Cross-university Platforms as an Enabler for Knowledge Management and Transfer

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Abstract: Collaboration Platforms are virtual or physical places that serve as an intermediary or medium for the exchange of technology, knowledge, products or services between previously independent actors or institutions. In academia, they can facilitate the collaboration between universities. One increasingly important area of collaboration is knowledge management and transfer. In this paper, a literature review is applied in order to derive the state of the art of university platforms for knowledge management. Based on this, the purpose of such platforms is analysed. The results indicate that knowledge transfer focuses on teaching, research, and transfer activities. Often, e-learning platforms are used to facilitate cross-university transfer of knowledge. The motivation to use such platforms is to share knowledge, to make use of synergies in cooperation and to gain more visibility. It is also shown in this paper, that despite its common application, there is a gap in scientifically evaluating the effective contribution of such platforms as enabler for knowledge management.

1 INTRODUCTION

Collaboration with other research facilities and universities is of growing significance for universities. Dedicated platforms and related business models facilitate such collaborations and are increasingly being applied within the university landscape, for example within the field of teaching or the sharing of knowledge about transfer activities (Gawer 2014). Successful knowledge management (KM) is an important competitive advantage of universities as it supports the identification, sharing, and adoption of good practices beyond university borders. Knowledge management focuses mainly on the core components of „People, Processes and Technology". *People* have an important impact on knowledge management as they generate, engage and encourage the sharing of knowledge (Stylianou and Savva 2021). *Processes* describe methods for acquiring, generating, transferring and also sharing of knowledge. *Technology* describes how organizations administer their knowledge (Chugh 2019). This includes accessible databases with knowledge generated by people. When universities are working closely together and form so-called "platforms" they can benefit from the sharing and transferring of knowledge with each other. In this situation the universities are in a situation of cooperating and competing with each other at the same time. This relates mainly to the fact that often universities with similar teaching and research areas or universities in the same geographic region form these platforms or collaborations. Therefore, they do not only compete against each other for students, but also for projects and funding (Doering and Seel 2019). Knowledge management and the transfer of knowledge is widely described in various research publications, but mostly it relates to knowledge management between transfer partners from industry. Therefore, the following research questions arise:

RQ1: What is the state of the art of knowledge management and transfer in university platforms?

RQ2: For which purpose do universities form platforms to share knowledge?

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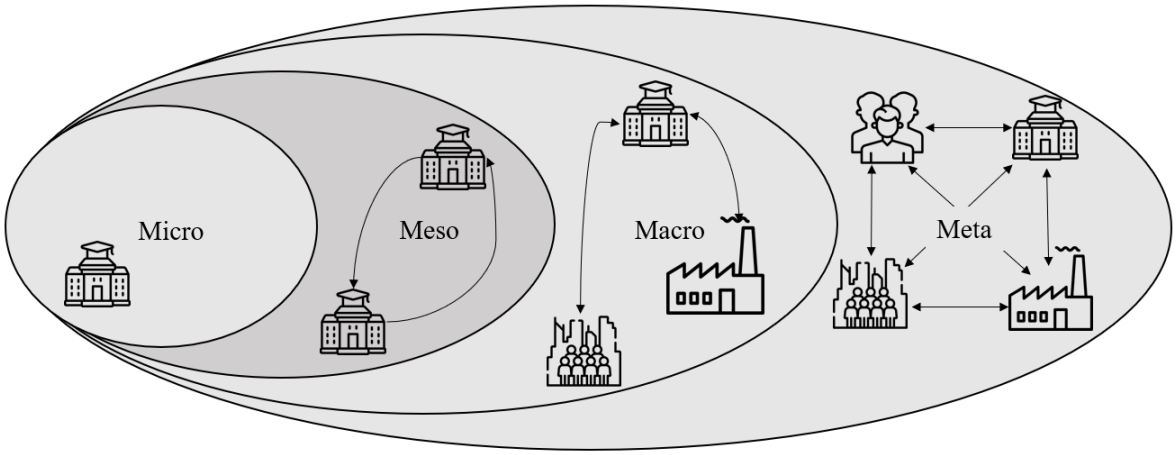

Figure 1: Dimensions of Transfer of Universities (own representation).

This article will firstly describe the research background of knowledge management and transfer within university platforms and then outline an extensive literature review and analysis on this topic.

