personnel

The most of available literature about RFID technology is focused on application of RFID technology for warehouse management and supply chain management. Let's single out the main communication channels of psychological management, the use of which allows you to transfer information to an individual psychological structure. These are the channels of the subject - subject, the subject - object and transpersonal influences.

The main features of the subject - subject influences are the following ones: indirect, hidden influence on operational events; a deep penetration into the management subject; a significant psychological transformation of management subject.

The characteristics of the subject - object effects that dominate the psychological management of a digital enterprise are the following ones: obvious, visible influence; not deep, superficial impact on psychology. The new relationships that arise as a result of this are tested by empathy. Empathy is directed at the reference group exclusively and generates a subject - object feedback as the reaction, in which the manager is viewed by the management subjects as a "robot-like" object.

The specificity of the transpersonal impact is that it is based on interpersonal communication, on the skillful penetration into the personal world, the phenomenological field of another person, which allows him to see the essential ideas about reality.

The operation of these communication channels should be taken into account as a real factor affecting the psychology of personnel and during the development of digital enterprise psychological management strategy. An important factor is the psychological aspect of digital enterprise personnel socialization.

5.2 Digital enterprise personnel socialization

In the process of digital enterprise development, the introduction of digital technologies and digital

transformation of company business processes [15], their own system of psychological relations is being developed. A digital enterprise, in accordance with its mission and the established functioning environment, forms the corresponding activity subject with an adequate behavior psychology. The psychological attitudes of personnel behavior are fixed in the process of its socialization, through various socialization institutions. They are external to the personnel mental world and influence actively the perception and the assimilation of socially-oriented information by them. Recently, digital enterprises of an institution, organizations, informal groups, mass media, communications, and social thought, that is, the elements which are less regulated by the state, act as the basic social institutions of personnel.

5.3 Other factors influencing the supply chain of digital enterprise personnel

The nature of a person psychological behavior as a subject or an object of management can be free or imposed from outside, especially through the system of global process influence on professional and national communities. In the context of globalization expansion and its influence increase on management processes, the external impact on a digital enterprise and the economic system as a whole become dominant.

Personality, as an individual and a professional, determines by his behavior the nature and the psychological attitude of the relations developing in the process of interaction between the digital enterprise personnel. In this regard, the factor of accounting for the ontological complexity of a person structure working in a virtual digital environment plays a special role in psychological management.

In order to make a person fit into a certain system of a digital enterprise vital activity, he needs to transform his psychological orientation, to go through all socialization stages.

The level of psychological readiness to work at a digital enterprise, indicating the extent and the depth of staff socialization, is determined by the results of its socialization, which have a serious impact on psychological behavior. The socialization results are largely dependent on the staff subjective perceptions concerning the interaction of digital and actual reality, which are necessary for an employee to implement business relations related to the performance of his functions. Such ideas are fixed in the minds of staff in the form of standards, in accordance with which they assess the behavior of other participants of virtual and real relationships which emerge at digital enterprises. These standards are used as the "measure" with a comprehensive assessment of surrounding colleagues, starting with their values and ending with the way a digital enterprise of the fuel and energy sector should look and behave.

Stereotypes play a certain role shaping the model of worker psychological behavior, which they use in difficult decision-making situations. Stereotypes are simpler than innovations in management and therefore it is possible to "hide" behind them when there are no new ideas for a problem solution.

For example, in China [4] they are one, in the USA, others. This affects opportunities and risks.

Thus, the considered factors can make a significant impact on the psychological behavior of the personnel of digital enterprises within the fuel and energy sector and should be used in management psychology to achieve their goals.

5.4 RFID and supply chain management

Information technology has been recognized as an issue of vital importance for RFID system to support supply chain management (SCM) (Angeles, 2009). Zhou (2009) presents different perspective by modeling item-level information visibility in general, unlike most of case study papers about RFID. Various enterprises use RFID to achieve organizational change and manage growth in today's competitive environment

5.5 Psychological safety management of digital company personnel

Psychological technologies are used by competitors at various levels of management, in the struggle for the possession of resources. They are implemented through culture and politics, with the inclusion of a wide network of foreign and domestic organizations in the process of influence. The use of supra-system psychological impact technologies on personnel is closely connected with the information space. It is a significant part of the environment in which such technologies are formed and implemented that affect the society as a whole, an integral part of which are the workers in various spheres of life, including the fuel and energy sector. In order to protect against an unauthorized use of such technologies in relation to economic systems and society, the mechanisms should be used to support self-organization in society and corporate culture.

The provision of a digital enterprise staff psychological safety within the fuel and energy sector is achieved through the implementation of a set of measures, nationwide and corporate in nature, involving the reliable protection of the employee psyche and strengthening their mental health, emotional balance, healthy thinking and behavior, as well as the awareness of the need for the implementation of the appropriate actions by the employees of digital enterprises. Psychological security is characterized by the absence of the influence threat on the consciousness and the subconsciousness of an employee in competitor interests.

6. Conclusion

The most applications of RFID in supply chain management currently take advantage of the technology with the objective to accelerate processes and reduce costs, but the real RFID features are found in capturing new types of information in real-time and supporting decisions. The study showed that the diversity of behavioral psychologies is conditioned by the diversity of economic systems. In connection with the diversity of economic system types, the choice of management systems adequate to them, which fully takes into account the psychological characteristics and

the value orientations of functioning, becomes fundamental. The use of value-oriented management psychology at digital enterprises within the fuel and energy sector will increase their stability, enrich the culture of digital production and significantly improve the key performance indicators through the use of the psychological factor.

