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Digital Transformation in Higher Education: A Case Study on Strategic Plans

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Abstract. Digital transformation is considered as an inevitable process for higher education systems like all socio-economic institutions and systems. The digital transformation, which paradoxically incorporates both challenges and conveniences, has to become the focus of corporations' strategies. The aim of this study is to determine the status of digital transformation in universities' strategies. For this purpose, the strategic plans of 18 Turkish universities, which ranked at the top 1000 most often in the world rankings, were evaluated with the content analysis method. Findings indicate that expressions about the components of digital transformation in the strategic plans of the universities were gathered under 4 themes, 14 categories and 35 codes. The expressions of the universities about digital transformation are coded under the category of diversity and flexibility of learning technologies, especially education theme and distance/open learning. It is observed that universities have the least digital transformation strategies concerning research and social service missions. In this sense, it was concluded that universities could not perform digital transformation beyond technological infrastructure renewal into an integrated transformation model and strategic vision. The results of the study were compared with empirical and theoretical studies in the literature. For universities and future studies, it was proposed that Turkish universities are compareable with the universities abroad, which show the successful examples of the digital transformation, and that the quantitative and/or qualitative methods related to the subject can be applied by internal and external stakeholders, especially in the sector's evaluations.

Keywords: digital transformation, university' strategic plan, higher education, case study model, content analysis method

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1. Introduction

Digital transformation has become the top priority of higher education institutions as well as many other organizations today. Digitalization has become inevitable for higher education institutions to meet many challenges caused by the rapid and various transformations in its environment. This transformation manifests itself as the use of digital technologies in the fields of actors, business management models, syllabus models, information and learning assessment/analysis programs, cost (finance), success measurement systems and security threats, especially with the widespread understanding of managerialism in the management of universities [1].

Digital transformation in higher education, in fact, does not merely refer to a technological transformation. Digital transformation aims

to broaden this narrow sense, to determine the stakeholder needs and behaviors in advance, and to provide education, research, and social services in line with the demands of the users/beneficiaries who take advantage of the services in a changing competitive environment. This means total digitalization, such as digitalization of core services, academics and students with advanced digital capabilities, and decision support systems that can adapt to changing circumstances [2].

Digital transformation in higher education varies with the components such as the Internet, mobile networks and smartphones, the Internet of Things, Big Data, new cloud services, smart accessories/garments, fast and high capacity connections, social media networks and artificial intelligence [3].

The main purpose of digital transformation in higher education is to redesign educational services and to redevelop the operational processes of higher education. In this sense, there are three approaches to achieve these goals. These approaches are [4]:

➢ *Operation-Priority Digital Transformations*. The main objective of this transformation is to redefine the services through a new and advanced digital in-house process. In the process of creating value of users and digitalizing support services together, digitalization of higher education comes into prominence in subjects such as student admission, registration, examination system, quality assurance system, course plan/hour, syllabus/module and academician employment of higher education institutions. On the other hand, digital transformation in education is considered as a prerequisite for progress by everyone, and changes in students' learning methods and use of technology are taken into account. However, the reaction of academicians to changing conditions and their interest in new teaching techniques are also considered important in this process [5].

➢ *Service-Priority Digital Transformations*. This method is closely related to the educational mission of universities. The method aims to create new educational programs as well as digitization of the programs offered by the old method. All sorts of distance learning structures in universities, especially massive open online courses – MOOC – are enriched with new methods [6].

In recent years, internet connections have been expanded, their scope has been differentiated and the standard of teaching materials has been changed to expand such digital and online education. It is possible to see video from fixed devices as well as from mobile phones. As a result, opinions that video and similar formats are indispensable functions in the lessons have gained importance [7]. Even today, traditional face-to-face education has been replaced by hybrid/blended education [8].

➢ *Service & Operation-Priority Digital Transformations*. The service-operation-priority transformation aims to undergo a systematic synthesis of the both approaches above. The development of operational processes and learning methods are being carried out simultaneously. This system, which is the pioneer pilot application in today's universities, is widely used. In all three approaches, students' adaptations to digital methods and developments are viewed as an important issue. The driving force of students is conceded important in the digitalization of higher education. The new generation is essentially the one that is not alien to digitalization. This generation's profile has the most recent student profile features, also called 'net generation' or 'digital natives' [9]. The fact that the generation is digital, necessitates the development of new teaching/learning methods in universities.

