BRIDGING THE GAP BETWEEN WEB-BASED IDEA MANAGEMENT AND ORGANISATIONAL COMPETENCES BY SYSTEMATIC LITERATURE REVIEW AND FOUR CASE STUDIES

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Abstract. Web-based idea management systems are directly connected to the creativity process, driving innovation, and challenging "conventional" way of idea management. To fully utilise web-based idea management systems, it is important to research what competences organisations should reward and boost to improve idea management results using web-based idea management systems. This investigation identifies the academic trends and their interaction between overlapping scientific fields, such as idea management, idea management systems and the basic and technological organisational competences using bibliometric and network publication analysis. To verify the results and gain additional practical insights, four practical case studies of idea management practises of different organisations and industries are included. The data is collected through systematic and scientific podcast interviews with different organisation representatives. To achieve the purpose of this research and to support the interview process, the scientific publications and their citations on idea management, idea management systems and competences are systematically analysed. The findings of this study provide important conclusions of the current state of research and serve as the basis for further empirical research on the organisational competences relevant for web-based idea management systems and their applications. This research is the first step to answer the question: which competences do organisations need to establish or improve, so that open innovation technologies will "boost" not "kill" creativity? The results are presented in a critical review form to establish a framework for the body of knowledge gathered in this research. The study highlights what kind of competences should be stimulated to successfully apply web-based idea management systems. Organisations should stimulate overall organisational competences and technology management competences. From overall organisational competences this includes – analytical, communicative, social, and monitoring competences. From technology management perspective this includes – process competences, project, systems competences, operations systems competences.

Keywords: idea management, web-based idea management systems, organisational competences, case study.

JEL Classification: M15, O36, O32.

Introduction

In the times of advanced digitisation, idea management (IM) has changed from board rooms full with post-it notes to digital tools used in the digital environment. This corresponds to a global trend in the application of different technologies supporting open innovation, for example, by use of web-based idea management systems (IMS). Use of web-based IMS is consistent with existing global trends, for example, with co-creation (Su et al., 2016), from which there are further benefits that could emerge through the use of web-based IMS or collaborative innovation (Stojčić, 2021). Growing importance of web-based IMS is consistent with the shift in today's innovation paradigm (Meissner & Kotsemir, 2016), and the need to provide online users with a community focused on innovation (Liao et al., 2021). In short, web-based IMS can be considered as a platform that facilitates open innovation (Carayannis & Meissner, 2017). Within the last few years, web-based IMS have received recognition across different sectors, leading to an increased interest in the scientific community, resulting in an increase in the research output on the usage of web-based IMS for different issues and applications.

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Web-based IMS are interesting as they are directly connected to the creativity process, driving innovation, and challenging "conventional" way of IM process. To fully utilise web-based IMS, it is important to research what competences organisations should reward and boost to improve idea management results using web-based IMS. This investigation identifies the academic trends and their interaction between overlapping scientific fields, such as IM, IMS and the basic and technological organisational competences (OC) using bibliometric and network publication analysis. To verify the results and gain additional practical insights, four practical case studies of IM practises from different organisations and industries are included. To achieve the purpose of this research and to support the interview process, the scientific publications and their citations on IM, IMS and OC are systematically analysed. The findings of this study provide important conclusions of the current state of research and serve as the basis for further empirical research on the OC relevant for web-based IMS and their applications.

OC are some assets of companies that can facilitate systematic reasoning when exploring innovations (Hammouch et al., 2021) – in web-based IMS context, it means that organisations can leverage their competences to generate new ideas that lead to innovations and improvements.

This research is the first step to answer the question: which competences do organisations need to establish or improve, so that open innovation technologies will "boost" not "kill" creativity? The following research questions (RQ) are looked at: (RQ1) what are the main research trends in IM, IMS and OC fields? (RQ2) what are the main research areas and the gaps in IM, IMS and OC fields? The results are presented in a critical review form establishing a framework for the body of knowledge gathered in this research and to answer the RQ.

1. Theoretical background

1.1. Idea management and idea management systems

IMS can be used by organisations to manage their idea generation, evaluation, and continuation of IM processes, while simultaneously enabling them to make sense of unstructured ideas through matching, forking, merging and refinement, to maximise the full potential of the ideas (Krejci & Missonier, 2021). The most practical approach to capture creativity from within an organisation is the internal innovation contests (Hober et al., 2021). In this paper, IM is defined as a "tool, tool kit or a complex system which provides a systematic, manageable process in IM" (Mikelsone et al., 2019). This IM definition by Mikelsone et al. (2019) is based on the assumptions that IM is a (1) systematic process; (2) manageable process; (3) comprises of idea generation, evaluation, and selection processes (including continuation – re-evaluation and repeated idea generation if it is needed) (Mikelsone

et al., 2019), but web-based IMS are web-based tools that supports IM. Detailed IMS description and characterisation of their (sub-) elements is summarised in Table 1.

