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Does Information Technology Influence Processes at Universities? – Teacher's Perspective

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Abstract

The rapid development of information technology (IT) both forces and supports the transformation of universities in almost all their operations (strategic planning, budgeting, education, research, quality control, cooperation with business and society, etc.). The paper presents the research results related to the digitalization of different processes at universities – more specifically, teachers' opinions on the effect of digitalization on different processes. The survey was conducted among the University of Mostar, Bosnia, and Herzegovina (BH) teachers. The authors identified processes at the university and investigated the perceived impact of information technology on them. The findings show that the impact of digitalization is positive on most processes, whereby a strong influence is determined for research projects financed by the Ministry of Education, quality management, teaching, and evaluation of acquired knowledge (examination).

Keywords: information technology; digitalization; process; teachers; university
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Introduction

Universities all around the world are facing an urgent need for constant transformation. The main drivers for change are digitalization, technological development, demographical changes, and volatile (changing) geopolitical contexts. For universities to respond adequately and adapt to the ever-changing world, they need to have adequate and transparent processes and strong leadership. However, nothing of this is possible without powerful IT support. Business organizations long ago recognized that adequate IT support was crucial for efficiently conducting and monitoring business processes and timely decision-making based on quality data and information collected from different information systems (ERP, CRM, SCM, BI, etc.).

In the last two decades, Higher Education Institutions (HEIs) have been faced with rapid changes in the environment and with new requirements and ideas about what should be the main role of these institutions in a modern, highly digitalized society. In the European higher education area Bologna process brought a huge paradigm shift – the HEIs could not be isolated islands with elite knowledge; instead, they have to be integrated with the society in which they operate to increase not only the knowledge base of the society but to influence on better life of citizens, social sensitivity and inclusion.

The political interest regarding the role of HEIs in Europe increased with the European Universities Initiatives in 2017-2018 that placed HEIs on the top of the European agenda with the main focus on the development of a transnational university alliance as a cornerstone of a future European Education Area (https://eua.eu/issues/28: universities-of-the-future.html). European Universities Association (EUA), in consultations with its members and partners for six months in 2020, proposed a vision of what European HEIs should look like in 2030 – „Universities without walls – A vision for 2030“ (EUA1, 2021). According to this vision, HEIs should achieve the following goals by 2030: „*to be open, transformative and transnational; sustainable, diverse and engaged in society; strong, autonomous and accountable; working based on the core values of institutional autonomy, academic freedom, scientific rigor, integrity, and ethics.*" (EUA2, 2021).

HEIs need adequate regulatory and funding frameworks and strong, transparent, and inclusive leadership (EUA2, 2021). This kind of leadership requires adopting and adjusting business logic to the HEIs environment.

Faced with increasing competition, struggle for students, and financial and human resources, universities are forced to apply rules and behavior from the business world to survive and continue developing. More and more universities are realizing the need to monitor their business processes and use IT to improve, enhance, or replace traditional services with digital ones to simplify the processes involved in educational service delivery and operational complexity (Benavides et al., 2020).

The COVID-19 pandemic also speeds up technology development, business models, and process innovation. The pandemic has led to instant changes in higher education, especially related to the organization and monitoring of essential business processes. The use of new or more efficient, sustainable, and fair use of existing ICT tools enables HEIs to collaborate, create, and share knowledge and resources with the outside world, ultimately leading to innovation and growth (Paunescu et al., 2022).

Its contribution to the development of the university is manifold. It provides the underlying infrastructure, collects and stores data, enables data translation into

useful information, and contributes to creating collective wisdom through tools for collaboration (Zahid et al., 2016).
However, despite the intensive application of IT in universities worldwide, it is still a great challenge to establish flexible and dynamic HE processes to holistically integrate the technology with the management of HEIs (Richard, 2015).

As one of the eight public universities in Bosnia and Herzegovina, the University of Mostar faces all the challenges described above. Hence, the focus of this paper is to examine the impact of IT on the business process at the University of Mostar. The aim was to determine teachers' views on the impact of ICT on business processes in higher education institutions - whether they recognize the impact and how they evaluate it. Therefore, three research questions (RQ) were asked:

- RQ1: Does ICT affect business processes in higher education institutions?
- RQ2: How does ICT affect business processes in higher education institutions?
- RQ3: How strongly does ICT affect business processes in higher education institutions?

This introduction, which gives a brief overview of the impact of IT on the business process at the universities, is followed by the methodology that describes the instrument, method of data collection, and statistical analysis. The research results were presented and discussed, and conclusions were made.

