Evgeny Kanaev, Rebecca Darnell, Dinh Le Hong Giang

VIETNAM'S HIGHER EDUCATION AMID THE FORTHCOMING FOURTH INDUSTRIAL REVOLUTION*

Abstract

Facing the profound transformations generated by the forthcoming Fourth Industrial Revolution, the Socialist Republic of Vietnam (SRV) may not turn out to be among its beneficiaries. The research question of this paper is why Vietnam's system of higher education is not able to effectively respond to the challenges resulting from the disruptive technologies. While selective aspects of this problem have been captured by K. Schwab, G. Sheridan, D. Taglioni, M. Hayden, S. Ryazantsev, N. Kuznetsov, Huynh Phu, Le Thi Kim Anh, Nguyen Hong Minh and other researchers, a cutting-edge study focusing on the ability of Vietnam's education system to timely and comprehensively respond to the upcoming transformations has been absent thus far. The academic novelty of this paper is its analytical prism linking the identification of the presumed repercussions of the Fourth Industrial Revolution upon Vietnam with the readiness of the SRV's system of higher education to make use of them to the country's greatest advantage.

The approach to the research question represents the synergy of qualitative and quantitative methods. The study is founded on primary sources and includes materials published by the SRV's Ministry of Planning and Investment, the Central Committee of the Communist Party of the SRV, Vietnam's higher education institutions, speeches and interviews with Vietnamese government officials, and statistical data.

The principal findings of the study represent the identification of the potential of Vietnam's higher education system to meet the challenges stemming from the

* The article is an outcome of the project "Business Success in the ASEAN Market: Perspectives for Russia".

Fourth Industrial Revolution, while taking into account its accumulated shortcomings and the present preparedness to be involved in the worldwide digital teaching and learning environment.

Keywords: Vietnam, Fourth Industrial Revolution, challenges, higher education, MOOCs.

Introduction

The Fourth Industrial Revolution has become a crucial factor behind the on-going evolution of the world. According to Klaus Schwab, the founder and chairman of the World Economic Forum, the Fourth Industrial Revolution follows on the heels of the Digital Revolution (the Third Industrial Revolution) by expanding upon previous technologies, such as computers and the Internet, in order to integrate them within the physical, digital, and biological spheres of society [Schwab 2015]. Framing a proper response to the pending changes has become a task of immense significance that will determine not only the course and nature of its evolution in a particular country, but also its future position in the global and regional rankings. Vietnam is a cautionary example, as digital technologies may consolidate the long-standing socio-economic problems the country encounters rather than offer it considerable benefits. Moreover, Vietnam is increasing its investment attractiveness within *the present* (*emphasis added*) paradigm of regional and global development, but in the strategic perspective, it might be deprived of the benefits generated by the Fourth Industrial Revolution. Tracing the Vietnamese dimension of the Fourth Industrial Revolution by placing an emphasis on the response from the SRV's higher education system is a timely and relevant exercise as it might be instructive for other countries facing similar problems.

Starting with the outline of the problems the Fourth Industrial Revolution poses for Vietnam, the paper assesses the efficiency of the response coming from Vietnam's higher education sector to finally turn to discussing the prospects for Massive Open Online Courses (MOOCs) in Vietnam's educational practices. The conclusion summarizes the foregoing analysis.