Table 1. IMS main characteristics (source: Mikelsone et al., 2019)

Description: IMS – tool, tool kit or complex system which provides systematic, manageable process of:		
Elements:	Sub-elements:	Source (s):
Idea generation	Preparation, capturing and/or gathering of ideas, retention, improvements/ enhancements	e.g. Korde and Paulus (2016); Wooten and Ulrich (2015); Summa (2004)
Idea evaluation	Screening, selection, retention	e.g. Westerski (2013); Summa (2004)
Continuation of IM	Concept development, distribution of ideas, support during implementation with repeated IM, and rewarding retention	e.g. Summa (2004)

1.2. Organisational competences

One of the main challenges in literature of competence is defining the term (Ciarniene et al., 2010). There could be 2 approaches: (1) competence as a collective approach, centred on requirements for organisational performance; (2) competence as an individual approach, centred on individual behaviours and outcomes. Most definitions in the literature touching on the term "competence" combine both extremes (Škrinjarić, 2022). In this paper authors base theoretical framework on both previous approaches to include group and individual competences, as they are both deemed essential in IM and other studies of a similar nature. It is important that the developed OC model is flexible, so it can be adapted to the specific contexts, especially from digitalisation perspective. In this paper, OC are defined as the ability of the organisation and individual to effectively participate and manage IM in web-based IMS to support realisation of organisational goals and objectives. In this study, in addition to overall OC, authors look at the technology management competences as the research focus is on web-based IMS. For example, González-Varona et al. (2021) developed a refined model of OC for digital transformation – in this case, authors will adapt existing competence model to a web-based IMS context. By concentrating on technological competences, authors will fill the research gap, as existing literature primarily focuses on non-technological competences.

2. Methodology

2.1. Literature analysis methodology

Theoretical framework development is based on a theoretical research method – critical literature review. Data

Table 2. Count of the literature sources in stages (source: created by authors)

Stages:	Stage 1 – in article title and/or keywords in the article:			Stage 2 – directly about (full text available):			Stage 3 – unique sources:		
	IM	IMS	OC	IM	IMS	OC	IM	IMS	OC
Scopus	66 459	28 860	15 748	126	42	132			
Google Scholar	5 200 000	5 080 000	151 000	82	29	19			
Ebsco	94	4	7	12	4	3	234	86	175
Web of Science	406	38	194	62	13	38			
Sum:	5 266 959	5 108 902	15 949	282	88	192			
! Every term was searched for in the different databases, based on the scientific database availability									

collection was conducted in 4 stages: (1) Scientific database research to explore literature using the following terms: "idea management", "organisational competences", "idea management systems"; each of these terms is looked-up in 4 different scientific databases; (2) select literature directly about IM, IMS, OC; (3) exclude articles that were duplicates and/or articles that do not have full-text availability; (4) the selected literature is applied in further systematic literature analysis and to answer the research questions. Detailed literature source count at the different stages is reflected in Table 2.

Literature sources remaining after stage 3 of the critical literature review were used in a systematic literature analysis to identify main research trends. The systematic literature analysis followed a 3-step method of Boiral (2012). In the first step, a review protocol is developed to have a structured approach to the analysis. The review protocol enables codification and categorisation of the literature sources in a way that supports the researcher with answering the research questions (RQ): (RQ1) what are the main research trends in IM, IMS and OC fields? (RQ2) what are the main research areas and the gaps in IM, IMS and OC fields? In the second step, the relevant data is extracted from the codified and categorised literature sources. In the third and final step, the extracted data is further analysed, and information synthesised is done by use of content analysis, which is an improved version of Boiral (2012) third step. Content analysis improves the results of qualitative data analysis and allows the research to perform additional quantitative analysis. While content analysis is of descriptive nature, it can be used in both inductive and deductive approaches. For this research, insights into qualitative and quantitative data are of added value. In that regard, content analysis is the better approach to use than, e.g. thematic analysis, as content analysis allows to gain the needed quantitative insights in order to identify the frequency of applied OC dimensions.

