

Business Process Management and Digital Transformation in Higher Education - Practical Lessons from Hanoi University of Industry

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ABSTRACT

Digital transformation is gaining attention and becoming a trend in higher education, but not many results in Vietnam have been recorded. On the basis of the review of the main views on digital transformation and digital transformation in higher education and relevant theories of business process management (BPM), this paper clarifies the similarities between business process management and digital transformation, thereby showing a highly feasible approach in laying the foundation for digital transformation at universities. The results from the application of the BPM model at Hanoi University of Industry, with initial success in digital transformation in higher education, possibly offer meaningful and practical lessons for Vietnamese universities.

KEYWORDS: *business process management, digital transformation, hanoi university of industry, higher education.*

1. Introduction

Along with the general trend, digital transformation in higher education is being mentioned in many forums and has received the attention of managers as well as technology experts. Universities have also shown attention to this trend of digital transformation as many seminars have been organised, and many articles related to the topic of digital transformation in higher education have been presented recently. However, digging into these contents shows that only the trend and general principles are mentioned. The examples from universities are expressed in the form of opinions or perceptions but lack detailed models and specific lessons which can serve as the basis for judgment, evaluation and experiences for the application and implementation on a large scale.

The analysis of how to apply the business process management model to the digital transformation process and the results obtained at Hanoi University of Industry, the article has drawn practical lessons, hopefully sharing meaningful practices with other Vietnamese higher education institutions in the process of digital transformation.

2. Literature review

Business process management, which was mentioned by numerous documents and scientists, is receiving particular interest; and the benefits of applying appropriate

business process management and its benefits have been especially appreciated by a large number of individuals and organizations. (Gulledge & Sommer, 2002). This is not an exception among universities in business processes management that meet the demand for consistency with the theory and practice of business process management (Brocke, 2015). Digital transformation (DT) has indeed become a priority for higher education institutions (HEIs) in this second decade of the 21st century, and this is a natural and necessary process for organizations that claim to be leaders of change and be highly competitive in their domain (Benavides et al., 2020)

BPM considers it the cornerstone for digital transformation in organizations. This approach allows organization to achieve both operational and performance efficiency with the use of the appropriate technology. For this reason, BPM becomes an essential component of digital transformation (Moore et al., 2017).

However, there have not been many detailed analyses of the similarities between these two approaches in higher education institutions, especially with the practice of higher education in Vietnam. In addition, there are no highly practical examples demonstrating the digital transformation process at higher education institutions on the basis of BPM. This is the goal of this article to aim and clarify.

3. Methodology

The article summarizes the theoretical issues related to digital transformation and business process management (referred to as BPM hereinafter), focusing on the connection between BPM and digital transformation. It is also to describe the BPM application into digital transformation in training management at Hanoi University of Industry, a public training institution under the Ministry of Industry and Trade.

4. Research results

4.1 Digital transformation in higher education

There are many different perspectives on digital transformation, Vial (2019) synthesized from 28 different sources that draw 23 separate definitions of the concept of digital transformation. Although viewed and stated from many different angles, the definitions have shared common characteristics of this digital transformation as follows:

Firstly, digital transformation is an activity implemented with the support of technological breakthroughs, especially digital technology. Digital transformation is associated with the technological elements of the Fourth Industrial Revolution like Artificial Intelligence, IoT, Big Data and cloud computing. This is considered as the environment of organization in the digital era.

Secondly, digital transformation is a comprehensive process of change in the ways both the organization and individuals in the organization work and interact basing on digital platforms. Digital transformation is not limited to digitalizing documents, or applying equipment or application software to work, but in essence, digital transformation is a change in vision and organisational culture and strategies, in interactions between individuals and departments in the organization. In this view,

Microsoft believes that “digital transformation is a rethinking of how organizations use people, data and processes to create new values” (citations).

Thirdly, digital transformation is carried out on the basis of data and digital resources, digital transformation can only operate effectively provided that there is a solid foundation of a complete, accurate, up-to-date and synchronous data source. Correct, accurate and timely decisions in management can be made only with data or information that have been collated and analysed scientifically. Incomplete data sources will possibly lead to unconvincing decisions, but inaccurate and unclear data are likely to make wrong decisions, hence, affecting the organization.