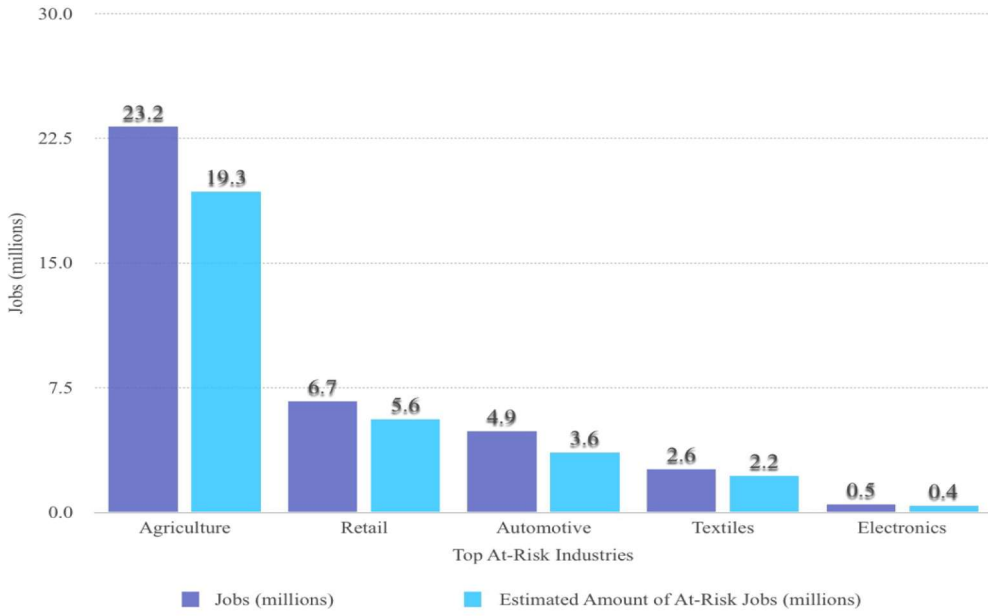
1.The Fourth Industrial Revolution and Vietnam: Identifying the Problem

In Vietnam's case, one positive aspect of the Fourth Industrial Revolution is that the number of self-employed workers will increase. Micro, small, and medium-sized enterprises can expand their sources of investment, which will partially resolve the problem of employment. This is especially important since

these enterprises comprise about 50 % of Vietnam's GDP [Phát triển doanh nghiệp: 27.12.2016]. Furthermore, technologically advanced, early warning, and search-and-rescue equipment enhances the possibilities to relieve the consequences of the natural disasters that are a common occurrence in Southeast Asia. According to the World Bank's estimates, in the next fifty years, Vietnam will face up to 6.7 billion dollars in damages due to natural disasters [Natural Disaster: 16.11.2016].

On the negative side, however, Vietnam faces the real prospect of mass unemployment as automation spreads to the industries that comprise the cornerstone of Vietnam's economy. Innovations associated with the Fourth Industrial Revolution, such as automation (Manufacturing, Retail, and Agriculture) and 3D printing (textiles, electronics, automotive), threaten low-skill, labor-intensive work (Figure 1). For example, a study by the International Labor Organization considers 86% of the jobs in the textile industry to be at risk. As 2.6 million people were employed in the textile industry in 2016 [Huynh, Arana 2016: 1], this results in an estimated 2.2 million jobs being placed at-risk of unemployment in this single industry alone.

Figure 1. Estimated Amount of Jobs at Risk of Automation in Vietnam (Based on 2016 Estimates)



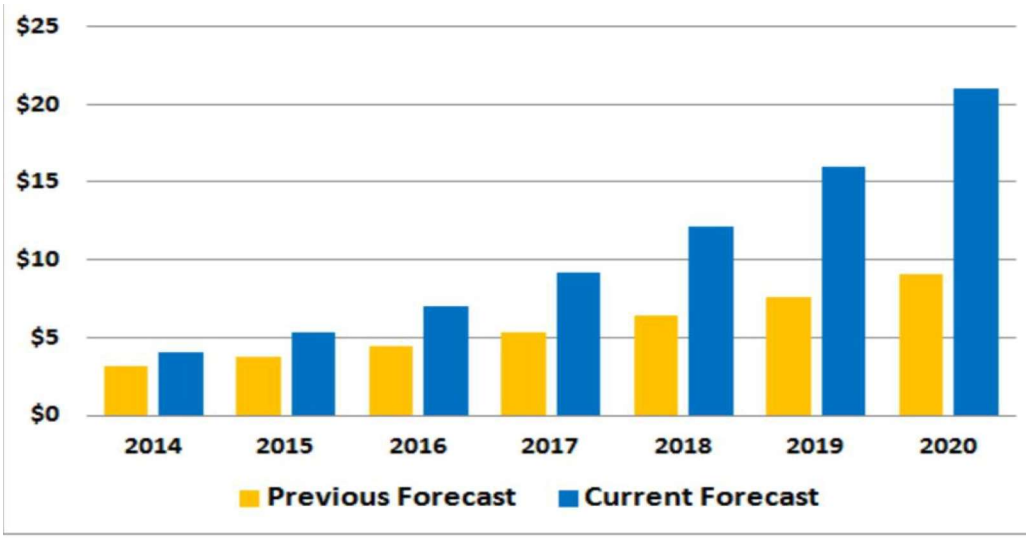
Sources: Chang J.H and Huynh P. (2016). ASEAN in Transition: The Future of Jobs at Risk of Automation. *Bureau for Employers' Activities, Working Paper* No. 9. *International Labor Organization*. URL: http://www.ilo.org/public/English/dialogue/actemp/downloads/publications/2016/asean_in_transf_2016_r2_future.pdf; (2016) Employment in agriculture (% of total employment) (Vietnam). World Bank Data Catalog. URL: https://data.worldbank.org/indicator/SL.AGR.EMPL.ZS; (2016) Number of employed people in Vietnam in 2016, by industry (in 1,000s). *Statistica*. URL: https://www.statista.com/statistics/615802/employment-by-industry-vietnam/; General Statistics Office of Vietnam 2016. URL: https://www.gso.gov.vn; Huynh P., Arana R.D. (2016) ASEAN in Transformation: How Technology is Changing Jobs and Enterprises. *International Labor Organization*. URL: http://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/---ilo-hanoi/documents/publication/wcms_537822.pdf