This new student profile, which grows under the conditions that digital brings to the forefront, prefers the methods of learning that are more active and more specific to them, and they want to empathize with the former generation academicians who are defined as 'digital immigrants'. This empathy essentially means acting with digital technology [10].

A system in which the teacher is not the only source and where teaching resources are diversified, such as digital tools, websites, social media, and other open learning channels, inevita-

bly leads to changes in the profile of the instructor/academician. The new profile makes the student an actor who learns how to learn rather than being merely a learner, and the instructor makes the learning easier with a digital transformation where the student is more active and the academician is, in a sense, comparatively more passive.

In the digital age, academics are expected to gain new merits such as to be able to use technology creatively, to adapt education standards to 21st century knowledge and skills, to develop project-oriented teaching methods, to use new and modern strategies in student performance evaluation, to apply differentiated educational programs and adopt continuous learning as a philosophy [11].

As a result of the interactive relationship between the learning environment of the digital age and the teaching-learning actors, the following models have started to form [12]:

• *The transition from monotype 'uniform' learning model to individualized 'customization' learning model:* The system, which is based on everyone learning the same things at the same time, has started to give way to the learning systems according to the students' interests thanks to the boutiqueization/individualization of computers and digital tools.

• *The transition from a single source (from an expert) to a multi-source learning model:* In the pre-digital era, the understanding of academics as an expert has been weakened by the fact that all digital tools, especially computers and videos, can offer a variety of resources in many different specialties.

• *The transition from the standard assessment model of learning/achievements to a customized/individualized assessment model:* In the pre-digital period, the assessment of students through exams was usually in the form of multiple-choice and short-answer items for objectivity, but with digitalization, students are evaluated in their categories.

• *The transition from the rote-learning model to the learning model by accessing the source of information:* While pre-digital learning was in the form of keeping in mind or memorizing what is learned, digitalization has the form of reaching information and solving problems by accessing external sources similar to those in professional business life.

• *The transition from an intensive learning model to a learning model focused on accessing lots of information on demand:* In the pre-digital period, all the information was provided intensively in the curriculum and since such a continuous renewal/updating is essential in the digital age, such learning has not been preferred. It has become important to get accurate and up-to-date information quickly.

• *The transition from an acquired/passive learning model to an on-the-job/active learning (learning by doing) model:* While it was quite important for a student to acquire information in pre-digital learning, it is important to construct the model with the information acquired by the digital age. This has led to the spread of experiential and participatory learning and even student-centered learning [13].

To summarize the processes described above, it can be said that universities have started to make the on-campus internet networks suitable for these methods as students turn to smart digital. Apart from the internet system, students entered in such race to make learning resources more digital. This has led to an increase in distance education systems, especially due to cost benefits. Experiential learning methods were added to the traditional face-to-face education methods as well as distance learning methods, and they have become blended/hybrid.

Ultimately, learning management systems, the ones in which training contents, learners and instructors are monitored and learning/teaching processes are managed and individualized, have had to be redesigned for the new generation. Beyond being merely learning-oriented, these systems have become eclectic structures such as providing preliminary information about courses, learning analyzes and providing integrated planning and advisory services [14].

Digital transformation in higher education, however, should not be evaluated solely in the

Table 1

Four hierarchical levels of the university business process model

Learning and teaching process	Research process
Study programme accreditation	Research planning
Teaching process preparation and realisation	Research preparation
Teaching process outcomes monitoring	Research conduct
Teaching process assessment	Research outcomes monitoring
Student and teacher mobility realisation	Research evaluation
Enabling processes	**Planning and governance processes**
Student administration services	Organization management services
Library services	Change and business process management
Staff provision and development services	Plan development
Finance and accounting services	Budget and funds planning
Marketing, sale and distribution services	Performance assessment
Procurement services	

Source: Adopted from [21].

context of education and research missions. It is considered that digital developments in education and all other areas should be handled within the digital transformation in the institutional sense and that universities should develop strategies related to corporate information systems beyond the progress in information and communication technologies [15].