Following the trend, digital transformation in the field of education and training has received attention and interest. In Vietnam, the main objectives identified in the digital transformation of education in general and higher education, in particular, are defined in the 2020 Digital Transformation Handbook of the Ministry of Information and Communications focusing on the following contents (Vietnam Ministry of Information and Communications, 2020), including (1) developing a platform to support remote teaching and learning, optimising digital technology in management, teaching and learning; digitalising materials; building a platform for sharing teaching and learning resources for both online and face-to-face classes. Development of technology for education, towards individualized training. Implementation of online examinations; recognition of the value of online learning certificates; (2) adjusting and supplementing undergraduate, graduate and vocational programs with basic digital technologies such as artificial intelligence, big data, cloud computing and the Internet of Things. Implementing courses on STEM, art, business, English and digital literacy, ensuring network security at all levels of education; and (3) providing massive open online courses with diverse access to education thanks to digital technology, training, retraining, advanced training of digital skills.

Deeper analysis of the objectives above shows that the digital transformation orientation in higher education is heavily directed at teaching and learning activities on digital platforms. This approach quickly forms ways training activities are organized, makes it easier to meet diverse training needs through the expansion of learning spaces. However, if viewed from a different perspective, this approach will not lead to the formation of a full digital ecosystem in a university, due to the improper consideration of some transformation factors in the model, culture, management and operation towards a smart university. This may explain why having much attention and investment has not resulted in many effective digital transformation models in Vietnamese universities. Identifying a feasible and easy-to-follow management model in line with the current trend of digital transformation in higher education will offer meaningful contributions to the development of higher education in the current digital era.

4.2. Business process management

BPM is a concept that appeared with the explosion of information technology, when applying its utilities to the management of workflows, then forming a

management model that is highly effective and efficient and increasingly popular in practice. There are a number of BPM definitions. From the perspective of business administration, Gartner (year) defines BPM “as the rule of processes management to improve efficiency and effectiveness...to benefit customers and stakeholders”(CPDM Lab, 2017). Jeston and Nelis (2014) argued that “business process management is a management activity that focuses on the use of processes as an important element to achieve the goals of the organization through continuous improvement...”. From a technological perspective, Aalst (2012) introduces the concept of BPM “... is a principled combination of information technology knowledge and management science in the operation and management of the organization’s business processes”; while Weske (2007) suggests that BPM “... is a set of methodological, tools, technical and technological factors aimed at identifying, designing and managing... the business processes of the organization”.

To sum up, the concept of BPM is explained from two aspects (Anh, 2021). First, in terms of management: BPM is a systematic approach to achieve organisations’ goals through the optimization of activities. Second, in terms of technology: BPM is a technological solution that helps organizations design, operate, monitor and improve operational processes.

In the ICT era, considering BPM as a close combination of process management and technology, especially information technology, has gained consensus among experts. It is therefore possible to come up with a concept of business process management: integrating management and technological elements into identification, design, management, operation and improvement of business processes to achieve goals and objectives of the organisation. BPM model is the synchronicity of 3 components: Management processes, technology and people of the organization (Brocke & Mendling, 2017).



Figure 1. Components of BPM

4.3. Business process management and digital transformation

Literature reviewed on business process management shows that this management model shares many characteristics that are the core elements of the digital transformation process in organizations.

Firstly, it is reflected in the management approach based on technology factors, especially information technology, with the participation of software in supporting the stages of operational processes. This approach helps to synchronize key components of digital transformation such as automation, IoT, and big data analytics. Technological factors are an indispensable component of business process management as well as digital transformation. Effective management and exploitation of digital resources: Replacing step-by-step to completely manual operations use is the goal of these activities. However, to be effective, the strategic approach needs to combine other factors such as people, management creates an equal share for each side (Robledo, 2021).

Secondly, digital transformation and business process management are based on a process management approach in management. According to Tech Republic – An online magazine, the social community for Information Technology professionals, said that digital transformation is “a way to use technology to redo processes more efficiently” (citations). This view shows the similarity in the nature of management activities between digital transformation and business process management. Referring to the stages of digital transformation in organizations, experts all have a high consensus with the view that one of the decisive stages of digital transformation is to transform the operational process and operation of the organization to the digital environment, operational process when attaching the operational activities of the system to information technology applications.

