DIGITAL MATURITY IN THE ADMINISTRATION OF A UNIVERSITY OF APPLIED SCIENCES

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Abstract

Digital Transformation is very slowly coming within the reach Public Administration in town, city, county, state and the federal government. If and how it reaches Public Administration in the Universities of Applied Sciences (UAS) however, has not yet being analyzed. The UAS point out that they have a strong practical orientation and devote themselves to this in their research. Therefore, they have research programs and lecture programs focusing on Digital Transformation. Coming face to face with this, the question arises whether the Digital Transformation has not just found its way into research and teaching but also into the administration of UAS. This paper describes an analytical model for assessing digital maturity and then addresses this question through an example of a UAS in Baden-Württemberg.

1. Introduction

The UAS in Baden-Württemberg are on the one hand public institutions with bureaucratic administrative structures but on the other hand they are similar to a private business with their given autonomy and competition amongst themselves. [1] Their concern is to provide society and the economy with the strength for innovation through an up-to-date combination of science and practical orientation as well as excellent quality teaching. [2] In addition to their core responsibility for research and teaching they are also responsible for further adult education as knowledge for life-long learning. Countless papers as well as new teaching materials and methods prove that they achieve their responsibilities by working on Digital Transformation. The UAS administration has the responsibility to unburden and support the areas of research, teaching and further education and thus becomes a service provider. Because of this the UAS administration is different from other public administration. Considering digitalization this means that its transformation should be stretched to the areas of research, teaching, further education and administration.

The government of Baden-Württemberg stresses the importance of digitalization in its strategy with their statement: "We will support the Universities of Baden-Württemberg for further development of their business processes concerning research, teaching and knowledge transfer to make use of the possibilities offered by digitalization."[3] and the Commission of Research and Innovation (EFI) explains in its report that digitalization is the major requirement for excellence in research and teaching [3].

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[3] *„Wir werden die baden-württembergischen Hochschulen dabei unterstützen, ihre Geschäftsprozesse weiterzuentwickeln, um die Möglichkeiten der Digitalisierung zu nutzen: in der Forschung, in der Lehre und beim Wissenstransfers."*[3]

The expectations of the service ability of UAS are rising [4] but not to the same extent as the means available. To bridge the gap between the demands and resources [5] there must be an increase in efficiency in all aspects to achieve a better provision of service and higher economic efficiency. [6] This could be achieved by using digital technology as shown by the following examples. Since the Eighties students at the University of Vienna have been able to obtain information or to enroll by using a screen text. [7] In Hungary the campus management system NEPTUN [8] is in use as are similar systems in Germany e.g. Fernuniversität Hagen [9]. So the question arises: if the Digital Transformation of UAS administration already exists and up to what extent Digital Maturity has been reached.

In order to analyze the extent of the digitalization and assess the maturity level of UAS administration, we need a general maturity model and information about their core processes to be able to design a data gathering instrument based on the maturity model and tailored to UAS as a vision of a "mature" UAS administration. Additionally we need a vision of a "mature" UAS administration to be able to define the scale for measuring the degree of maturity.

2. Degrees of Maturity and Maturity Models

First of all the core processes were identified within a framework of an organizational analysis and illustrated in a process map. Since there is no digital maturity model in the literature suitable for every organization and nothing specifically for UAS administration, the development of a digital maturity model followed. 12 different digital maturity models were identified and compared (see table 1). All of them were developed through business consultants, scientists, researchers and all of them are being successfully used in different organizations such as companies and ministries.

Each maturity model consists of (a) dimensions to define the business areas and (b) the indicators to check the extent of digitalization within the dimensions, (c) maturity levels for the assessment of the degree of digitalization. Comparing the models we noticed that the core dimensions are similar even if they are split in different ways. So we needed to define the number of maturity levels, to identify the relevant dimensions and to decide upon the indicators for the measurement. Considering the given circumstances of core processes and structures of UAS we worked through these three steps (a) to (c) identifying nine dimensions, each having equal importance, and their indicators (see table 1) as well as five maturity levels beginning with 0 (no digitalization up to minimal digital implementation) up to 4 (complete digitalization).

A questionnaire was designed based on the newly developed maturity model. To guarantee that the participants understood each dimension and its indicators additional explanations were given. The field survey took place in a faculty of one of the biggest UAS in Baden-Württemberg. The faculty was chosen as a random sample. 60 people were invited to complete the questionnaire online. 34 were professors, six scientists and six lecturers – representing the lecturing and research perspective dependent on the administration, eleven administrative employees and one secretary, one IT-administrator, one head of marketing – all representing the administration.

