

UDC 330.341.1:656.2

DIGITALIZATION IN RAILWAY TRANSPORT BY STARTUPS DEVELOPING

PhD (Econ.) I.L. Nazarenko², M. McKay Hoppman²

¹ *Ukrainian State University of Railway Transport (Kharkiv, Ukraine)*

² *Coastal Carolina University (Conway, the USA)*

On May 24 in Davos the first International Diia Summit Brave Ukraine took place as part of the International Economic Forum. The summit brought together for the first time 12 EU Ministers for Digital Transformation, who came to help Ukraine and share their experience [1]. It is obvious that the war has speeded up the digitalization process in Ukraine, in all spheres of activity. Taking into account that Ukrainian rail transport is the backbone of its economy, the main carrier of goods and passengers, its digitalization needs to be accelerated as much as possible.

The rail industry is on a journey towards digitalization all over the world. To achieve its potential to become the preferred mode of travel, rail has to become more competitive in terms of reliability, performance and service models. Digital technology is a key enabler for this change.

The research of railway transport development in terms of digitalization of the economy is carried out by V.L. Dykan, H.V. Obruch, [2, 3], V.V. Kompaniets [4], I.V. Tokmakova [5] and other scientists, whose works identify the prospects for the development of railway transport enterprises (for instance, in [6]). At the same time, the issues of promoting digitalization with limited investment during the war remain insufficiently researched, which is why this paper is devoted to it.

Although the Road Map of Digital Transformation of Ukrzaliznytsia [7] was developed in 2018, it has not been implemented on the whole yet. Some digital services already work in Ukrzaliznytsia, such as buying tickets online, elements of Internet of Trains or Connected Train, and some internal processes are digitalized. But the process of digitalization is impeded by corruption, unwillingness of managers to change business processes, their fear of change and of losing their jobs, and, last but not least, lack of investments.

Therefore, taking small steps with small investments seems to be helpful in this situation. We suggest creating and developing IT startups – agents of change – with brand-new technologies that if implemented can help Ukrzaliznytsia to innovate. These startups can be organized by the IT specialists who are aware of the rail transport processes' specifics and wish to create their own businesses.

We believe that in this case experience of the Indian Railways could be used.

The Indian Railway Innovation Policy will identify and enable Indian innovators to engage with the railways for developing cost-effective,

implementable, scalable solutions and functional prototypes for the national transporter [8]. The railways will invest in startups to get a head start in procuring innovations directly from them with a promise of up to Rs 1.5 crore (approximately \$193000) of seed money for innovative technological solutions for the national transporter, according to a policy paper.

"Since there is a major constraint of capital inadequacy in the startup ecosystem, particularly in the seed and 'Proof of Concept' developmental stage, this policy aims at providing the necessary seed fund support of up to Rs 1.5 crore (on matching contribution basis) to the startups that show the capability, intent and promise to produce functional prototypes, based on new innovative concepts, for potential use of the Indian Railways," a senior official said [8].

The eligible organisations or beneficiaries of the support will include any Indian company incorporated under the Companies Act 1956/2013, primarily micro, small and medium enterprises, and individual innovators. The policy also encourages research and development institutions to apply for the grant. The innovators can apply through a dedicated portal and once chosen for the grant, its disbursement will be linked to pre-decided milestones. The funding scheme has been fixed on a cost-sharing basis in equal proportions –50/50 by the Indian Railways and the innovator. The maximum amount of grant will be Rs 1.5 crore per innovator, even in cases where the total project cost exceeds Rs 3 crore (approximately \$387000).

Under the policy, the innovator will exclusively retain the ownership of the intellectual property rights generated under the project. However, it can be extended to include any associates as joint owners only after obtaining a prior approval from the Railway Board. The railways will retain the government purpose rights, which will be an exclusive, transferable, irrevocable license to use the intellectual property for internal consumption or manufacture. The railways may use the government purpose rights to manufacture either directly or through sub-contractors for its use. In this case, the government will pay a royalty fee for the use of government purpose rights in intellectual property or technology or product.