Thirdly, digital transformation and business process management both operate on the basis of large databases and digital resources. A common feature that is easy to see in management and digital transformation is that both aim for transparency and visualizing the activities of the organization. This is obtained through the process of analysing the data collected during the operation of the organization. Data and resources for the operation of digital transformation as well as management of the operation process. Producing, collecting, and effectively exploiting the database generated during system operation is both a condition and the goal of these 2 activities (Baiyere, Salmela & Tapanainen, 2020).

Fourth, all 2 of these approaches aim to increase the organization’s flexibility and adaptability to market changes and needs and aim to bring new values to customers (Sandle, 2018). Innovating the way the organization operates or applying technology to optimize operational processes is aimed at enhancing the effectiveness and efficiency of the operation process to bring customers the best products and services. One reason for many organizations to implement digital transformation is the need for increased speed and flexible transformation that allows for a better response to changing market situations or customer expectations. Traditional management models are not easy to keep up with and handle these changes.

However, if digital transformation aims to comprehensively change the organization to suit the digital era, then the business process management takes its focus on changing the way the organization manages and operates its activities. Therefore, business process management is not another way of doing digital transformation in an organization. The processification of activities accompanied by the application of technology to manage and operate them to optimize the entire operation while effectively exploiting the organization's digital resources is a stage in the long and complex digital transformation process. In other words, applying the business process management model helps to form the initial foundation through which organizations orient and launch their digital transformation process appropriately and accurately.

4.4. Digital transformation at Hanoi University of Industry

Hanoi University of Industry (HaUI) is a practice-oriented public university under the Ministry of Industry and Trade. With 29.201 students, more than 1300 staff (including lecturers), the university is currently one of the major training institutions under the Ministry of Industry and Trade and in the whole country. The university currently offers 55 undergraduate and graduate programs, mainly Engineering, Technology, and Business. Each year, HaUI receives over 110.000 applications, over 96% of its graduates have jobs within 1 year of graduation, HaUI has gradually affirmed its brand and position in higher education in Vietnam. Determining that digital transformation is an inevitable trend in higher education, HaUI has identified the contents that need to focus on in this process as the transformation in the business process management of the university, and transformation in the organization of teaching, studying, and research.

Regarding management, the activities that HaUI focuses on are: the application of new models and methods of management; The application of advanced philosophies the establishment and operation of the whole management system; Active development and application of software systems into management; Digitalisation of information, the establishment of big data system as the basis for analysis, forecasting and decision making at all levels of management at HaUI.

Regarding teaching and research matters, activities include: the establishment of digital resources (electronic textbooks, courseware for e-learning, online assessment tools ...); the establishment and operation of learning management system; the establishment and operation of online assessment tools; the establishment of learning and research forums; the development of a learning ecosystem, that provide support to learners through channels in the model of online public services.

In both of these contents, changes in administration, leadership, business processes, interaction and organisational culture in order to be compatible with the digital environment have been identified as a decisive factor in this inevitable transformational process. In order to achieve this goal, since 2016, HaUI has developed and implemented BPM model in managing all types of activities through main stages as follows:

Design and model business processes: Identifying all business processes and their internal and external links, using modelling language to express the interactions between them.

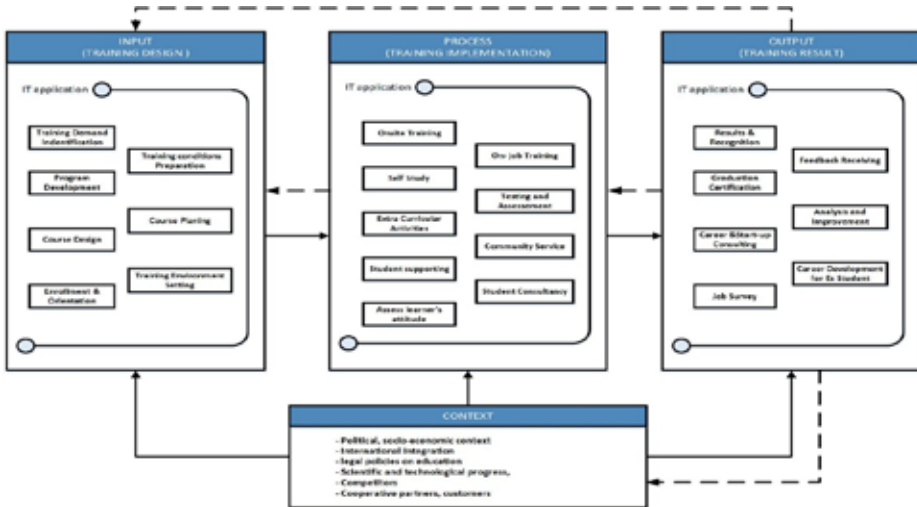


Figure 2. Overall Business process model of training activities at HaUI

Digitalize business processes: Developing software applications to manage and support the operational processes. Developing functions and processing capabilities of applications according to identified and designed processes. Authorisation of the software corresponding to tasks of the designed processes.