2 RESEARCH BACKGROUND

Knowledge itself is one of the most valuable assets an organisation can possess (Levy and Linn 2020). According to PETER DRUCKER, who first described the term „Knowledge Worker": *„Knowledge is the only meaningful economic resource*" (Drucker 1995). The term "knowledge" can refer to various forms of knowledge, e.g. factual knowledge (data, facts, events), process knowledge (knowledge about procedures and cause-effect relationships) or knowledge of action (know-how, problem-solving knowledge) (Armstrong 2008; Goldman 2004; Hedlund 1994). Each type of knowledge has both tacit and explicit parts (Nonaka and Takeuchi 1995). Explicit knowledge summarizes the more easily transferable, organizational and factual knowledge, tacit knowledge is inherent to the person knowing (Polanyi 1983). In university platforms a voluntary exchange of knowledge, ideas, technologies, experiences between the different universities can take place. Transfer with external partners from industry and society is not a new concept for universities. Since the 1980s theoretical concepts for transfer were developed, e.g. the theory of "entrepreneurial universities" (Clark 1998), "Mode 2" (Gibbons et al. 1994) and "Triple Helix" (Etzkowitz and Leydesdorff 2000). All these theories incorporate the idea that universities interact with their surroundings in a deep knowledge transfer. Knowledge transfer refers to the process of transferring relevant knowledge. Knowledge transfer refers to diffusion, distribution and reproduction of a transfer object and is not an accidental event, but always an explicit and controlled process, which can take place in different dimensions (see Figure 1).The micro-level refers to transfer within an institution (e.g. university), the meso-level refers to transfer between peer institutions (e.g. multiple universities or research institutions), and the macro-level refers to transfer between different partners outside the institution (e.g. partners from industry/society) (Wilkesmann 2007). Transfer on the meta-level refers to a profound knowledge society in which knowledge is shared between all partners. One task of universities is primarily only the transfer of knowledge from the micro to the macro-level and also eventually take part within the meta-level. Knowledge management and transfer on meso-level illustrates the situation of university collaborations or platforms.

The word platform was already used in the Middle Age. According to the Oxford Dictionary it refers to a construction, a raised, flat surface on which things can be placed, intended for a particular activity or operation. In research, the word platform has been used in very different contexts. WHEELWRIGHT and CLARK (1992) dealt with platform products, KOGUT and KULATILAKA (1996) examined platform investments, KIM and KOGUT (1996) platform Technologies, SAWHNEY (1998) platform thinking and ROCHET and TIROLE (2003) platform from the perspective of industrial economists.

Platforms can take on different dimensions. EVANS and GAWER (2016) describe transaction, innovation, integrated and investment platforms. Transaction platforms connect previously independent actors and facilitate or enable the

exchange of technologies, products or services. Services are considered differently and can be distinguished as Acts-Based Services or Ownership-Based Services. Services can be created and built upon either through acts of somebody or through the ownership of physical or intangible assets (Kayastha 2011).

Universities often act as transactional platforms in the context of knowledge management by providing access to their knowledge or technology to other actors or institutions under the ownership-based service theory. The attractiveness of a university depends either on the number of actors on its own side (for example in a network of several universities) or on the number of tangible and intangible assets, knowledge or patents.

3 METHODOLOGY

The literature review and analysis is structured by the framework from VOM BOCKE et al., with a definition of scope by the taxanomy of COOPER and a concept matrix by WEBSTER and WATSON (Vom Brocke et al. 2009). Vom BROCKE et al. emphasize, that the process of a literature search must be described in a comprehensible way, so that readers can check the completeness of the literature search and, if necessary can then use it for their research (Vom Brocke et al. 2009). The phases in which this review and analysis is described by Okoli (Okoli and Schabram 2010).

Planning Phase: to determine the scope of the literature review, the taxonomy by COOPER was used and is displays in Table 1 (Cooper 1988). The focus of this literature review is on published research outcomes and theories in the field of knowledge management and transfer within university platforms by investigating the current and previous state of research. With taking a neutral position and a conceptual representation in this review, works that are based on the same abstract idea are considered together. The coverage of this review is exhaustive and is described for specialised scholars and experts.

To identify a relevant search string for the literature review, first an overview about the topic was gathered in an iterative search, which consequently resulted in a keyword with an extension phrase. The developed search string is:

TITLE(„knowledge") AND („academi" OR „universit*" OR „higher education" OR „HEI" OR „platform")*

Table 1: Taxonomy of the literature review.