Despite the revolutionary development of information technology, the use of a virtual environment for working with information, a person remains the main subject of a digital enterprise. His subconscious sphere - the deep layers of human existence are involved in the digitalization processes more and more. It should be edited with psychological management special methods and techniques in such a way that digitalization processes do not contradict the main values of society life activity.

Conflict of interests

The author confirms that the submitted materials do not contain a conflict of interest.

7. Acknowledgments

The work was prepared with the support of the of the Peoples' Friendship University of Russia. The study was carried out with the financial support of the Russian Federal Property Fund in the framework of the scientific project No. 20-010-00137.

References

- [1] Banos R.M., Liano V., Botella C. "Changing induced moods via virtual reality" Persuasive technology: Proceedings of First International conference on persuasive technology for human well4being (May 2006, Eindhoven, The Netherlands) / Ed. by W. IJsselsteijn et al. // Lecture Notes in Computer Science/ Vol. 3962. Springer, 2006.
- [2] Galazhinsky E. "The things not taught in universities [Electronic resource]" News: site. Electron. data. 2017, August 3 URL: <https://www.vedomosti.ru/opinion/articles/2017/08/03/727760-ne-uchat-v-universitetah>.
- [3] Gnatyshina E.V., "Salamatov A.A. Digitalization and the formation of digital culture: social and educational aspects". Bulletin of the Chelyabinsk State Pedagogical University. 2017. № 8.
- [4] Zhang, M. L., & Chen, M. S. "China's Digital Economy: Opportunities and Risks". // International Monetary Fund. 2019.
- [5] Zhuravlev A.L., Nestik T.A., Yurevich A.V. "Forecast of psychological science and practice development by 2030", Psychological Journal. 2016. V. 37. No. 5. CyberLeninka: <https://cyberleninka.ru/article/n/razvitie-tsifrovyyh-tehnologiy-i-budushee-psiologii>.
- [6] Kozubovsky V.M. "General psychology: methodology, consciousness, activity" Mn., 2008. <https://psyera.ru/psihologiya-virtualnoy-realnosti-1267.htm>.
- [7] Kolontaevskaaya I.F. "Digital culture of an engineer: problems and solutions [Text] / I.F.

- Kolontaevskaya, O.A. Isabekova*” Science 2014: Problems and Prospects: Proceedings of the International Scientific and Practical Conference (Moscow, January 26, 2015). - M.: Griffin, 2015. - pp. 72–76.
- [8] Nestik T.A. “*The development of digital technologies and the future of psychology. The bulletin of the Moscow State Regional University*” Series: Psychological Sciences, 2017, №3. DOI: 10.18384 / 2310-7235-2017-3-6-15. <https://cyberleninka.ru/article/v/razvitie-tsifrovyyh-tehnologiy>.
- [9] Nosov N.A. “*Virtual psychology*” Proceedings of virtual study laboratory. Issue 6. - M.: Agraf, 2000.
- [10] Orlov A. “*10 trends in psychology during 2018*” Trend 10. http://www.b17.ru/article/2018_trends_10/
- [11] Plakitkin Yu. A., Plakitkina L.S. “*Industry-4. 0*” and “*Digital Economy of the Russian Federation*” - Opportunities and prospects in the coal industry // Mining. 2018. No1 (137).
- [12] Riva G., Mantovani F., Capideville C.S. et al. “*Affective interactions using virtual reality: The link between presence and emotions*” CyberPsychology and Behavior. 2007. Vol. 10. N 1.
- [13] Sergeeva I.L. “*The transformation of mass culture in the digital environment [Text] / I.L. Sergeeva*” Culture and Civilization. - 2016. - V. 6. - № 6A. - pp. 55–65.
- [14] Sundberg, L. “*If Digitalization is the Solution, What is the Problem?*” In The 19th European Conference on Digital Government, Northern Nicosia, Cyprus. 2019.
- [15] Tikhanichev O.V. “*The technologies of “added reality” as an element of decision support systems*” Informatization and communication. 2017; (2): pp. 63–65.
- [16] Tolstykh T.O., Dmitrieva E.V., Lyadova N.I. “*The priorities of digitalization at industrial enterprises of the region*”. Proceedings of the 10th International scientific and practical conf. “State and Municipal Management in Russia: Experience, Problems, and Development Prospects” (Voronezh, VF FSBEI HE “RANEPA”, October 27, 2017). Preobrazhensky B.G., ed. Voronezh: Publishing and Printing Center “Scientific Book”; 2017: 200–207.
- [17] Trifonov N.Yu. “*The assessment in modern conditions: from market to user value. Evaluation issues*”. 2010; (4): 54–57.
- [18] Chishti S., Barberis Ya. Finteh: “*the guide to the latest financial technologies*” M.: Alpina Publisher; 2017. 676 p.
- [19] Schwab K. “*The Fourth Industrial Revolution. Trans*”. from English. M.: Eksmo Publishing House; 2017. 208 p.
- [20] Fogg B.J. “*Persuasive technology: Using computers to change what we think and do*”. Amsterdam, 2003.