Since its introduction in the 1980s, 3D printing has developed beyond its initial prototyping function to include the production of finished goods, and the growing list of raw materials available for printing continues to increase [BCG Perspectives: 26.09.2013] (Figure 2). Coupled with the nearly 90% decrease in costs associated with 3D printing, it has become more accessible than ever [Bamber, Brun 2017: 5]. It is upon this base that Vietnam is beginning to develop its 3D printing capabilities. 3D printing simultaneously offers opportunities and challenges for Vietnam. In terms of possibilities, 3D printing has a multitude of usages, including in the spheres of biotechnology, electronics manufacturing, and product design with production costs decreasing. At the same time, 3D printing offers a dangerous challenge to Vietnam's current manufacturing model as the economic benefits of outsourcing the manufacturing of goods overseas to countries like Vietnam will become less profitable. There is a very real risk that the manufacturing base that helped propel Vietnam's economic growth could dry up and leave.

To make matters worse, the intra-ASEAN cooperation, upon which Vietnam increasingly places more emphasis, has to radically reset its content and institutional parameters as new issues are emerging. If an enterprise from one ASEAN country buys a blueprint from another country, distributes it by means of 3D printing, and then something goes wrong, who should bear the legal responsibility? How can the trade in medical services be reconciled with maintaining medical confidentiality? How can the rise in the trade of virtual goods

and services be harmonized with taxation and the social protection of employees? How often should the legal base of ASEAN economic regionalism be amended? These questions are critically important for Vietnam due to its eagerness to integrate in both global and regional multilateral platforms, as outlined by Vietnamese top leadership [Ho Chi Minh Academy: 01.02.2017].

Figure 2. Worldwide 3D Printing Industry Forecast, Billions



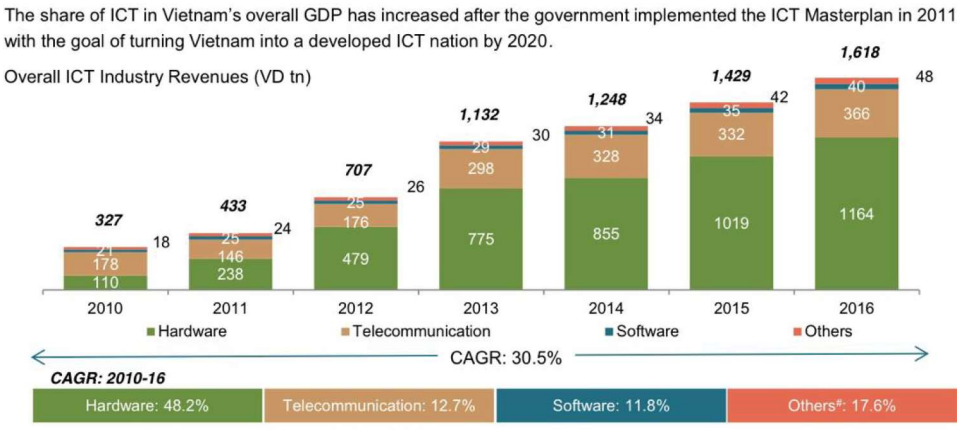
SOURCE: WOHLERS ASSOCIATES, AUTHOR'S CALCULATIONS.