The institutionalization of universities, apart from education and research, also means the digitalization of governance as well as educational and research activities of the third-generation universities [16] and even the fourth generation universities [17–18], which should be entrepreneurial and innovative to adapt to today's conditions [19–20].

Table 1 summarizes the main activities of higher education institutions to present the basic processes of digitalization.

In this model, which builds internationalization and cooperation with stakeholders in innovation in education, research and social service missions of universities, it should be remembered that digitalization should provide technological, cognitive and ethical integrity [22].

In this study, a case analysis has been made about the extent, and how the universities use the concept of digital transformation in their strategic planning. Thus, a descriptive evaluation of the strategies and priorities of universities related to digital transformation is made. The study varies from former studies as the sample used in the study and includes the universities in Turkey that are ranked in the top 1000 (in a sense, prominent ones) in the world and the developing universities exhibit samples in terms of adaptation for the digital era. For this purpose, the following research questions were sought in the study:

1) Do strategic plans of the leading universities in Turkey have the purpose of conducting digital transformation?

2) Which of the digital transformation components do the strategic plans of the leading universities in Turkey contain?

2. Methods

2.1. Research design

This study was devised using a case study model, one of the qualitative research models, to examine the objectives and aspirations of digital transformation in the strategic plans of Turkish universities, which are among the first 1000 in most of the world ranking organizations. The case study includes the process of collecting, analyzing and reporting data on the basis of the event or samples [23] to examine the research topic in more detail and to make the case studied more comprehensible [24]. The case study method is a preferred system to find answers to how, what and why questions, where

Table 2

Universities and Rankings

#	UNIVERSITY	RANKINGS										
		URAP	WEBO METRICS	SCIMAGO	USNEWS	THE	CWTS	RUR	QS	NTU	CWUR	ARWU
IN 11 RANKINGS												
1	Hacettepe	527	758	599	531	550	447	415	775	575	525	550
2	Istanbul	579	769	586	663	900	317	561	900	575	560	450
3	Istanbul Technical	619	567	574	376	700	572	408	625	675	648	750
4	Middle East Technical	620	494	560	367	700	565	437	475	675	596	850
5	Ankara	687	777	642	597	1001+	656	571	900	675	625	850
IN 10 RANKINGS												
6	Gazi	776	931	641	858	1001+	862	676	900		679	850
7	Bogaziçi	809	594	617	234	550		419	495	725	740	950
IN 8 RANKINGS												
8	Erciyes	948	1301	654	1113	900	700				874	650
9	Dokuz Eylul	962	1112	674	1022	1001+	728				938	650
IN 7 RANKINGS												
10	Ege	746	882	624	778		526				616	850
11	Yildiz Technical	868	1205	671	769		778	662				950
12	Marmara	946	1198	657	910	1001+	858					950
13	Cukurova	1047	1268	695	826	1001+			900		932	
IN 6 RANKINGS												
14	Ataturk	1016	1284	652	1075		742				979	
15	Akdeniz	1203	1544	682	1100	1001+	900					
IN 5 RANKINGS												
16	Selcuk	1084	1431	678	1173		840					
17	Karadeniz Technical	1135	1451	682	1100		808					
18	Anadolu	1300	823	625	1127	900						

Source: [27–28].

the researcher has limited control over real events [25]. As this study aims to determine how expressions related to digital transformation take place in the strategic plans of Turkish universities, the case study design was used.

2.2. Working group

In the study, the purposeful sampling method [26], a method used for presenting the information more effectively and in more detail, was preferred, and only the first 1000 universities from the Turkish universities that make up the study universe to evaluate the aim of the study were determined as sampling in accordance with the purpose.

In the study, the University Ranking by Academic Performance (URAP) Laboratory, established within the Informatics Institute of Middle East Technical University, which has been ranking Turkish and world universities since 2009, is listed in the "2019-2020 URAP World Ranking List" dated December 11, 2019 [27] and the report dated February 27, 2019, on the status of "Universities in the 11 world ranking" [28] was used. For the sample, three criteria were set: (1) being a public university, (2) taking part in more than half (5 or more) of 11 world ranking institutions, and (3) being among the top twenty universities in the country. As 18 of the 23 public universities listed in the second criterion meet

the third criteria, 18 public universities were included in the sample. *Table 2* shows the inclusion of 18 public universities and ranking institutions.