"With innovation through technology becoming more and more significant in the railways, this policy would mean that we would have innovators vying to make products just for our use. They will be the best and the latest. It is a win-win situation for both the railways and the innovators. While we get the latest technology, they will get the railways as a client," said an official [8].

To sum it all up, we find the aforementioned measures useful and at least partially applicable in Ukraine in Ukrzaliznytsia. Besides, we suggest Ukrzaliznytsia to buy the most shares of startups which survive up to the IPO stage, although brand-new technologies could attract some foreign investors too (railways of the EU and of the USA).

Moreover, we believe that using business incubators to accelerate startups' development and helping them on their way to become unicorns, decacorns and so

on is beneficial and increases the percentage of successful startups, boosting simultaneously the degree of fruitfulness and of mutual cooperation. For example, the eō Business Incubators which are set by the USAID in Kharkiv and Kyiv [9] and which keep working despite the war can help.

The eō Business Incubator is an advanced incubation program for Ukrainian startups based on mentoring. It is a world-class program, but with a single focus - to make Ukrainian startups famous and competitive around the world. They work only with Ukrainian startups, and their mentors and investors from the United States, the United Kingdom, Israel, and other parts of the world are focused and have the experience startupers need to build an international and competitive business.

The program is based on an intensive 4-month schedule, specially designed to help startupers launch and grow their business. During the incubation program, startups will have access to lectures and materials on key business topics from leading experts, entrepreneurs and investors from the United States, Ukraine and the world. Lectures are on a very wide range of topics: from idea formation to attracting investment in the finished product. By joining eō, startupers will also gain access to an international platform, an ecosystem based in Ukraine but connected to the whole world.

Directions for further research include the development of a specific mechanism for interaction between Ukrzaliznytsia and startups (with the help of business incubators) on the way to digitalization.

[1] Pershyi International Diia Summit Brave Ukraine: yak viina pryshvydshyla tsyfrovizatsiiu Ukrainy. 24 travnia 2022. [The first International Diia Summit Brave Ukraine: how the war accelerated the digitalization of Ukraine. May 24, 2022] Available at: URL: <http://www.vin.gov.ua/news/ostanni-novyny/47292-pershyi-international-diia-summit-brave-ukraine-iak-viina-pryshvydshyla-tyfrovizatsiiu-ukrainy>.(accessed 27.05.22)

[2] Dykan V.L., Obruch Gh.V. (2020). Management of implementation of joint investment projects with the participation of railway transport enterprises in the conditions of digitalization [Upravlinnia realizatsiieiu spilnykh investytsiinykh proektiv za uchastiu pidpriemstv zaliznychnoho transportu v umovakh tsyfrovizatsii] *Bulletin of Economics of Transport and Industry*, vol.69, pp. 9–21.

[3] Obruch Gh.V. (2020). Balanced development of railway transport enterprises in the conditions of digitalization of economy: monograph / [Zbalansovanyi rozvytok pidpriemstv zaliznychnoho transportu v umovakh tsyfrovizatsii ekonomiky : monohrafiia]. UkrSURT.. – Kharkiv. 403 p.

[4] Kompaniets V. V. (2018). Conceptual analysis of prospects for digitalization of the economy and railway transport [Kontseptualnyi analiz perspektyv tsyfrovizatsii ekonomiky y zheleznodorozhnoho transporta. *Bulletin of Economics of Transport and Industry*, vol.62, pp. 197–200.