Sources: Columbus, Louis. (2015). 2015 Roundup Of 3D Printing Market Forecasts and Estimates. *Forbes*. URL: https://www.forbes.com/sites/louiscolumbus/2015/03/31/2015-roundup-of-3d-printing-market-forecasts-and-estimates/#148289e61b30

But the key reason for concern stems from an imbalance generated by two priorities that may come into conflict with one another. A study conducted by the Asian Development Bank Institute reveals a pending strategic trap for the Vietnamese economy. Under the current circumstances, the upcoming Fourth Industrial Revolution brings up the issue of increased preparation in order to efficiently perform *cognitive tasks* while remaining open to international trade, which has prioritized *the manual tasks* (*emphasis added in both cases*). Both of them are within Vietnam's comparative advantages in the present division of international labor.

This is all even more likely since the digital infrastructure in Vietnam remains underdeveloped (Figure 3). Vietnam has five internet cables connecting it to the world wide web, and one of the most important of these cables (the Asia-America Gateway) is unreliable and suffers outages [Oxford Business Group 2017]. Although Vietnam has been identified as a potential IT hotspot, with the information and communications sector (ICT) possessing a compound annual growth rate of 30.5% since 2010 [The Asian-Oceanian Organization 2017: 176], it will be difficult to capitalize upon these advances without the proper infrastructure.

Figure 3. The SRV's ICT Industry



Source: Ministry of Information and Communications, Vietnam

Note: Segmental percentage shares for 2016 are kept similar to 2015 splits due to unavailability of data.

#Others consists of Digital content and gaming

Sources: Reimagining the Digital Era: Digital Transformation Agendas & Initiatives within the Asia Pacific Economies (2017). *The Asian-Oceanian Computing Industry Organization*. URL: https://witsa.org/wp-content/uploads/2017/08/ASOCIO_Consolidated_24Aug17_Finalrevised.pdf.

A notable example of the SRV's response occurred in May of 2017, when Prime Minister Nguyen Xuan Phuc issued Directive No. 16/CT-TTg about the necessity of developing a strong IT base in the country including 4-G and 5-G technologies. But as things currently stand, Vietnam's internet speed is not fast: on the global scale, Vietnam's broadband is ranked 56th due to its slow average download speed of 24.85 Mbps, which is well below the world average of 40.11 Mbps [Speedtest: 11.2017]. Owing to digital infrastructural barriers, the Internet

population penetration, while growing, is still hovering around 50% [International Telecommunications Union 2016].

The aforementioned factors suggest that under the present trends, Vietnam will hardly find its place among the beneficiaries of the Fourth Industrial Revolution. The extent to which the situation may be rectified depends upon the capacity of Vietnam's system of higher education to respond to the emerging challenges.

2. Vietnam's Higher Education: A Triple Trap

In retrospect, Vietnam's division in 1954 gave rise to the establishment of the Soviet system of higher education in the northern part of the country. After the re-unification of Vietnam, it was extended across the whole SRV and made an invaluable contribution to the SRV's economic development and human resources training [Ryazantsev et al. 2009: 32]. After the start of the Doi Moi policy, however, profound reforms were implemented. The Prime Ministerial Decree № 90/ND-TTg in 1993 allowed the establishment of private institutions financed by community organizations. State guarantees to provide graduates full-time and sufficiently-paid employment were abandoned while tuition fees for university education were imposed.

Follow-up measures included the Higher Education Reform Agenda (HERA) and the Higher Education Law, drawn up in 2005 and 2012, respectively. In the former case, the Vietnamese government's goals are to increase enrollment rates in higher education institutions, to increase the quality of the education system, to introduce and reinforce research in universities through better training for teachers, and to improve the higher education and research system at both the national and regional levels [Sheridan 2010: 2]. The Higher Education Law reaffirmed that the core of the Vietnamese national policy is to develop the human resources needed for the country's move towards a knowledge-based economy in the future [Luật Giáo dục: 2012]. Universities were given an autonomous status, meaning that they are free to decide their own financial regulations, determine enrollment quotas,

implement their own education programs, assess study results, and recognize graduates. As of August 2017, the SRV Ministry of Education and Training listed 235 universities with 1.8 million students [Những con số: 11.08.2017].