2.3. Data collection tool

In this study, the "document analysis" method of data collection tools was used. Like other analytical methods in qualitative research, document analysis is a method that requires the analysis and interpretation of data in written and/or on electronic platform to make sense and develop empirical information [29].

Because there is a five-year strategic plan obligation of state institutions in Turkey, strategic plans were obtained from the web portal of Strategic Management in Public, Strategy and Budget Department of the Turkish Presidency. The five-year goals, objectives, and strategies under the title of "Strategy Development" included in the strategic plans were transferred to the Excel program to be evaluated and systematized [30–31].

2.4. Data collection and analysis

Data collection, based on the strategic plans of the universities, was carried out in December 2019. The content analysis method was employed to determine the status of digital transformation in strategic goals and objectives. According to L. Cohen, L. Manion, and K. Morrison [32], content analysis is defined as the process of summarizing and specifying the main contents of the written information and the messages they hold. In content analysis, there are four stages: data processing and coding, finding themes, arranging codes and themes, and interpreting the findings [33]. In this study, the strategic goals and objectives associated with digital transformation were coded and various categories and themes were reached in this context. After that, codes, categories, and themes were checked again. After the necessary corrections, the codes were digitized and the findings were interpreted.

2.5. Validity and reliability

The researcher triangulation [34] technique was used for internal validity; data collection, analysis, and interpretation were executed by two different academicians. For external validity, the process of data collection and analysis was detailed. Besides, direct quotation of information from secondary sources (university web pages) was also included.

In this study, M. Miles's and A. Huberman's consensus similarity formula was used for internal reliability and it was seen that the consensus ratio of the researchers increased to 88% and thus the internal reliability coefficient was at least 80% [35]. For external reliability, coding notes and other records on the data were retained in their original/raw form.

3. Findings

In this study, the data obtained from the strategic plans of 18 Turkish state universities that are the best 1000 universities in the world are analysed. For this reason, first, a status assessment was made regarding the strategic plans of Turkish universities.

3.1. Description of the case study

In Turkey, Public Financial Management and Control Law dated 10.12.2003 and No. 5018, made the strategic planning mandatory for all public institutions. With Law 5018, financial management processes have been redefined within the framework of public financial management reform. An important innovation introduced by the Law is that it considers strategic planning as a key component of the budgeting process for public institutions. In addition to the obligation of strategic planning, the Law also assigned the Ministry of Development to determine, which public administrations will prepare strategic plans, the timetable for the strategic planning process and the principles and procedures.

In addition to the relevant law, per the announcement dated 2.5.2018 and numbered 30409, for strategic plans covering the period of 2019–2023, to be prepared and evaluated according to the Strategic Plan Template in the Strategic Planning Guide for Universities in the Public Strategic Management website (www.sp.gov.tr), universities were requested to submit

Table 3

Contents of Universities' Strategic Plans

University	Period of Strategic Plan	Total Pages	Analyzer			
			IT Infrastructure	PESTLE Analysis	SWOT Analysis	Goal Objective Strategy
Akdeniz	2018–2022	152	✓	✓	✓	✓
Anadolu	2019–2023	102	✓	✓	✓	✓
Ankara	2019–2023	124	✓	–	–	✓
Ataturk	2019–2023	102	✓	✓	✓	✓
Bogaziçi	2015–2019	68	–	–	–	✓
Cukurova	2019–2023	88	✓	–	✓	✓
Dokuz Eylül	2016–2020	83	✓	–	✓	✓
Ege	2019–2023	79	✓	✓	✓	✓
Erciyes	2017–2021	95	✓	–	✓	✓
Gazi	2019–2023	132	✓	✓	✓	✓
Hacettepe	2018–2022	113	✓	–	✓	✓
Istanbul	2019–2023	Online	✓	✓	✓	✓
Istanbul Technical	2017–2021	67	✓	–	✓	✓
Karadeniz Technical	2019–2023	80	✓	✓	✓	✓
Marmara	2017–2021	71	✓	✓	✓	✓
Midfdle East Technical	2018–2022	145	✓	✓	✓	✓
Selcuk	2019–2023	74	✓	✓	✓	✓
YildizTechnical	2016–2020	72	✓	–	✓	✓

their strategic plans to the Ministry of Development by the end of April 2018. While half of the universities in the study have strategic plans for the 2019–2023 period, the strategic plans of the other half cover different periods as shown in *Table 3* and the strategic plans of five universities start from the period before 2018. However, there are no content differences between the strategic plans of 2018 and onwards that would affect the homogeneity of the sample.