Implement business processes: Applying IT and processes to management practice at HaUI. Individuals performing tasks via the software will have assigned authority following designed process. The output or results of each step of the work are automatically transferred by the system as input for the next step. The data of the system is generated from the actions of individuals on the system. The system automatically records tasks and processes of each individual, the stage of the process in real-time.

Monitor, evaluate and improve business processes: On the basis of recorded results, evaluating the effectiveness and efficiency of each process. Time and results of performance of assigned tasks of individuals and departments; academic results of individual classes or all courses are recorded and charted on the system to make improvements accordingly.

After more than 5 years of implementation, HaUI has identified, designed 615 process models, set up and operated electronic university model with 28 software modules, 5 mobile apps, 5 Decision Support Systems (DSS), 1 semantic system, 2 AI applications, 623 dashboards like reports. This has enabled over 90% of the school's activities to be connected, managed and operated on a real-time unified database. The LMS System follows online training standards with 2,551 electronic lectures, 114,086 digital document items in different forms that have gradually brought the teaching activities to a digital environment.

All activities related directly to students are carried out under the public services model where requests are made online through web-based and mobile portals, have created a close connection between HaUI, students and other stakeholders. The application of software to support task performance and management at each stage, has made it clear and transparent to determine the responsibilities of each individual, the output of each stage, and make reports. Student feedback is collected comprehensively and accurately, regularly through the system, which helps managers to promptly solve arising problems and overcome weaknesses. Along with that, the quantification and standardization of activities are also of particular interest to HaUI: 100% of the training programs are developed according to CDIO model, which is an advanced program capable of assessing learners' capacity/competence in each stage; KPIs for various types of activities in the university have been established with IT application (Hanoi University of Industry, 2021).

Having an appropriate approach, identifying the right content to be done and making appropriate steps in the digital transformation process have initially formed a digital ecosystem in HaUI. The effectiveness and efficiency of management and implementation of all activities thereby have been boosted, contributing to the improvement of quality of training and research at HaUI. Compared with the components and requirements of university digital transformation, HaUI has travelled a long way. Effective digital transformation also helps HaUI quickly adapt to arising problems. In the past 2 years, facing the COVID-19 pandemic, all activities from enrollment, admission, training, assessment to issuing graduation certificates have been made online up to expectation. The effectiveness of digital transformation can also be seen in the performance of departments or/and individuals, where nearly 50% of human resources and up to 70% of time have been saved. Interactions on the system have become a habit, "paper-free" activities have gradually become a trait in HaUI culture. (Hanoi University of Industry, 2021)

From the results of applying BPM model to digital transformation at HaUI, some lessons can be drawn out. First, unity of awareness throughout the organisation. Digital transformation needs to start from "Transformation". Many Higher Education Institutes have paid high prices when starting the process from the "Digital" factor, only interested in upgrading infrastructure and purchasing equipment. The process of "transformation" needs to take place from awareness, management processes, working practices. In terms of training activities, special attention should be paid to methods of Teaching, Learning, and interaction in the digital environment.

Secondly, the state-of-the-art management model is the "core" of the digital university system that needs to be completed through the standardization of organizational structure, management methods, business processes, training programs, management tools, information systems, system and network security in accordance with national and international standards. The application of national and international standards in the management and implementation of the training and research processes at HaUI offers a foundation for the effective and efficient management system. The BPM model is a factor of success for HaUI in its digital transformation process.

Thirdly, “digital” human resources including individuals who are capable of taking management or training or research activities in the digital environment is especially important. With an abundant digital resource platform, a modern teaching management system will not likely to be effective in the absence of digitally competent teaching staff who master methods and can effectively organize the training process in the digital environment. In addition, higher education institutions also need to pay attention to a team of experts who are capable of developing digital materials and management systems to expand the digital ecosystem and resources.