The results of these reforms, however, have been mixed at best. With the benefit of hindsight and strategic perspective, ample evidence suggests that the SRV's higher education is caught in a triple trap.

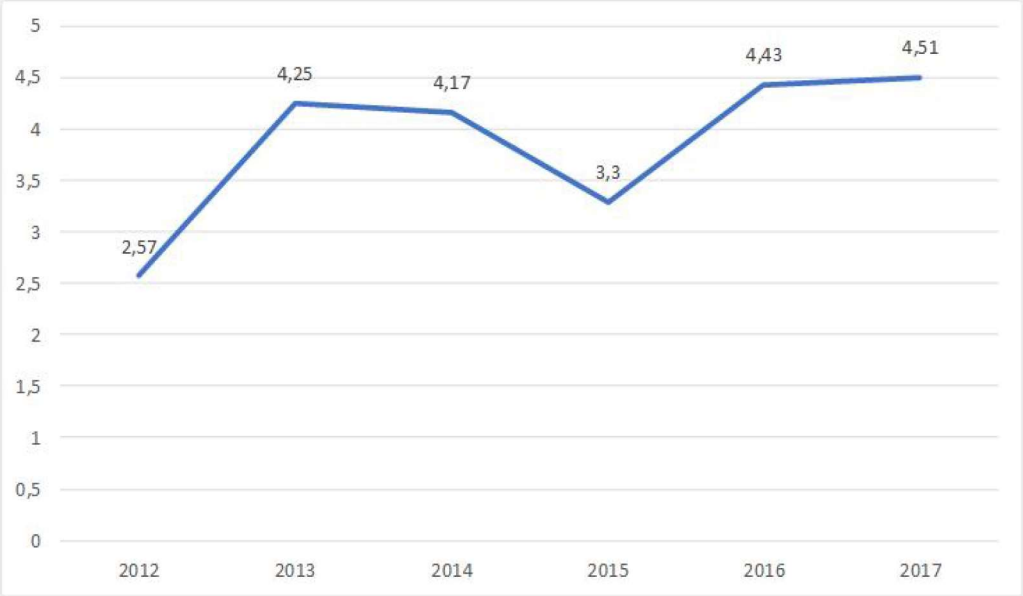
The first trap is an imbalance of the on-going realities with the practices and priorities of the past. The challenges posed by the Fourth Industrial Revolution must be addressed quickly, and maximum adaptability has become a key prerequisite for success. In the Vietnamese educational practice, however, many universities are constrained in terms of decision-making autonomy as far as research, funding, and staffing are concerned. University councils lack real independence, and rectors are appointed rather than elected [Nguyễn Minh Thuyết 2014]. Coupled with the endless coordination of financial adjustments between government agencies related to higher education and underdeveloped research infrastructure, this makes it difficult, if at all possible, to research the urgent topics generated by the Fourth Industrial Revolution.

This problem is reflected by the inability of Vietnamese universities to respond to the rise of unemployment among graduates (Figure 4). As shown by the unemployment rates during the first quarter of 2017, the average unemployment rate was 2.09%, and the graduate unemployment rate was even higher [Le Thi Kim Anh, Hayden 2017: 83]. This sufficiently demonstrates both the inertia of the present educational system, which remembers the 'good old times' of guaranteed employment for everyone that had a university degree, and its feeling of self-complacency in regard to the future.

The second imbalance is between research and teaching. Vietnam's researchers produce only a few peer-reviewed publications in international academic journals. In 2016, Vietnam produced only 5563 documents that were included in the SCImago Journal and Country Rank database (in comparison,

Japan's and South Korea's figures are 121262 and 78660, respectively) [SCImago 2016]. Among the reasons, apart from a relatively-insignificant percentage of the budget being invested in research, poor coordination between research institutes and universities, the root of the problem lies in the widely spread perception amongst the Vietnamese academic community that their main objective is teaching. Private universities offer better salaries and do not require first-rate publications, which causes the academic staff in Vietnamese public universities to take several part-time jobs as a means to have a supplemental source of income at the expense of both fundamental and applied research.

