DIGITAL TRANSFORMATION IN HIGHER EDUCATION INSTITUTIONS: CHALLENGES AND STEPS TO ROADMAP TOWARD SUSTAINABLE DEVELOPMENT

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Abstract

Digital transformation is known well as one of the most powerful drivers for each entity: organizations, institutions, associations, groups, etc. in the digital economy era. Digital transformation in Higher Education Institutions (HEIs) is forced to ensure integrity, quality and creation for sustainable development of each one of HEIs. This work is a review to find some ideas, challenges and opportunities to establish a roadmap toward sustainable development of University from the post-Covid-19 pandemic.

Keywords*: Digital transformation, higher education, challenge, sustainable development, digital strategy, clear vision.*

Chuyển đổi số trong các cơ sở giáo dục đại học: Thách thức và con đường hướng tới sự phát triển bền vững

Tóm tắt

Chuyển đổi kỹ thuật số được biết đến là một trong những động lực mạnh mẽ nhất cho mỗi thực thể: tổ chức, viện, trường, hiệp hội, tập đoàn… trong kỷ nguyên kinh tế kỹ thuật số. Việc chuyển đổi kỹ thuật số trong các Tổ chức Giáo dục Đại học (HEI) buộc phải đảm bảo tính hội nhập, chất lượng và sự sáng tạo cho sự phát triển bền vững của từng cơ sở giáo dục đại học. Đây là một nghiên cứu đánh giá để tìm ra một số ý tưởng, thách thức và cơ hội để thiết lập một lộ trình hướng tới phát triển bền vững của trường Đại học kể từ thời kỳ hậu Covid-19.

Từ khóa: *Chuyển đổi kỹ thuật số, giáo dục đại học, thách thức, phát triển bền vững, chiến lược chuyển đổi số, tầm nhìn.*

Introduction

Digital transformation is known well the incorporation of computer-based technologies into an institution/ organization's products, processes and strategies. Institutions and Organizations undertake digital transformation to better engage and serve their workforce and customers, as well as expand and diversify partnerships and thus improve their ability to compete as to ensure their sustainable development. Digital transformation is not only more than merely migrating paper records to a computer, and but it is more than adopting technologies to perform business operations faster and more efficiently. It being gives us to take more results in day by day, a particular chain value being is synergistic which is depending on our realization for identification and implementation related works. The digitization has started in the late 20th century and been accelerating since the beginning years of the 21st century, supporting and boosting a growing need for digital transformation across areas, especially industries and forecasts of situations and events. Science and technology and mathematics where they are stand to addresses the role of the scientific method in producing solutions to the world's most urgent challenges such as climate changes, food security, integrating and innovative in economics sectors and socials, etc. to maintain and

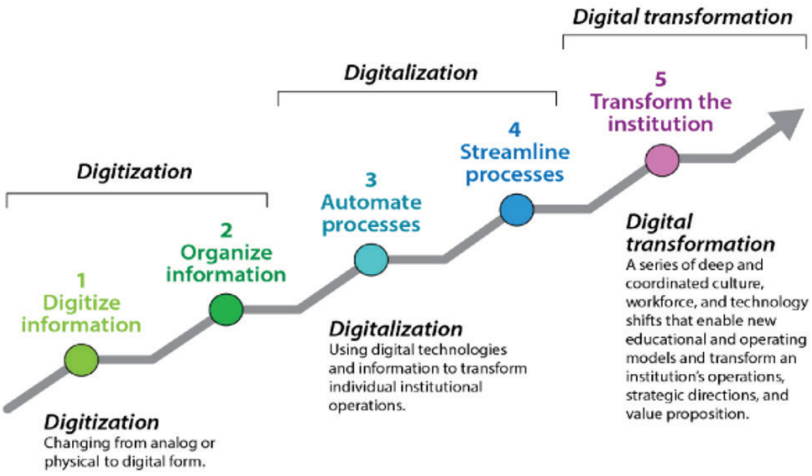

Figure 1. Illustration of the history of the digital transformation [1]

promote the sustainable development of every institutions/organizations, and of every countries. Accelerating and scaling discovery is more critical than ever, and transformations in science and business necessitate the development of information technology based on hybrid cloud for discovery. Recently, researches revealed [2 ÷ 5] that in the industry 4.0 revolution of the digital age