Methodology

Empirical research was conducted among the University of Mostar employees in Bosnia and Herzegovina in April 2020. An online survey was conducted. The Google Forms option was used to create the survey questionnaire. The invitation to participate in the survey, with a link to the survey questionnaire, was e-mailed. A total of 63 teachers responded.

The authors identified processes at the university in the following areas: management, project, cooperation with the economy and society, finance, strategic planning, teaching process, scientific research, quality, library, and resource. The respondents assessed the impact of information technology on processes identified in the areas mentioned earlier on a scale of 7 grades. Grades included impact (influence/yes, does not influence / no), direction (positive, negative), and strength (weak, medium, strong). Offered grades and their meanings are shown in Table 1.

Table 1
Grades and their meanings

Grade	Impact	Direction	Strength
-3	Yes	negative	strong
-2	Yes	negative	medium
-1	Yes	negative	weak
0	No		
1	Yes	positive	weak
2	Yes	positive	medium
3	Yes	positive	strong

Source: author's preparation

Descriptive statistics procedures were used for all three research questions, and the results are expressed as numbers and percentages and presented in tables and text. The analysis was performed in Microsoft Excel (Office version 2016, Microsoft Corporation, Redmont, WA, USA).

Results

Respondents' responses show that ICT affects all processes. More than 75% of respondents gave an affirmative answer for each offered process. All respondents agree that ICT affects International educational projects and administrative affairs with students (none gave a negative answer). The answer "no" is most common in examinations and legal affairs.

The distribution of the "yes" and "no" answers to the question "Does ICT affect a particular business process" is shown in Table 2. It offers an answer to the first research question (RQ1) related to the impact of ICT on processes (whether there is an impact or not)

Table 2

Does ICT affect a particular business process at the university - the distribution of the answers

	Number (%) of respondents	
Digitization affects	**No**	**Yes**
The work of the Scientific-Teaching Council / Senate	11 (17.5)	52 (82.5)
Work of the Dean's / Rector's College	11 (17.5)	52 (82.5)
Work on projects		
International research projects	2 (3.2)	61 (96.8)
Domestic research projects	5 (7.9)	58 (92.1)
International educational projects	0	63 (100.0)
Cooperation with the economy and the social community	5 (7.9)	58 (92.1)
Financial planning and budgeting	8 (12.7)	55 (87.3)
Strategic planning	6 (9.5)	57 (90.5)
Teaching process		
Preparation of teaching and teaching materials	1 (1.6)	62 (98.4)
Teaching	3 (4.8)	60 (95.2)
Evaluation of acquired knowledge (examination)	13 (20.6)	50 (79.4)
Scientific research work	1 (1.6)	62 (98.4)
Quality management	4 (6.3)	59 (93.7)
Library business	3 (4.8)	60 (95.2)
Resource management		
People	9 (14.3)	54 (85.7)
Other resources	9 (14.3)	54 (85.7)
Legal affairs	15 (23.8)	48 (76.2)
Administrative affairs		
Work with students	0	63 (100,0)
Work with teaching staff	3 (4.8)	60 (95.2)

Source: author's preparation

Most respondents stated that ICT positively affects the business processes offered in higher education institutions. Only five answers are the opposite. Thus, a negative impact was recorded in the following processes: work of the Dean's / Rector's College (one respondent), cooperation with the economy and society (one respondent), financial planning and budgeting (one respondent), and human resources (two respondents). These data represent the answer to the second research question (RQ2) related to the direction of the impact of ICT on processes.

The obtained results show that, according to the respondents, ICT has the strongest influence on activities related to international scientific and educational projects, preparation and implementation of the teaching process, preparation of teaching materials, and library operations. On the other hand, they have a weak

influence on administrative bodies (management), resource management, and knowledge evaluation.

The distribution of the "strong", "medium," and "weak" answers to the question "How strongly does ICT affect a particular business process" is shown in Table 3. It is also the answer to the third research question (RQ3) related to the strength of the impact of ICT on processes.

Table 3
How strongly does ICT affect a particular business process at the university - the distribution of the answers