Maturity Model of / Dimensions	Universität St. Gallen [10]	Deloitte [11]	Hochschule Ulm [12]	Wolf/Stroschen [13]	Bundesministerium des Innern [14]	BSP Business School Berlin [15]	FOSTEC & Company [16]	Appelfelder/Feldmann [17]	Netode AG [18]	DRP Reifegrad Fraunhofer [19]	Forrester [20]	Accenture [21]	SUM
Organizational structure	1	1	1	1	1		1		1		1	1	9
Information- and Communication Technology	1	1		1	1	1	1	1	1		1		9
Business Processes	1	1	1	1	1			1	1			1	8
Customer Experience / Customers Perspective	1	1	1		1	1	1	1	1				8
Culture & Expertise	1	1		1	1	1			1	1	1		8
Strategy	1	1			1	1	1		1	1		1	8
Employees			1	1	1	1		1		1			6
Products & Services	1		1	1				1	1				5
Collaboration	1			1					1	1			4
Production / Delivery			1	1				1					3
Business Models			1					1					2
Networking with Partners				1				1					2
Supplier & Partners			1					1					2
Agile Methods			1							1			2
Services			1									1	2
Data Management				1				1					2
Controlling / Continuous Improvement Proc.					1						1		2
Transformation Management	1												1
Communication				1									1
Production 4.0										1			1
Methods & Tools					1								1
Leadership						1							1
Competition							1						1
Value-added Chain				1									1
Standardization					1								1
Number of Maturity Levels	5	-	5	5	5	4	10	5	5	5	4	5	5,3

Table 1. Dimensions of the identified 12 maturity models

3. A "Vision" of a digitalized UAS

As already explained five grades of digitalization beginning with 0 (no digitalization up to minimal digital implementation) up to 4 (complete digitalization) were defined. So the question arises, what is meant by the highest score "complete digitalization"? One would think that it primarily aims at controlling the flow of processes by means of "digital technologies" – i.e. IT systems. That is only one part of the vision limited to an e-Government-perspective [22] which focuses more or less on the core processes of a UAS. Considering the whole organization, the research results of Digital Transformation [23] and working through all dimensions of the different maturity models, the

vision is a broader one. Our vision of a digitalized UAS is an organization which makes use of digital technologies to benefit in every aspect such as offering new and additional (e-)services to their customers as well as supporting and empowering their employees to do their work in an up-to date way. Its goal is to speed up workflow processes, to give the employees more time to focus on important work and to provide them with the opportunity to be agile in order to meet new expectations, new requirements and new trends, to be able to act and to adapt to changing circumstances in order to fulfil their task in providing society and the economy with the strength for innovation through an up-to-date combination of science and practical orientation as well as excellent quality teaching and the transfer of knowledge.

To achieve this goal, each of the chosen dimensions is needed. For example digitalization needs cultural change. Several digital transformation projects are proof that digitalization focusing only on digital technologies does not meet the expected results as long as there is no digital culture. Analogue procedures are reproduced accurately in digital procedures, but a worse analogue procedure is a worse digital procedure. Behaviour patterns and ways of thinking, the people's mindset and their mental horizons need to be changed so that they "think and act" in a digital way. Only then can the benefits of digital transformation be derived. [11] This means i.e. that employees need digital abilities and recruiting employees need to consider this ability by selection processes. Additionally employees need to enhance their digital and non-digital competencies through an extensive education program to stay up-to date and to continually develop their abilities. [14,15,16,19]

4. Results and Discussion

Thirty-eight people took part in the questionnaire. This represents 63.3 percent of the sample. The whole of the results are shown in table 2. For the assessment we used the marking where each indicator was positioned on the scale from 0 to 4. The abbreviation "RG" stands for the average of each indicator as well as for its maturity level, ⌀ shows the maturity level of the dimension.

Dimension	Indicator	RG	⌀
Organizational structure	There is one person in charge of the digitalization of the administration	1,4	1,3
	Cross-departmental and cross-functional teams work on and drive the projects of digitalization.	1,3	
	The UAS provides personnel and financial resources for the digitalization of the administration.	1,7	
	The administration has the ability to react /to adapt to digital changes and its requirements.	0,8	
Information- and Communication Technology	ICT meets the expectations and needs of students, researchers, lecturers and employees.	1,7	1,3
	The IT-department offers and uses up-to date technology and is able to develop and implement it in short-term.	1,2	
	All IT-systems are connected and they exchange data in the sense of "once only"	1,1	
	There is a central data storage for customer data which can be used by all departments who need it.	1,3	
	Electronic file management is implemented throughout the whole organization.	0,7	
	IT-Infrastructure offers new possibilities and supports collaboration.	1,8	
Business Processes	Standardized processes are automated.	1,3	1,1
	Continuous improvement of digitalization and standardization is implemented.	1,1	
	Digitalized business processes - without any changes of media usage.	1,1	
	The business processes will be continuously improved.	1,4	
	The business processes are transparent and easy to understand.	0,9	
	The business processes are measured via key performance indicators.	1	
Customer Experience / Customer Perspectives	All communicational channels (e.g. email, sms, paper, face to face …) are available for the customers to address their issues.	1,4	1,0