[5] Tokmakova I. V., Cherednychenko O. Yu., Voitov I. M., Palamarchuk Ya. S. (2019) Digital transformation of railway transport as a factor of its innovative development [Tsyfrova transformatsiia zaliznychnoho transportu yak faktor yoho innovatsiynoho rozvytku]. *Bulletin of Economics of Transport and Industry*, vol.68, pp. 125–134. Available at: URL: http://nbuv.gov.ua/UJRN/Vetp_2019_68_15 (accessed 27.05.22)

[6] Nazarenko I.L. Vorobiova A., Pohorilets N. (2021). Increasing the intellectual capital of the car section through digitization. *Proceedings of the 17th scientific and practical international conference "International transport infrastructure, industrial centers and corporate logistics" (June 3-4, 2021, Kharkiv)* [Naroshchuvannia intelektualnoho kapitalu vahonnoi dilnytsi shliakhom tsyfrovizatsii Materialy 17-yi naukovo-praktychnoi mizhnarodnoi konferentsii "Mizhnarodna transportna infrastruktura, industrialni tsentry ta korporatyvna lohistyka" (3 - 4 chervnia 2021 r. m. Kharkiv)]. UkrSURT. Pp. 46 – 49.

[7] Road map of digital transformation of the railway, APPAU version. Rail EXPO [Dorozhnia karta tsyfrovoi transformatsii zaliznytsi, versii APPAU] . Available at: URL: <https://railexpoua.com/novyny/dorozhnya-karta/> (accessed 25.05.22)

[8] Railways to invest in startups; policy promises up to Rs 1.5 crore seed money for innovations *The Times of India* . Available at: <https://timesofindia.indiatimes.com/business/india-business/railways-to-invest-in-startups-policy-promises-up-to-rs-1-5-crore-seed-money-for-innovations/articleshow/91004242.cms> (accessed 23.05.22)

[9] Nazarenko I.L. (2019) The role of business incubators in the development of the startup movement in Ukraine. Proceedings of the XI International Scientific and Practical Conference "European Vector of Economic Modernization: Creativity, Transparency and Sustainable Development" (Kharkiv, May 28-29, 2019). Abstracts of reports. [Rol biznes-inkubatoriv u rozvytku startup-rukhu v Ukraini. Materialy XI Mizhnarodnoi naukovo-praktychnoi konferentsii «Leuropeyskyi vektor modernizatsii ekonomiky: kreatyvnist, prozorist ta stalyy rozvytok», (m. Kharkiv, 28-29 travnia 2019 r.). Tezy dopovidei.]– Kharkiv, KNUBA.

УДК 004.41

ПРОЕКТУВАННЯ ТА РОЗРОБКА ЕЛЕКТРОННОЇ АДАПТИВНОЇ СИСТЕМИ «ВИКЛАДАЧ ОЧИМА СТУДЕНТА»

DESIGN AND DEVELOPMENT OF THE ELECTRONIC ADAPTIVE SYSTEM "LECTURER BY STUDENT'S EYES"

О.Р. Пазюк, к.ф.-м.н. А.В. Соломко

*Прикарпатський національний університет імені Василя Стефаника
(м. Івано-Франківськ)*

O.R. Pazyuk, PhD (Phys. & Math.) A.V. Solomko

Vasyl Stefanyk Precarpathian National University (Ivano-Frankivsk)

В Україні згідно частини першої статті 50 Закону «Про освіту» [1] передбачено атестацію педагогічних працівників. Порядок атестації працівників регулює Типове положення про атестацію педагогічних працівників, затверджене наказом Міністерства освіти і науки України від 06.10.2010 №930 [2]. Педагогічні працівники, які підлягають атестації відповідно до цього Положення, подають заяву про проходження атестації, до якої додаються атестаційні документи, одним з яких є оцінка викладача його студентами. Проведення опитування, збір оцінок студентів та підведення результатів без автоматизованої системи є процесом складним, трудоємким та не завжди об'єктивним.

На сьогоднішній день у більшості навчальних закладів студенти проводять оцінку своїх викладачів, але обробка даних за результатами опитування потребує детального аналізу та часу для формування об'єктивних висновків. Крім того, ускладнюється процес порівняння результатів оцінки викладачів з результатами оцінки відносно попередніх періодів. При проведенні таких оцінок дуже часто студенти можуть завищувати або занижувати оцінку викладача та проходити тест не відповідально, а результати опитування не завжди проходять систему об'єктивного аналізу вихідних даних.