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These mentioned requirements require changes in human perception to changes all sectors in economics which can bring about numerous advantages,

such as improved efficiency, accessing new markets or improving brand image or reputation. This revolution, the digital transformation is driven by internal forces (e.g. changes in organizational structure and in required skills and training) and external forces, such as changes in technological applications. Obviously, educating and training human resources to meet this revolution is a huge and long-term challenge, from the adoption and use of digital technologies, to understanding and then improving and creating new ones. Higher education can be considered as the initial completion step, which brings for each individual not only professional knowledge and skills, but also career-related digital transformation knowledge and skills, as well as the ability to perceive a chain of values, direct values and indirect values, that the digital transformation yields. Therefor more than merely migrating data records to a computer, and it is must more adopting technologies to perform scientific researches and business operations faster and more efficiently. So digital transformation caused a deep integration of technologies and their shifts which have been making a new workforce having more deep professionally and collaboration coordinated culture. That enable perform new educational and operating models and transform institution's business models, strategic directions, as well as new value chain identification.

As Jack Welch who is well-known for his role as chairman and CEO of General Electric for close to twenty (20) years had said that "When the rate of change inside an institution becomes slower than the rate of change outside, the end is near". It may be considered as a general reminder on some risk which may be occurred when we must ensure flexibility and agility in administrating an organization or a network of institutions as to assess and ensure their sustainable development, especially how we would ensure the development of critical crossing fields. The following paragraph we will list some challenges and opportunities when review literatures to identify problems and ideas for establishing reconfiguration of HEIs activities and processes, and bring them into digital age.

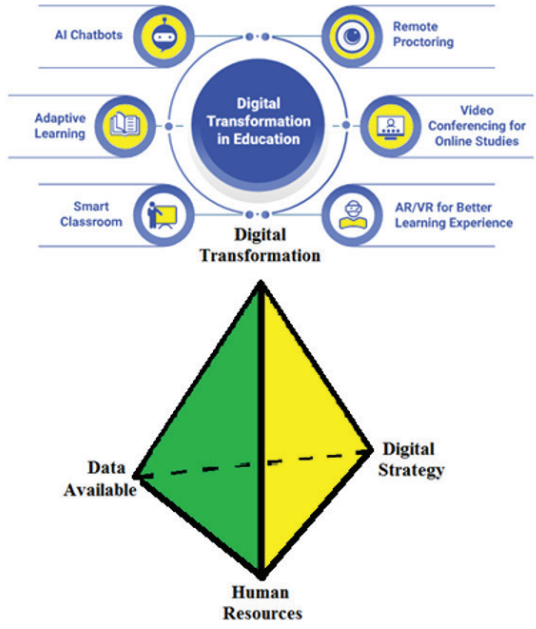

Figure 2. Illustration of a principle pyramid of basics to make successes in digital transformation in HEIs with many component results such as smart classroom. AR/VR (virtual reality, VR, and augmented reality, AR, can add real value to the learning process) for better learning experience, AI chatbots, etc.

Finding ideas, challenges and opportunities

Obviously, digital transformation is imperative and must be done if any organization or institution wants to exist at the current period before its development can be mentioned. The success or fail of digital transformation is surely dependent in findings of technological changes based on building holistic plans and coherent digital strategies. Since 2016, in their work [4], Hess et al. showed that digital transformation has become a high priority on leadership agendas, with nearly 90% of businesses in Europe and in the USA expecting IT and digital technologies to make high quality products and their diversity, effectively business processes, and wider than sales channels as well as supply chains. So how does Higher Education response to wider and further demands of a single company and of economic networks or systems. One of the answers that make the changes in value creation dimension for all entities, including institutions, organizations, as well as institutional innovations.

The Covid-19 pandemic has forced Higher Education Institutions (HEIs) over the world to move learning-teaching activities into online environments. Unexpectedly, a whole generation of young people has been effected by risks of the Covid-19 pandemic and they have had to continue their learning in different ways in an unusual situation. Many researches [6-9] revealed that a significant number of students have faced enormous challenges and a proportion of them are unable to attend online classes. For example, at Vietnam, in 2016, only 2% (33.638) of the total HEIs students nationally (1,581,227, it does not include all students of all lower degrees) were engaged in 'distance learning' [6]. But during Covid-19 pandemic, 100% HEIs students and about 17.6 million students of all lower degrees have to attend online classes based on the same information technology infrastructure as before. Changes in activities have become big problematic, especially HEIs students can't do any internship and experiments courses. Up to now there is no answer exactly for learning-teaching quality responding to learning outcomes.