Feature	**Specification**			
Focus	Research outcomes	Research methods	Theories	Applications
Goal	Investigation	Criticism	Challenging	
Perspective	Neutral perspective	Taking a position		
Organisation	Historical	Conceptual	Methodological	
Coverage	Exhaustive	Fully selective	Representative	Central
Target Audience	Experts	General scholars	Practitioners/ politicians	General public

The search was conducted in the databases *Scopus*, *IEEE Xplore*, *Science Direct* and *ECONBIZ*, with no restrictions on years or on specific journals or conferences. Nevertheless, abstract, editorials, tables, chapters, notes, book reviews and commentaries were removed.

Selection Phase: a total of 2659 sources were found in an initial search in July 2022. Finally, only 53 sources were considered. The initial search was administered with the search term mentioned above (for results see Table 2). All these publications were then scanned for duplicates and irrelevant publications. For example, many publications contained research about knowledge management systems in libraries of universities, which is not relevant for this publication. In the next step, the abstracts of the remaining publications were examined depended on their abstract, which led again to a sorting out of irrelevant publications. For instance, multiple publications show individual concepts of single universities, which are not representative in general. All these publications were sorted out. The entire remaining publications were then studied and evaluated.

Extraction Phase: According to the proposed research questions and the research objective on existing concepts on knowledge management in university platforms, the publications were allocated into a concept matrix suggested by WEBSTER and WATSON (Watson and Webster 2020).

Execution Phase: All papers, which remained after the last deletion step, were then fully read, examined and then categorized into the concept matrix (see Table 3). Only 13 main papers were categorized into the concept matrix, as the remaining 40 papers did not fit into exactly into to our research scope (e.g. platform context was missing).

Table 2: Results per search string and database.

	initial search			
	Scopus	IEEE Xplore	Science Direct	ECON BIZ
"knowledge" AND "academi*"*	182	68	17	465
"knowledge" AND "universit"*	464	208	48	328
"knowledge" AND "higher education"	106	61	8	273
"knowledge" AND "HEI"	11	0	1	4
"knowledge" AND "platform"	63	231	14	107

deletion of duplicates			
Scopus	IEEE Xplore	Science Direct	ECONBIZ
142	8	4	124
234	10	9	96
22	3	0	71
11	0	0	0
11	19	3	5

deletion after review of title			
Scopus	IEEE Xplore	Science Direct	ECONBIZ
75	0	0	13
90	4	3	43
20	0	0	13
0	0	0	0
5	3	1	0

deletion after review of abstract			
Scopus	IEEE Xplore	Science Direct	ECONBIZ
9	0	0	2
16	2	1	3
14	0	0	1
0	0	0	0
4	1	0	0

The findings will be presented and discussed in the following sections of this paper.

4 RESULTS AND DISCUSSION

Existing research has mainly focused on universities having two main tasks: teaching and research. This is also reflected by the conducted literature review and analysis. The created concept matrix was developed on basis of the guidelines by WEBSTER and WATSON (Watson and Webster 2020). The authors are listed alphabetically and then the research areas of the publications are presented. These divide into the areas of KM (knowledge management), platforms, transfer, KM systems and others. Many publications focus on KM system establishments, especially in the field of education, and describe them with individual cases of universities.

The type of research is the grouped into three types. *D* stands for research which is in development or construction. *T* stands for the application of new theories or concepts and *E* indicates research which is an examination or discussion. CALVO examines how universities can make their research outcomes and knowledge in general available to others through IT solutions (Calvo et al. 2019). CASTRO PEIXOTO show with the usage of the SECI-model by NONAKA and TAKEUCHI how knowledge can be shared in collaborations (Castro Peixoto et al. 2022). Also DOERING shows knowledge sharing and transfer in university platforms with proposing a concept for collaboration (Doering and Seel 2019). Although GARCIA MORENO focuses only on private universities in their research, they propose a knowledge management concept for knowledge sharing within such types of institutions (Garcia Moreno et al. 2018). GENG shows in a pilot study of Chinese and American universities how knowledge can be shared and transferred in these institutions and which tools and structures are needed (Geng et al. 2005). Another knowledge management concept which uses an IT solution was published by GENTILE and shows how universities could benefit from this solution, especially in their teaching and the sharing of knowledge over university borders (Gentile et al. 2016). IT solutions can contain risks, such as ethical or legal issues, which are examined by KYOBE on the field of university collaborations (Kyobe 2010). MAKANI investigates how research in university networks can be handled through a research data management support-system (Makani 2015). To investigate and measure knowledge sharing in such systems, MEDINA GARCÍA propose a set of indicators to evaluate knowledge management in universities (Medina García et al. 2021). PAEZ-LOGREIRA show the relationship between knowledge management, innovation and research, including processes and operations performed by universities around these (Paez-Logreira et al. 2016). The sharing of knowledge just between lecturers of different universities is examined by PRABOWO who present a case study with lecturers from separate higher educational institutions (Prabowo et al. 2018). In a literature analysis SECUNDO investigates that tools and models for knowledge management in universities are still published only fragmented and more research is still necessary in this research area (Secundo et al. 2019). SMITH outlines that governments need to encourage higher educational institutions to collaborate and share knowledge with each other (Smith 2001).