	Information is tailored to the customers' needs.	1,2	
(students, lecturers, researchers, employees)	User behavior is tracked and used to improve processes and services.	0,7	
	Feedback of customers is valued and analyzed to improve services and processes.	1,1	
	Customers are able to track the processing of their issues.	1,0	
	Customers are involved in process design and service development	0,9	
	New trends and technologies are used for communicating with customers.	0,9	
Culture	The administration knows that digitalization is a success factor for competition.	1,5	1,1
	The administration is ready for digital change and has the ability to drive digital change.	0,7	
	The administration has a culture of constructive criticism. Its zero-defect culture promotes dealing with errors actively and openly in order to benefit from potential improvements.	1,0	
	The UAS management encourages and promotes digital innovation in administration.	1,4	
	The management are prepared to take risks into account when it comes to digital innovation in existing business of the UAS.	0,9	
Service Delivery	Up-to date technology (e.g. customer relationship management systems) supports service delivery completely.	1,0	1,0
	All services offered by the administration are digitalized from customer back to customer.	0,9	
	Value added e-services are all well-known and transparent.	0,9	
	Customer feedback management is implemented.	1,0	
Strategy	The UAS has a vision of digitalized administration.	0,9	0,9
	A holistic and integrated strategy for digitalization of administration exists and is embedded in the Structural and Development Plan of the UAS.	1,1	
	All employees participate in the strategy development.	1,1	
	All employees know the digital strategy of administration.	0,6	
	The management of administration gives a good example when it comes to digitalization and they work on it.	0,9	
	All goals of the digital transformation are „SMART" (specific, measurable, achievable, realistic, timed).	0,7	
	All actions to digitalize administration follow a concerted policy.	0,7	
	The strategy of Digital Transformation is regularly checked and adapted to new trends and technology.	1,0	
Collaboration	Mobile devices support cross-departmental and cross-functional collaboration.	2,5	2,1
	All employees have the choice to work mobile.	2,4	
	Teams optimize their collaboration through mobile work.	2,1	
	The administration is connected and uses collaboration platforms.	1,8	
	New Work-methods and techniques are used to improve collaboration.	1,6	
Employees	The administration considers the digital ability of applicants in their recruiting procedures and selection processes.	1,5	1,4
	The administration offers an extensive education program focusing on digital competencies of their employees.	1,0	
	Employees are motivated, asked and urged to extend their digital ability.	1,4	
	The administration has a strategic HR development program to improve the digital ability of employees.	0,9	
	All employees actively use their digital ability, methods and techniques.	1,7	
	All employees express a strong interest in participation in the digital transformation of their UAS.	1,9	
	All employees of the administration use agile methods e.g. Scrum, Design Thinking, etc.	1,1	
Digital Maturity Level of the UAS administration			**1,2**

Table 2. Maturity levels of dimensions and its indicators

The results of the analysis show that the digital maturity level for the UAS administration is generally low with an average of 1.2. Figure 1 gives an idea of the overall status. The diagram makes it clear with the exception of the dimension "*Cooperation*" that all dimensions stand at level 1. Level 1 is defined as "It is recognized that digital transformation management is necessary" which means that although it has been recognized no concrete steps have been taken. It is worth noting that the dimension "cooperation" comes out above average with the digital maturity level of 2.1 compared with the other dimensions. It is also worth noting that the dimension "strategy" comes