Low-income students who do not live at home face more difficulties in distance learning due to poor Internet connection or lack of an electronic device. Lower income and lower economic growth exacerbates the problems of digital transformation in education, meanwhile the challenges of post Covid-19 are still continuing in the health crisis. Some investigations [7-9] revealed that nearly 60% of the required students strongly agreed that they had sufficient financial resources to cover monthly costs before the pandemic, while less than half strongly agreed with this statement during the COVID-19 pandemic. There are about 30% students reported some difficulties related to financial problems, and 27% to health [8].

During Covid-19 pandemic lockdown [10, 11], the biggest problem that students faced was "Lack of motivation, difficulty distinguishing between free time from study time, less ability to concentrate, stress due to quizzes and tests, uncertainties about the future and method of evaluation". Indeed, many students responded that it was difficult for them to concentrate at home: "hard to concentrate", "hard to concentrate at home", "I can't focus. I get distracted very easily" are some of the answers illustrating this.

So in that situation how to improve the teaching-learning environment in which students and lecturers usually feel stronger, more active, eager to explore and create... as well as in which new positive relationships are established. All have to be pointed to develop students' interests and passions responding to their future careers. Digital transformation in higher education needs to be mastered and directed towards these issues. Obviously it is that the clear nexus between leadership, agility, timeliness and digital transformation.

In general, only social media companies and corporations, such as Facebook, Tiktok, Twitter, etc. and Space-X, Blue Origin, Virgin galactic and other such as Amazon Corporation are pioneers and proactive in digital transformation, other organizations and corporations such as HEIs, middle and small enterprises, public sector organizations are still facing many challenges, barriers to implement digital transformation, such as the lack of meaningful insights of required inlet/outlet sets and establishing interconnection between them with data availability for administrating activities and processing problems during production, trading transactions, especially for HEIs in which high quality resources have been educating and training. Moreover the lack of administrative skills, lack of resources, lack of technological capabilities, as well as institutional policies of using talented people is not satisfactory [12-14] are always hidden or ignored then. The mentioned short analysis revealed that the mastering digital transformation have to get a principle pyramid consisting of three components such as digital strategy, data available and human resources as illustrated at Fig. 2. It means that these three basics have to implement simultaneously. In further, it should be known clearly that three basics are three sets in which every set is a selection of conditions, requirements and particular achievements at each step that bring us to reach final targets. So except for identifying all fully conditions, requirements and the obtained results, the consistency synchronicity of them in each set and between the sets must be establishing to organize and promote simultaneous collective action through the digital transformation operation. They imagine as the matching of gears in the moving transmission system. Obviously the consistency synchronicity is not the same as time synchronization, but requires that agreement on the firing period and moving phase for some sigma-algebra sets generated by three mentioned original sets for real-time coordination of actions. More simply, the digital transformation should be built up as multi-period operations in which the end of each operation will give us value chains in different dimensions, for example several explicit value chains and some options of value chain in the next future, i.e. the whole value is synergistic.

These mentioned above arguments will bring principle fundamentals for looking for the answers and solutions as to know how to master digital transformation based on the nexus between leadership, agility, and digital strategy. The role of digital strategy and human resources is to plan the activities, to calculate the budged, to ensure the objectives and to minimize the risks. Digital strategy and human resources have to set up

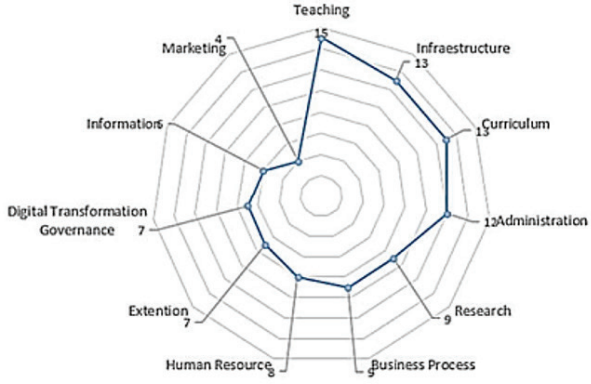

Figure 3. Radar of the dimensions (node-blue line) of the digital transformation in HEIS [13].

in the Leader's vision under a coherent data base. The main corner stones as the results of the critical analysis of filtering database and of making plan reveal successes of the digital transformation must be identified, as to figure out a digital strategy clear vision in which digital strategy is not only focus on the existing issues, i.e. consistency synchronicity for present-days, but also flexible for responding requirements to define challenges and risks and new potential opportunities, i.e. consistency synchronicity for future. Obviously, these corner stones have just been established and may be justified since some stage during implementation by the leaders and experts, the most important peoples in institutions. They understand the sustainable development of their institutions by understanding the economics of digital. Digital bring a number of opportunities for learners, lecturers, researchers and others to get most powerful information, including solutions, for themselves developments in all aspects, and also reduce rent prices and other fees. L-M. C. Benavides et al. [13] revealed that at HEIs, to have successes of the digital transformation the senior leaders have forced to intervene in digital transformation processes in which teaching has been the dimension most influenced by technologies intervention, while the least addressed has been the marketing. Below, is figure 3, shows the radical scheme of the dimensions of digital transformation in HEIs.