Figure 4. Rate of Unemployed University Graduates in Vietnam (%)



Source: Data obtained from Institute of Labour Science and Social Affair, Ministry of Labour – Invalids and Social Affairs. Socialist Republic of Vietnam. URL: http://www.ilssa.org.vn

The third imbalance relates to the need to internationalize both Vietnam's higher education and the real feedback received thus far. While in 2016, the top SRV leadership pledged to "Take full advantage of international cooperation and assistance, absorb knowledge, especially management, science and technology knowledge" [Overall strategy: 31.01.2016], the extent to which Vietnam strives to perform this task can be seen from its participation in the professional network, the Asia-Pacific Quality Network. Vietnam is represented by several institutions,

including the Hanoi National University of Education. As of late December 2017, the latest information on the English version of this institution's website was from October 2015; in the "Conferences and Workshops" sub-section of the "Collaboration" section, the latest information was dated December 2014. The "Projects" section was empty [HNUE 2017].

In sum, Vietnam's higher education system is encountering a double burden; it must rectify the current imbalances while simultaneously responding to the challenges presented by the Fourth Industrial Revolution. Both tasks should be implemented under severe time constraints.

3. MOOCs as Part of the Response: An Interim Assessment

Among the responses from Vietnamese educators, of note are suggestions made by Dr. Nguyen Hong Minh of the General Department of Vocational Training in the SRV's Ministry of Labor, who emphasizes creating favorable conditions for the digitalization of the learning process [Nguyen Hong Minh 2016]. In these circumstances, the potential of online education exemplified by Massive Open Online Courses (MOOCs) is worth exploring.

Though a relatively new undertaking, the MOOC is becoming increasingly popular as an educational tool. It is a platform of online courses that embraces a large audience (massive), welcomes any person with a good internet connection (open), travels far beyond the traditional classroom (online), and offers a sequence of academic and practical activities unified by educational logic in order to produce internally completed learning outcomes (courses). From the educators' perspective, institutes and universities may promote their brands in the international education community with the subsequent commercialization of education programs. Professional interests, including shared services to attract and enroll applicants, joint research and exchanges of experience regarding how to best use online resources and prepare specialists able to meet the requirements of the Fourth Industrial Revolution also drive the development of MOOCs. As far as students are concerned, studying online allows them to listen to lectures delivered

by internationally renowned professors while bearing relatively low, if any, financial expenses. The certificate for completing a MOOC course (or a set of courses) offered by a prestigious university is a good asset for a future career.

In the Vietnamese educational practice, however, the MOOC as an educational instrument remains underdeveloped. The lack of guidebooks, instructions and guidelines is conspicuous. The usage of foreign MOOC courses in Vietnamese universities is still in its infancy, while these universities themselves produce conspicuously few MOOCs. FPT University, one of the leading education establishments in Vietnam, just started a MOOC project in May 2015, but open access is only available for a limited number of learners (at present, only for FPT students) [Mở và miễn phí: 02.01.2016]. To explain the key reasons, several points are worth noting.

Vietnam's system of higher education has traditionally prioritized classroom activities. Concerning MOOCs, this creates a problem from the perspective of educators and learners. Educators worry that online teaching will make 'live' lecturing useless, so they will lose the academic hours necessary for full-time employment and, consequently, their income. The lack of guidelines understandably raises questions. For example, a leading Vietnamese expert with an internationally renowned reputation may think: "Suppose that ten thousand students choose my MOOC course (a popular online course run by an eminent professor can be chosen by even more students). Does this mean that I will have to supervise ten thousand dissertations? If my assistants help me, will this generate dissatisfaction from those enrolled in my course, as it is advertised as being run by a leading figure in this particular sphere (while the assistants are not mentioned for understandable reasons)? As long as these questions remain open and unanswered, burning enthusiasm is unlikely to appear.

From the students' perspective, the situation is also far from optimistic. Formed by the teacher-centric and student-centric system of education, the students in Vietnamese universities are accustomed to "face-to-face" interaction with their

professors and administrative staff, which results in the lack of the students' discipline.

On the whole, in order to succeed in Vietnam's educational practice, MOOCs must adopt the legal regulation of this type of online educational activity and convince professors and students that it is in their advantage to develop on-line education. At present, all these components are missing

Conclusions

The analysis of Vietnam's higher education system in the context of the upcoming Fourth Industrial revolution reveals several conclusions. While Vietnam is implementing reforms in the education sector and upgrading its digital infrastructure, it still lags behind the developments generated by the disruptive technologies instead of taking advantage of them. The scale and tempo of incipient changes can rock the very foundations of Vietnam's developmental paradigm upon which the country's economic success stories have been premised.