Moreover, appropriate investment plans into IT infrastructure, databases, smart devices, system software systems and applications for big data to develop the infrastructure for a digital ecosystem of a smart University need to be considered according to the needs and financial capabilities of each school.

Last but not least, special attention to the establishment and enrichment of a digital resource repository for training and research should be given. Experience from HaUI shows that digital resource repositories can be formed and developed internally through the development of lectures and science research. However, it will be much more effective to establish channels for connecting and sharing digital resources between training and research institutions nationwide and worldwide. Universities need to consider forming a networking system to connect and share this resource.

Through the development and implementation of Business Process Management, HaUI has established an essential foundation for the digital transformation roadmap. The lessons drawn from this practice are worth studying for other higher education institutions in Vietnam, with special attention to the specificity as well as the culture of each organisation. That is hopefully meaningful for higher education institutions inside and outside the Industry and Trade sector.

5. Conclusions

The article has focused on several key issues. Firstly, perspectives on digital transformation and business process management in institutions in general and higher education institutions, in particular, are discussed. Secondly, the article analyses the connection between business process management and digital transformation in an organization, thereby showing that the BPM approach can serve as the basis for the digital transformation process. Thirdly, it also analyses the process and outputs of the BPM system at HaUI shows that this is an appropriate approach and benefits the digital transformation process at the university. This offers some lessons about the digital transformation process for Vietnamese universities.

In order to have clearer views of the digital transformation of Vietnamese universities, it is necessary to continue to focus on reviewing of literature for digital transformation and business process management and the link between them, and frameworks with measurable criteria and standards for digital transformation or business process management in higher education institutions.

References

- Aalst, W. M. P. (2012). Business Process Management: A Comprehensive Survey. *ISRN Software Engineering*, Volume 2013, Article ID 507984.
- Anh, H. (2021). Business process management and its applicability at universities under the Ministry of Industry and Trade – Vietnam, *Vietnam Journal of Educational sciences*.
- Baiyere, A., Salmela, H., Tapanainen, T. (2020). Digital transformation and the new logics of business process management. *European Journal of Information Systems*, 29(3), 238-259. DOI: 10.1080/0960085X.2020.1718007
- Benavides, L. M. C., Arias, J. A.T., Serna, M. D. A., Bedoya, J. W. B., & Burgos, D. (2020). Digital Transformation in Higher Education Institutions: A Systematic Literature Review. *Sensors* 2020, 20, 3291. DOI:10.3390/s20113291.
- Brocke, J. (2015). Handbook on Business Process Management 1. In *Handbook on Business Process Management 1*. <https://doi.org/10.1007/978-3-642-45100-3>
- Brocke, J., & Mendling, J. (2017). *Business Process Management Cases: Digital Innovation and Business Transformation in Practice*. Berlin, Germany: Springer.
- Gulledge, T. R., & Sommer, R. A. (2002). Business process management: Public sector implications. *Business Process Management Journal*, 8(4), 364–376. <https://doi.org/10.1108/14637150210435017>
- Hanoi University of Industry. (2021). *Hanoi University of Industry succeeds with the e-university model, towards building a smart university*. <https://www.haiu.edu.vn/en/haiu-perspective/hanoi-university-of-industry-succeeds-with-the-e-university-model-towards-building-a-smart-university/63201>
- Jeston, J., & Nelis, J. (2014). *Business Process Management*, 3rd ed. NY, USA: Taylor & Francis.
- Moore, C., Finn, K. M., Khoshafian, S., ..., Swenson, K. D. (2017). *Digital Transformation with Business Process Management: BPM Transformation and Real-World Execution*. FL, USA: Lighthouse Point.
- Robledo, P. (2021). BPM is key to digital transformation. <https://albatian.com/en/blog-ingles/bpm-is-key-to-the-digital-transformation>.
- Sandle, T. (2018). Business Process Management is central to digital transformation. <https://www.digitaljournal.com/business/business-process-management-is-central-to-digital-transformation/article/512404>.
- Vial, G. (2021). Understanding digital transformation: A review and a research agenda. In A.Hinterhuber, T. Vescovi & F.Checchinato, *Managing Digital Transformation*, (1st ed, 9 – 63). NY, USA:Taylor&Francis.
- Vietnam Ministry of Information and Communications. (2020). *Digital transformation Handbook*. Hanoi, Vietnam.