Table 3: Concept Matrix of Literature Search and Analysis.

						Type of Research		
Authors	**KM**	**Platforms**	**Transfer**	**KM Systems**	**Others**	**D**	**T**	**E**
Calvo (2019)	×		×					×
Castro Peixoto (2022)		×	×					×
Doering (2019)	×	×	×			×	×	
Garcia Moreno (2018)	×			×				×
Geng (2005)	×	×		×				×
Gentile (2016)		×		×		×		
Kyobe (2010)	×			×	×			×
Makani (2015)	×	×		×		×	×	
Medina García (2021)	×		×					×
Paez-Logreira (2016)	×		×	×				×
Prabowo (2018)		×		×				×
Secundo (2019)	×		×	×				×
Smith (2001)	×	×	×				×	×

5 CONCLUSION AND OUTLOOK

Knowledge is a core competency to build or maintain a competitive advantage for universities. These institutions build and share knowledge in form of research, teaching and transfer activities. The current state of the art on how universities handle this, was examined in this paper (**RQ1**). Within the scope of this research a literature review and analysis of 2659 sources was conducted. The whole process was structured by important and respected theoretical guidelines. The focus was on publications in the field of knowledge management in university platforms. With the help of a concept matrix, all found research was grouped and categorized.

Overall, the large number of publications was expected, since knowledge management is one of the main tasks of universities. In general, concepts and studies on this topic were overrepresented (see column "E" in Table 3).

There is comparatively limited theory and analysis on how universities, who collaborate with each other could share their knowledge with each other. Also, knowledge management in universities is very often connected with the idea of transfer or the so-called "third mission".

It is not surprising that quite a large number of publications cover the topic of knowledge transfer for educational reasons in universities. At the very latest, the Covid-19 pandemic has shown universities that knowledge management and therefore their teaching, but also research and transfer activities, are important to manage by the usage of knowledge management systems with e.g., e-learning systems.

It is also remarkable that no published research was discovered on the evaluation of already implemented knowledge management systems in universities (or even university platforms). This shows that there is in fact a lot of theory around this topic, but no tested and proven concept which universities can apply.

It also became clear that the topic of knowledge management in university platforms is a quite "new" topic, as the oldest, relevant publication in this literature analysis is from 2001 (Smith 2001). This shows that this topic is of growing importance in research.

In the literature review and analysis it was also investigated for which purpose universities form platforms to share knowledge (**RQ2**).

By harmonizing knowledge and reducing redundancies via platforms, process and data continuity can be achieved, which can lead to synergy effects in terms of science (new research activities, continuation of previous research projects, etc.) but can also result in cost reductions. Platforms also allow, especially smaller, universities to increase their visibility and to benefit from each others' knowledge on research and transfer projects. This can give them the possibility to deal with complex projects. In the case of knowledge transfer for education, Massive Open Online Courses or other e-learning systems offer a way to reach a broad audience through a one-time effort in creating the courses without having a proportionally increasing effort as the number of participants increases. Through this channel (MOOC platforms), universities can take advantage of the network effects that platforms offer and address large numbers of participants.

Shared data management, for example via a platform for research data management organized

according to the Guidelines for Responsible Data Management in Scientific Research (Coulehan and Wells 2006) offers the possibility to present a repository. Templates, lessons learned, checklists or shared research data can be stored there. A uniform process can also be defined and modeled there so that there is a common understanding of knowledge management throughout the institution.

For future work, the gap of research in knowledge management and transfer within university platforms needs to be closed. There is a lack of platform theory concepts in the university landscape, especially in the areas of research and transfer, which needs further research. This can be solved by the application of existing platform concepts on higher educational institutions or by the design of own concepts.

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