out with the worst average of 0.9 compared with the others. This is all the more remarkable since at strategic thought and action is taught at the UAS.
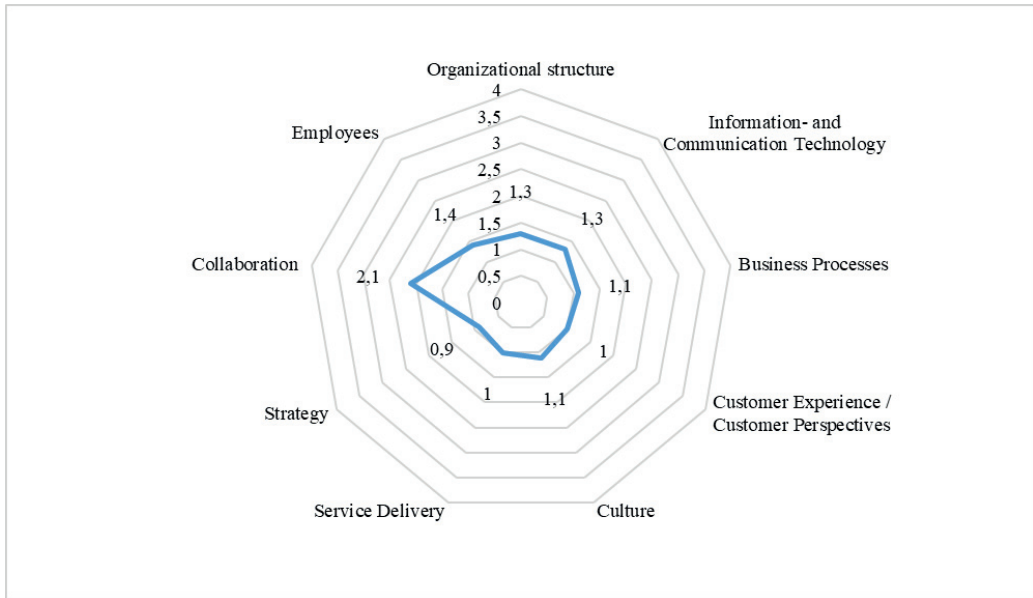

Figure 1. The Digital Maturity Level of the UAS [24]

The participants were particularly critical that the UAS is not able to react quickly to changing demands. This can be seen from the indicators "preparedness to be mobile" and "ability to change" as well as "ability to take a risk". Above all the participants criticized the performance of the core processes, the lack of participation of clients while designing the business processes and the missing e-document management / e-archive. The possibility of mobile work which supports internal collaboration received a positively response. Additionally the participants commented that they would like to be involved in the process and implementation of Digital Transformation.

Looking at the results the question arises why digitalization caused profound changes only in the private sector and didn't reach the administration of a UAS. This is all the more remarkable when we consider the fact that the UAS focuses on the subjects Economy, IT and Technique and therefore cooperates with the private sector to successfully fulfill its core responsibilities. Maybe the strength of their practical orientation of the UAS is limited to theoretical work in research and teaching. Maybe there is a border in transferring research findings and knowledge to the internal organization. When we searched for the digitalization strategies of the UAS, we could only find two UAS which had their strategy online and wrote about it.

Another explanation may offer the implementation of the digital strategy for Baden-Württemberg. Even if *strategy* emphasizes that business processes may be supported, the implementation focuses on research and teaching e.g. they started a new program for "e-Learning" which supports new teaching methods and materials and they initiated a network called "Hochschulnetzwerk Digitalisierung der Lehre in Baden-Württemberg". [25] There are no action plans or activities focusing on campus management systems and the business processes connected to research and teaching.

The administration of UAS is hierarchically and traditionally organized like most of the public administration. Therefore they show little willingness to change anything, if the change is not driven by the management. The management drives change if they have to face competition or to meet financial deficits or to attract new employees in the time of demographic change. The pressure of change is not yet high enough. This is proved by their hesitant attitude to implement new software and drive digital transformation overall [26].

5. Summary

This paper addressed the question whether the Digital Transformation has only found its way into teaching and research as a topic but not into the administration of UAS. Considering the results of the study the question can be answered with "no". The digital maturity of the chosen University of Applied Sciences is 1.2 on a scale ranging from 0 to 4. The lowest score of the nine analyzed dimensions (organizational structure, information and communication technology, business processes, customer experiences and perspectives, culture, service delivery, strategy, collaboration and employees) could be found in *strategy* with 0.9. This is surprising because each University of Applied Sciences has to publish annually a so-called "Structural and Development Plan" which is examined by the Ministry of Education, Science and Culture of Baden-Württemberg.

Based on the hypothesis that the chosen UAS represents all UAS in Baden-Württemberg alarm bells should be ringing in times of Digital Transformation. The results show that the UAS administration is not aware of the importance of digital change, nor willing, and therefore not prepared to drive the digital change. Following the statement of Prof. Scheer [27] who said: "Only if the administration is innovative, the areas of teaching and research are able to proceed in the digital future." this underlines the necessity to drive the Digital Transformation in all areas of a UAS: research, teaching, further education *and* administration.

The study was limited to one faculty of one of the biggest UAS in Baden-Württemberg. So the conclusions of the results are limited and can only be seen as an indication. Additionally the majority of participants represented the customer perspective, not the perspective of administration. Therefore, to verify the findings, further research is necessary with a bigger sample.

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