The contribution that the SRV's higher education system can make in order to overcome these problems remains modest. The system encounters serious long-term challenges while, as exemplified by MOOCs, new teaching and learning trends are slowly earning their place in the Vietnamese educational practice.

The biggest challenge for SRV's system of higher education lies in its conservative mindset regarding the development of human resources. The increasingly urgent tasks are to realize the current shortcomings (including those identified in this paper) and to substantially upgrade the conventional approach to teaching and learning.

Reflecting on Jack Ma's quotation that artificial intelligence "will cause people more pain than happiness" [Alibaba Founder: 24.04.2017], there is little doubt that the Fourth Industrial Revolution will have its winners and losers. In carving out and securing a niche in the "brave new world" of disruptive technologies, the pool of proficient human resources becomes a decisive factor. Accepting this as a self-evident axiom, the forecast that the Socialist Republic of

Vietnam has a long way to go to overcome the deep-rooted problems in its education system and raise its potential to the level commensurate with the tasks the country has to deal with appears perfectly accurate and logical.

References

1. Alibaba Founder Jack Ma: AI Will Cause People 'More Pain Than Happiness'. *The Guardian*. Retrieved on December 30, 2017 from URL: https://www.theguardian.com/technology/2017/apr/24/alibaba-jack-ma-artificial-intelligence-more-pain-than-happiness
2. Bamber P., Brun L., Frederick S., Gereffi G. (2017). Chapter 1: Global Value Chains and Economic Development. *Duke Global Value Chains Center*, pp. 1-17. Retrieved on December 01, 2017 from URL: https://gvcc.duke.edu/wp-content/uploads/Duke_KIET_GVS_Economic_Development_CH_1-2. pdf.
3. BCG Perspectives (2013). 3D Printing Will Change the Game. Retrieved on November 26, 2017 from URL: https://www.bcgperspectives.com/content/articles/nformation_technology_strategy_innovation_prepare_impact_3D_printing_change_game/
4. Data of the official website of Hanoi National University of Education. Retrieved on December 08, 2017 from URL: http://english.hnue.edu.vn/
5. Ho Chi Minh National Academy of Politics (2017). International Integration and Its Impact on Party Building in Vietnam. Retrieved on December 01, 2017 from URL: http://english.hcma.vn/home/features/international-integration-and-its-impacts-on-party-building-in-vietnam-140
6. Huynh Phu, Arana R.D. (2016). ASEAN in Transformation: How Technology is Changing Jobs and Enterprises. *International Labor Organization*. 4 pp. Retrieved on December 15, 2017 from URL: http://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/---ilo-hanoi/documents/publication/wcms_537822.pdf
7. International Telecommunications Union (2016). Percentage of Individuals using the Internet. Retrieved on November 10, 2017 from URL: https://www.itu.int/ en/ITU-D/Statistics/Pages/stat/default.aspx
8. Le Thi Kim Anh, Hayden M. (2017). The Road Ahead for the Higher Education Sector in Vietnam. *Journal of International and Comparative*

Education. Vol. 6, Issue 2, pp. 77-89. Retrieved on December 18, 2017 from URL: http://ajba.um.edu.my/index.php/JICE/article/download/7721/5480