	Number (%) of respondents		
Digitization affects	**Strong**	**Medium**	**Weak**
The work of the Scientific-Teaching Council / Senate	22 (42.6)	21 (40.4)	9 (17.3)
Work of the Dean's / Rector's College	23 (44.2)	21 (40.4)	8 (15.4)
Work on projects			
International research projects	8 (13.1)	18 (29.5)	35 (57.4)
Domestic research projects	16 (27.6)	25 (43.1)	17 (29.3)
International educational projects	7 (11.1)	24 (38.1)	32 (50.8)
Cooperation with the economy and the social community	13 (22.4)	27 (46.6)	18 (31.0)
Financial planning and budgeting	15 (27.3)	22 (40.0)	18 (32.7)
Strategic planning	18 (31.6)	26 (45.6)	13 (22.8)
Teaching process			
Preparation of teaching and teaching materials	9 (14.5)	25 (40.3)	28 (45.2)
Teaching	11 (18.3)	25 (41.7)	24 (40.0)
Evaluation of acquired knowledge (examination)	22 (44.0)	17 (34.0)	11 (22.0)
Scientific research work	7 (11.3)	23 (37.1)	32 (51.6)
Quality management	17 (28.8)	21 (35.6)	21 (35.6)
Library business	14 (23.3)	19 (31.7)	27 (45.0)
Resource management			
People	24 (44.4)	15 (27.8)	15 (27.8)
Other resources	25 (46.3)	16 (29.6)	13 (24.1)
Legal affairs	20 (41.7)	17 (35.4)	11 (22.9)
Administrative affairs			
Work with students	13 (20.6)	25 (39.7)	25 (39.7)
Work with teaching staff	16 (26.7)	23 (38.3)	21 (35.0)

Source: author's preparation

Discussion

The conducted research satisfactorily answered the research questions asked. Table 4 shows how research findings answer each specific research question.

Table 4
Answers to research questions

Research question	Answer
RQ1: Does ICT affect business processes in higher education institutions?	Yes, it affected (Table 2).
RQ2: How does ICT affect business processes in higher education institutions?	Yes, it positively affects.
RQ3: How strongly does ICT affect business processes in higher education institutions?	Yes, it is most strongly and medium affected (Table 3).

Source: author's preparation

The prevalence of the answer "Yes" to the question of whether ICT affects specific business processes leads to the conclusion that ICT affects all business processes of HEIs. This result is expected. Findings from the literature (Zahid et al., 2016; Dahiya, 2018; Kozlova et al., 2021; Martínez-Gautier, Garrido-Yserte, and Gallo-Rivera, 2021) show how technology affects the HEIs, and that it is simply impossible to implement any technological solution without changes in business processes. For now, the literature prioritizes the positive effects of the application of technology, which has been confirmed through this research. The research results related to the perception of the direction of technological impact show a positive impact - only a few respondents stated a negative impact on specific processes. Still, no process can be highlighted as an example of the negative effects of technology. The results make it easy to identify the processes most affected by technologies and those least affected. Based on the prevalence of the "yes" answer, it can be noticed that in the respondents' opinion, ICT has the most significant impact on project-related activities (domestic/international, educational/ research), scientific work, and quality. This group inevitably includes activities related to direct work with students - administrative work and business related to the implementation of teaching (preparation of teaching materials and knowledge transfer).

On the other hand, technology has the least impact on legal affairs related to the management of HEIs and examinations (student assessment). However, the research results confirm the positive impact of ICT on the business processes of HEIs. As already pointed out, such results are expected, and the literature also states the positive impact of technology on HEIs. Variations in the representation of responses by individual processes can be attributed to differences in the degree of digitalization of HEIs from which respondents come. It primarily refers to when the HEIs started digitization, what technology is applied, and the approach to implementing technology. In addition, significant factors of difference are the respondents' attitudes toward technology, the practice of applying it in everyday life, and their knowledge of technology. All of the above can cause significant differences in the perception of the impact of technology on the business processes of HEIs. Of course, one should also consider that not all respondents are directly involved in all university business processes. However, as teachers often have multiple roles (e.g., teachers, researchers, board members, etc.), the result is their involvement and knowledge of different university business processes.

This research aimed to examine teachers' opinions on the impact of ICT on the business processes of HEIs. For a complete picture, it would be necessary to investigate how other stakeholders in the business processes of HEIs perceive the impact of ICT (students, administration, external stakeholders, etc.).

Conclusion

As stated at the beginning of the discussion, the conducted research answers all three research questions. According to the respondents (e.g., teachers), the results showed that ICT positively impacts business processes in HEIs. For most business processes, this impact is strong and medium strong.

Research findings show that the University of Mostar uses ICT in its business processes and that its teachers are aware of the impact of technology in their daily work. The extent to which the use of ICT at the University of Mostar is planned and comprehensive is the topic of some new research.

Future research could expand the sample, i.e., the inclusion of other HEIs from Bosnia and Herzegovina and widely in the research, allowing comparisons between institutions and scientific fields. Also, the opinion of other stakeholders (e.g., students,

administration, etc.) regarding the perception of the impact of ICT on the business processes of HEIs. To further understand the impact of ICT on processes at universities, the advantages and disadvantages of ICT in the business processes of HEIs should be investigated.

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