The strategic plans to be prepared by the universities include 10 main sections. The prominent titles of these sections are: *status analysis,* in which they evaluate the field of activity, stakeholder relations, and sector positions through methods such as SWOT (Strength, Weakness, Opportunity, and Threat) and PESTLE (Political, Economic, Social, Technological, Legal, and Environmental); *differentiation strategies* and objectives, targets, performance indicators and strategies, in which they determine their position, success area, value presentation preference, and basic competency preferences are the headings of *strategy development*. Table 3 shows detailed information on the content of the strategic plans reviewed:

As can be seen in Table 3, it was determined that most of the strategic plans of universities between 60 and 150 pages made the status analysis related to technology and informatics infrastructure and mostly they used SWOT analyses in the sector and internal-external environmental analyses.

3.2. Assessment of findings

In the study, firstly, the word «digital» was searched in the text. Accordingly, eight universities that had the word "the digital" in their strategic plans were Gazi (n=7), Dokuz Eylül (n=3), Bogazici (n=2), Akdeniz (n=2), Hacettepe (n=2), Aegean (n=1), Istanbul (n=1) and Marmara (n=1) universities, while the other 10 had no such word.

The reason why the word digital was more in Gazi University's strategic plans compared to the other universities was that it was fed by

Table 4

Digital Transformation Codes by Education Theme

Theme	Category	Code	Number (n)
Education (n=103)	Learning technologies (n=51)	Flexible and technological learning diversity	30
		In-class and out-of-class technology development	11
		Curriculum techniques	5
		Course source difference	5
	Communication with students (n=19)	Communication with potential students	8
		Graduate student communication & collaboration	8
		Communication with current students	3
	In-service training (n=16)	Use of technology and informatics education	14
		Provision of digital expert staff	2
	Library (n=10)	Expansion of facilitating technology	6
		Database expansion	4
	Accreditation (n=7)	National / international accreditation	6
		Technological support	1

references about the Turkish Republic New Economy Programme (2019–2021). Here are some examples of plans that include the word "digital" in their goals and objectives:

"*…deficiencies in digital literacy will be met again in this plan period*" (Hacettepe University);

"*Effective use of digital promotion tools to eliminate the lack of communication and promotion with potential students*" (Akdeniz University);

"*To increase the efficiency and transparency of business processes by digitizing them*" (Bogazici University).

Secondly, expressions related to digital transformation in strategic plans were made. 4 themes, 14 categories, and 35 codes were obtained as a result of the analyses. After the coding, the themes were named as "education, research, social service, and management/governance" in the context of the basic missions of higher education.

In the strategic plans, the categories and codes under the educational theme related to digital transformation are shown in *Table 4*. Under the theme of education, codes were evaluated under the categories of learning technologies, communication with students, in-service technical training, library and accreditation.

According to *Table 4*, the expressions related to digital transformation in the strategic plans of universities are coded under the category of learning technologies (n=51) under the theme of education. In strategic plans, flexible and technological learning diversity (n=30) statements were seen most. The majority of the statements under this code are related to distance education and open education. The second most coded category was communication with the students (n=19), it was seen that there were expressions about the use of digital tools in communication with the most potential students (n=8) and graduates (n=8). In the in-service technical training (n=16) category, it was found that the expressions mostly related to the use of technology and informatics training (n=14) of academic or administrative staff in the university.

For flexible and technological learning diversity, for example, at Bogaziçi University, a goal has been set for flexible learning methods such as "*developing distance education packages that can be delivered simultaneously and asynchronously and providing access to them over the network*". At Akdeniz University, on the other hand, a strategy has been developed in terms of in-class technologies to "*overcome the deficiency of virtual classroom and electronic technology*".