9. Luật Giáo dục Đại học (2012) [Law on Higher Education]. *Government Portal*. Retrieved on November 05, 2017 from URL: http://www.chinhphu.vn/portal/page/portal/chinhphu/hethongvanban?mode=detail&document_id=163054.
10. Mở và miễn phí xu hướng học tập mới [The Open and Free Course: A New Educational Trend] (2016). *Thanh niên*. Retrieved on 19 December 2017 from URL: https://thanhnien.vn/giao-duc/mo-va-mien-phi-xu-huong-hoc-tap-moi-653332.html.
11. Natural Disaster Could Cost Vietnam $6.7 Billion (2016). *Vietnam News*. Retrieved on December 16, 2017 from URL: http://vietnamnews.vn/society/346294/natural-disasters-could-cost-vn-67b.html
12. Nguyen Hong Minh (2016). Industrial Revolution 4.0 and the Given Issues to Professional Education System in Vietnam. *Ministry of Labor-Invalids and Social Affairs*. Retrieved on 18 December 2017 from URL: http://en.tcdn.gov.vn/infomation/research-exchange/2016/12/155.aspx
13. Nguyễn Minh Thuyết (2014). Tự chủ đại học – thực trạng và giải pháp [University Autonomy – Status and Solutions]. *Tạp chí Tia sáng*. Retrieved on December 20, 2017 from URL: http://tiasang.com.vn/-giao-duc/tu-chu-dai-hoc-thuc-trang-va-giai-phap-7739
14. Những con số "biết nói" về giáo dục đại học Việt Nam [The Statistics on Vietnam's Higher Education] (2017). *Vietnamnet*. Retrieved on December 30, 2017 from URL: http://vietnamnet.vn/vn/giao-duc/tuyen-sinh/nhung-con-so-biet-noi-ve-giao-duc-dai-hoc-viet-nam-389870.html
15. Overall strategy for international integration through 2020, vision to 2030 (2016). *Online Newspaper of the Government*. Retrieved on December 11, 2017 from URL: http://news.chinhphu.vn/Home/Overall-strategy-for-international-integration-through-2020-vision-to-2030/20161/29060.vgp
16. Oxford Business Group (2017). Vietnam's IT Industry Sees High Growth Rates, Although Education and Training Challenges Remain. Retrieved on November 28, 2017 from URL: https://oxfordbusinessgroup.com/overview/moving-toward-maturity-industry-seeing-high-growth-rates-although-some-challenges-such-education-and.
17. Phát triển doanh nghiệp nhỏ và vừa – tạo động lực cho nền kinh tế [Developing Small and Medium Enterprises as a Driving Force for the National Economy] (2016). *Tạp chí Cộng sản*. Retrieved on December 20,

2017 from URL: http://www.tapchicongsan.org.vn/Home/PrintStory.aspx?Distribution=42747&print=true

18. Ryazantsev S., Kuznetsov N., Trịnh Duy Luân (2009). Di cư từ Việt Nam đến Liên bang Nga [The Migration from Vietnam to Russia]. *Xã hội học* [*Sociology*]. Vol. 2, pp. 31-40.
19. Schwab K. (2015). The Fourth Industrial Revolution. *Foreign Affairs*. Retrieved on December 12, 2017 from URL: https://www.foreignaffairs.com/ articles/2015-12-12/fourth-industrial-revolution.
20. SCImago Journal and Country Rank (2016). Retrieved on December 18, 2017 from URL: http://www.scimagojr.com/countryrank.php?year=2016
21. Sheridan G. (2010) Viet Nam: Preparing the Higher Education Sector Developmental Project (HESDP). *Vietnam Higher Education Sector Analysis. Asian Development Bank*. 48 pp. Retrieved on November 25, 2017 from URL: https://www.adb.org/sites/default/files/project-document/63092/42079-01-vie-tacr-03.pdf
22. Speedtest Global Index (2017). Retrieved on November 11, 2017 from URL: http://www.speedtest.net/global-index#fixed
23. The Asian-Oceanian Computing Industry Organization (2017). Reimagining the Digital Era: Digital Transformation Agendas & Initiatives within the Asia Pacific Economies. 212 pp. Retrieved on November 30, 2017 from URL:https://witsa.org/wp-content/uploads/2017/08/ASOCIO_Consolidated_24Aug17_Finalrevised.pdf.

Authors:

Kanaev Evgeny A., Doctor of Sciences (History), Professor, School of International Affairs, Faculty of World Economy and International Affairs, National Research University Higher School of Economics. Leading researcher, Center for Asia-Pacific Studies, Primakov National Research Institute of World Economy and International Relations. E-mail: ekanaev@hse.ru.

Darnell Rebecca, Graduate student, European and Asian Studies program at the National Research University Higher School of Economics, Teaching assistant, Higher School of Economics-New Economic School Joint Bachelor's Program. E-mail: rd3154a@student.american.edu

Đinh Lê Hồng Giang, Graduate student, European and Asian Studies program at the National Research University Higher School of Economics. E-mail: giangdinh@yandex.ru

Received 31.12.2017