Here we should further consider the teaching dimension i.e. digital transformation seen from teaching dimension has several fronts. It was confirmed that digital transformation bring a new space on which by using all the tools based on digital technology, contents of teaching and learning have been fully satisfied on contemporary educational standards and methods, and has been considered as the key to integrate educational innovation processes in University [15, 16]. Also it

was emphasized that innovations in digital teaching are not just technical innovations, but rather academic, curricular, organizational and structural innovations, and pedagogical methodologies innovations [17]. In digital media, the use of digital educational resources is perceived as enabling new ways for teachers and students, creating flexible and motivating ways of learning, being more autonomous and collaborative. These resources selected by teachers to fulfill various objectives: transmitting content, organizing the learning experience, provoking encounters, developing student skills, or making assessments, and allowing students to actively build knowledge via collaborative and authentic learning activities that enable exploration. These skills and competencies, essential in society today, are as follows: collaboration, communication, digital literacy, citizenship, problem-solving, and critical, creative, and productive thinking. To response these, modernizing the curricula is required to satisfy contemporary educational standards and methods, developing international curricula, finding new ways of delivering content through digital learning and the widening use of information communication technologies. A flexible curriculum is defined to make flexible responses to the needs of labor market is the main goal of updating the educational program.

In side by side with mentioned above, teaching administration process and Infrastructure dimension have been implemented fully and proportionally. From an administrative level, there are many HEIs have leveraged the use of technology to provide flexibility in learning and just-in-time training for learners in the efforts to improve both the internal processes of course delivery and enhance the provisions of education quality [18]. And for infrastructure dimensions, the digital transformation seen from the infrastructure dimensions has diverse frontages, depending on the dimension that is supported. Digital infrastructure for teaching including digital platforms and learning platforms are important tools

which satisfy contemporary educational standards and methods. For example, physical infrastructure for teaching, that is laboratories, learning workshop, living lab, etc. as seen in the upper part of figure 2.

To build up a successful digital transformation strategy, the Leader's vision must be consisted of elements, such as clear objectives, adaptability, integrated approaches, skills-focused and buy-in from leaders. In more detailed, when driving objectives forward, it's reasonable to arrange the analyses of the current HEI state. First it is evaluation the organization structure in which a framework of distributed authorities is most important. Outline operational issues and roles of units and subunits, especially of grouped units in HEI and reorganize forward-future issues. It is also needed to assess mindset, values, and skills of HEI's teachers, learners, and staffs to be aware of some approaches for strengthening their competence. Then you have to identify and face pain issues and main challenges for further development, and learn key opportunities to be addressed while digital transformation. So, to develop a winning HEI development strategy it's worth differentiating values and results for the short, medium and long stage. And for each stage, tactical function-focused digital approaching improvements and changes in the way to develop HEI's digital infrastructure sustainably, in which delivering learning outcomes and services for learners are offered fully to satisfy contemporary educational standards and methods by implementing digital strategy.

But still, neither clear objectives nor strategy subset plans can be helpful if we don't have the pool of leaders, specialists and technical staffs able to drive, support, and initiate changes.

Finally to conclude it should be recalled that in digital economics students can do nothings without reaching learning outcomes of modernized curricula responsible for modern educational standards and methods. Because students are increasingly demanding an improvement in the "basics" of their experience, with features such as digitization of administrative processes, unrestricted 24-hour access to all information, and services using multiple platforms or digital curriculum [19].

Conclusion

Digital transformation at HEIs is closely associated with the changes in the forward movement of the digital economics. It is currently buzz phrase that generates great interest and are being used in many contexts. Digital transformation is fundamentally about change and it involves people, processes, strategies, structures, and competitive dynamics. So the consistency synchronicity is satisfied not only in preparation of human resources, data available, budgets and a digital strategy with a clear vision, but also satisfied key require to make sure a framework of distributed authorities that support and encourage to build up and create a culture of autonomy in HEIs. And culture is backbone for institutional successes that will set up and foster a positive hybrid work environment where knowledge, skills and educational technologies and others are being used by researcher, teachers and students in the post-covid-19 pandemic.

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