Regarding the use of information technologies in communication with students, for example, Dokuz Eylül University states that they aim to establish a "*Science Community Center to*

Table 5

Digital Transformation Codes by Research Theme

Theme	Category	Code	Number (n)
Research (n=18)	Innovation (n=9)	Innovative product development	4
		Renewable environment and energy projects	4
		High domestic technology development	1
	Entrepreneurship (n=5)	Utilization of incubation services	3
		Start-up / Technopark technologies	1
		Develop your own software	1
	Research technologies (n=4)	Digitalization of research infrastructure	2
		Technological equipment of laboratories	2

establish a long-term bond with potential student" while Anadolu University points out the importance of social media channels in communication with graduating students by stating that "*the share of social media should be increased in eliminating the communication problem with graduating students*".

In the context that the adaptation of academic and administrative staff to digital transformation is only possible through education and providing in-service technical pieces of training, for example, Anadolu University presented a solution offer as to "*increase in-service trainings on how academics can apply technology effectively and use technological developments more commonly in formal education such as mobile learning, social media and augmented reality*".

In strategic plans, the categories and codes under the research theme related to digital transformation are shown in *Table 5*. Under the research theme, codes were evaluated under the categories of innovation, entrepreneurship and research technologies.

According to *Table 5*, the expressions under the research theme were coded under the category of innovation (n=9). Under this code, it was found that there are more strategies for innovative product development (n=4). Under the entrepreneurship (n=5) category, utilization of incubation services (n=3) and under the research technologies (n=4) category, digitalization of research infrastructure (n=2) was coded at the maximum number.

Regarding innovative product development, for example, Dokuz Eylül University has set a goal "*to develop at least one innovative product (therapeutic product, diagnostic kit, cellular therapy, bio-similar drug, etc.) in priority areas*". On the other hand, renewable environment and energy, which is one of the important developments of the digital age, for example, Marmara University has set a target "*to save energy and water in our campus and to work on the use and production of renewable energy sources*".

Following the digital transformation in the field of entrepreneurship, for example, Gazi University underlined the importance of digitalization in the activities carried out in the sense of entrepreneurship such as "*in Digital Design Laboratory, researchers and undergraduate/graduate students produce digital design, application and prototype production within the scope of industrial product design*". Besides, the Middle East Technical University accepted "*the number of students who completed the pre-incubation and incubation processes of their research, the start-up project budget and the number of technoparks*" as performance indicators in achieving their objectives.

Regarding the digitalization of research infrastructures, for example, Ankara University stated that they aim at the effectiveness of virtual tracking systems "*in the research infrastructure by specifying that the important devices of the research infrastructure within the university will be kept in the virtual central laboratory by providing and maintaining the consumables*". At the same time, Ataturk University has determined to adapt the laboratories to digital transformation innovations in the form of improving

Table 6

Digital Transformation Codes by Community Service Theme

Theme	Category	Code	Number (n)
Social Service (n=11)	Relationship with external stakeholders and society (n=5)	Socio-cultural and social responsibility	3
		Promotion and presentation of university services	1
		International network of higher education	1
	Sustainable campus (n=4)	Smart, sustainable and unobstructed campus	2
		Environmental-friendly campus	2
	Relationship with the sector (n=2)	University-sector cooperation in digital transformation	1
		Leading IT services competition	1

"*the infrastructure and facilities and technical equipment in 30% of the laboratories and accrediting the laboratories in the applied units*".

In the strategic plans, the categories and codes under the social service theme related to digital transformation are shown in *Table 6*. Codes under the social service theme were evaluated under the categories of relationship with external stakeholders and society, sustainable campus and relationship with the sector.

According to Table 6, it is seen that under the social service theme, establishing relationships in terms of socio-cultural and social responsibility (n=3) is mostly coded under the category of the relationship with the external stakeholders and the society (n=5). Secondly, smart, sustainable and unobstructed campus codes (n=2) take place under sustainable campus (n=4) category and university-sector cooperation (n=1) codes in digital transformation under the category of relationship with sector (n=2).

Concerning the use of digital tools about external stakeholders and the community, for example, Middle East Technical University determined the objective of "*establishing and expanding open access mechanisms for disseminating knowledge to the society and increasing academic visibility*", while Anadolu University stated that "*the activities within the framework of social responsibility of universities will be promoted by using all information communication facilities*".

For smart campuses based on digital technologies in terms of a sustainable campus, for example, Istanbul Technical University aims "*to reach the smart building infrastructure and to provide smart transportation-ring services with electricity on the campuses*". Middle East Technical University, on the other hand, has pointed out the objective of "*preparing and implementing a report that includes information-oriented, short, medium and long-term project proposals and priorities that will support the development of smart, sustainable, durable and barrier-free campuses*".

Regarding university-sector cooperation in digital transformation, for example, Gazi University stated that "*innovative university-sector cooperation models will be established within the framework of the needs of the industry and digital transformation targets*" and so the university emphasized that it internalizes the country's top policy objectives in its strategic plan.

In strategic plans, categories and codes related to digital transformation under the theme of management/governance are shown in *Table 7*. Under the management theme, codes were evaluated under the technological infrastructure, automation-software, internal and external communication, performance evaluation and management information system categories.

According to Table 7, it is seen that the codes are mostly marked as internet/web system/mobile networks (n=16) under the category of technological infrastructure (n=29) within the management/governance theme. The statements in the second most coded automation-software (n=27) category were also coded as software/data/server (n=17). Regarding the Management Information System (n=12) category, the codes

Table 7

Digital Transformation Codes by Management/Governance Theme

Theme	Category	Code	Number (n)
Management Governance (n=68)	Technological infrastructure (n=29)	Internet / web system / mobile networks	16
		Information-operating systems	13
	Automation-software (n=27)	Software / data / server	17
		Automation systems	10
	Management Information System (n=12)	Use of information technology in management	6
		Corporate communications	3
		Performance evaluation	3

related to the use of information technologies in management (n=6) were the highest.

For the code of internet/web system/mobile networks, the target of Cukurova University "*to update the web pages of our university and its units and to increase the visual richness*" can be given as an example. Moreover, for the information-operating systems code, the target that aims to perform "*existing information infrastructure of Hacettepe University will be strengthened*" can be another example.

Regarding software/data/server codes, for example, Ege University's statement of "*introducing new good practices to the university within the scope of software technologies*" can be an example. In addition, for automation systems, Selcuk University has set goals for the "*realization of the software needed for the new automation systems*".

Under the Management Information System category, for example, Ankara University aims to *"achieve a sustainable management information system that will be developed technically and managerially and new systems will be added"*. Selcuk University, on the other hand, stated that it aims to have an integrated performance evaluation system with the statements of "*establishing an integrated measurement and evaluation system with the existing information support systems"*.

4. Discussion

This study aims to examine the strategy determination situations related to digital transformation in strategic plans of universities by the content analysis method. For this purpose, 18 Turkish universities ranked in the first 1000 in the world ranking lists were selected as the sample. The reason why these universities were selected that, as well as being long established and prominent; they are presumed to include vital clues on understanding digital transformation awareness in the country's higher education system of the related vision and strategies about digital transformation.

According to the findings obtained from the Turkish universities examined, it can be mentioned that the Turkish universities generally perceive digital transformation as a technological tool and cannot internalize their corporate goals as a strategic component. This finding is consistent with the findings of F. Almaraz-Menendez, A. Maz-Machado and C. Lopez-Esteban [8] on the strategic documents of a medium-sized Spanish state university. As, in this study, it has been found out that in the strategic plans of the universities, there are strategies related to learning/teaching technologies under the theme of digital transformation. In this sense, it was seen that the universities emphasize flexible and technological learning diversity the most due to their goals and objectives related to distance education and open education. This contradicts with the recommendations in the literature that the use of technology beyond all aspects of digital transformation should be addressed [15–22].

On the other hand, it can also be stated that Turkish universities tend to distance education or open education methods parallel to the general trends in the world. It is thought that the

reasons for cost-saving and resource need are effective in this orientation in Turkish universities as in the world. However, it should be noted that the cost-saving feature of distance education is still controversial [36]. Moreover, while the most important objectives of the universities in a digital transformation are to be student-oriented [37], the deficiencies of the strategy of Turkish universities regarding innovative and digital learning methods are contrary to the spirit of digital transformation. Because the most important feature of digital transformation is personalization, and in higher education, digital transformation means the transformation of a digital learning environment beyond the development of information technologies. This, of course, makes it inevitable to focus on the learner and learning experiences of higher education institutions in digital transformation [14].

The fact that the strategic plans of the universities included in the study, such as providing pieces of training on technological transformation to in-university academic staff, can be considered a positive strategy for eliminating generation conflicts in the form of digital native and digital immigrants [38]. Actually, as in the study of A. Balula et al. [39], negative attitudes towards digital technological innovations may be seen in academicians and pieces of awareness training are recommended for such resistances.

In the study, it was found that the expressions and targets related to the management information system, technological tools such as the internet, web system, software, and automation take place more in the strategies of the universities. This is, however, a particular case for the early stages of digital transformation covering the 1980–1990s [40]. Digital transformation is, in fact, an integrated governance process that encompasses all the vision and strategies of the organization and designs communication with external stakeholders and their needs [41].

In this study, it was also found out that the aims, objectives and strategies of digital transformation related to research and social service missions of Turkish universities are rather low. Although the prescription of world-class universities is research universities [42] and in this sense, although most of the universities in the sample are declared research-mission oriented-universities by the top policy-makers in the country, in the research mission, it is important to address this urgent situation that contradicts with the era.

Similarly, communication and cooperation to be established with the external stakeholders, especially the sector, and with the society are considered quite pivotal for today's university understanding. The fourth generation of universities [43], where proactive development mission is attributed to the local socio-economy in global markets, is expected to fulfill these missions in an era of digital transformation. This means that universities first perceive and realize digital transformation themselves and only then involve the region and society in the process.

5. Conclusion

On the basis of the study undertaken and described in this paper, it is recommended that the universities involved in the study increase awareness of digital transformation and set goals and objectives that will make digital transformation an integrative corporate strategy of the university. In doing so, it is also important that each university develops its methods following the essence of the digital age, which makes the truth relative. It should not be forgotten that the most important point to be developed for the perception of the digital transformation of the strategy makers in the universities is the student (learner) focus and participation.

The study has certain limitations. As the study was carried out in a small sample of Turkish universities, it is far from being generalizable regarding the digital transformation of Turkish higher education, yet still it can be viewed as a starting point for further studies in terms of introducing the digital transformation strategies of the leading universities. Future studies may include more universities in the country as well as comparative examples of the successful digital transformation of universities abroad.

To determine the status of digital transformation strategies in universities, it is possible to provide the evaluation of the internal and external stakeholders, especially the sector, through quantitative and/or qualitative methods such as surveys, interviews and focus meetings. In addition to the contribution of these empirical studies to the practitioners, it is thought that it will provide significant theoretical advantages to researchers in terms of both structure and actors in the perception of digital transformation in the higher education system.

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Цифровизация в высшем образовании: тематическое исследование планов стратегического развития

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Аннотация. *Целью представленного в статье исследования является определение места цифровизации в стратегическом развитии университетов. Для этого с помощью метода контент-анализа изучались планы стратегического развития 18 университетов Турции, входящих, по оценке мировых рейтингов, в 1000 лучших вузов. Элементы цифровизации, отражённые в планах стратегического развития университетов, были объединены по 4 темам, 14 категориям и 35 кодам. Оказалось, что задачи университетов в области цифровизации относятся прежде всего к категории разнообразия и гибкости технологий обучения, особенно в сфере дистанционного/открытого обучения, в наименьшей степени цифровизация касается научных исследований и социальной сферы. В связи с этим был сделан вывод, что университеты пока не в состоянии распространить цифровизацию за пределы технологического обновления инфраструктуры и внедрить интегральную трансформационную модель. Результаты проведённого исследования сопоставляются с эмпирическими и теоретическими данными, опубликованными в литературе. В исследовании было сделано предположение, имеющее значение для университетов и будущих исследований, которое заключается в том, что университеты Турции сопоставимы с зарубежными университетами, демонстрирующими примеры удачной цифровизации, а применённые количественные и качественные методы могут быть использованы внутренними и внешними стейкхолдерами, особенно теми, кто осуществляет оценку данного сектора.*

Ключевые слова: *цифровизация, университеты Турции, стратегические планы университетов, контент-анализ, мировые рейтинги вузов, интегральная трансформационная модель*

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