The content analysis model is based on the work of Vaismoradi et al. (2013), comprising the following steps:

Step. 1: Preparation – reviewing of all literature source review protocols and their purpose (Vaismoradi et al., 2013).

Step 2: Organisation – non-linearly using data-driven and pre-defined coding for the initial coding of literature source review protocols. In the same step – 3-level network of categories – basic, organising, and global – is created. The basic description of each category is created based on data within each category (Vaismoradi et al., 2013).

Step 3: Report development – describing the key categories relevant for the research. Supports the researchers to find answers to the research questions (Vaismoradi et al., 2013).

Based on the type and aim of the research, the chosen systematic literature review and analysis approach is a good approach for finding answers to the proposed RQs.

The 3-level category network of the content analysis is visible in Figure 1. The elements within this category network supports researchers in forming the OC framework in IM and IMS context.
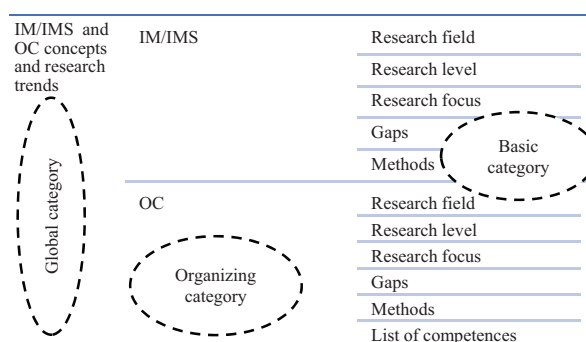

Figure 1. Category network (source: created by authors)

The newest version of Scopus has integrated analysis mechanisms for bibliometric analysis and it will support the researchers in performing some parts of the analysis process, in addition to collecting publications for the network analysis.

2.2. Network analysis methodology

Authors have started the analysis of publications with initial data collection through the search for pre-defined terms. The search results were filtered and then the refined results were used for further network analysis. The network analysis provides the qualitative scientific explorations with the focus on publication correlations and their impact on the publication network. In the

network analysis, keywords in the titles were appraised. Initial search was conducted in the Scopus database to collect the publications for network analysis, because in this database is the highest number of publications about IM, IMS and OC. For the network analysis, visualisation tool VOSviewer was applied. It is effective at clustering and visualising data, and therefore, it is used for network presentation of keyword correlations (Van Eck & Waltman, 2017). In future research and as a next step, "Gephi" tool will be applied – for network citation analysis (Cherven, 2015). The whole procedure is visible in Figure 2.
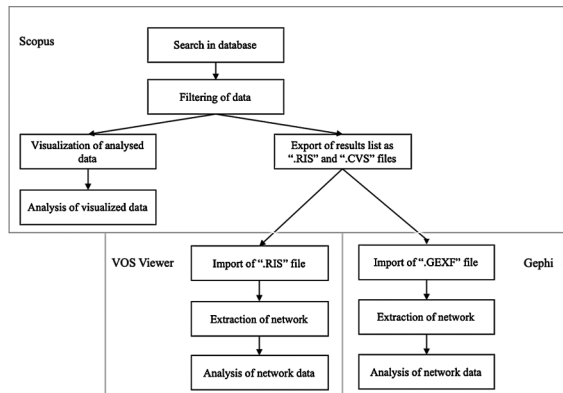

Figure 2. Procedure of network analysis
(source: created by authors)

2.3. Case studies methodology

To analyse the IM and OC relations, the case analysis was performed, the results of which have been processed by using a content analysis (refer to Table 3. For an overview of case study steps).

Table 3. Case study steps (source: created by author's)

Data gathering method	Data analysis method	Period	Method application steps
Case studies from scientific, analytical podcast interviews	Content analysis	2022	1. Interview question creation based on the theoretical background 2. Case study document analysis 3. Content analysis of materials 4. Case study description, development, and evaluation

The gathered data on case studies comes from four scientific, analytical podcast interviews performed in 2022. The questions used within the podcast interviews were created based on the theoretical background on IM, IMS and OC. In the first step of the analysis, the researchers analysed the documents on the four case studies. In the second step, the researchers performed a content analysis of the materials obtained by filling in

and analysing information using case analysis protocols. A protocol is designed as a category map that makes it easy for the researchers to analyse the gathered information. The category map elements are the same as in the literature review and overall elements related to IMS application and OC.

The following, main criteria, was used to select case study objects: *"an innovative company with an innovative solution, where they apply both technological and non-technological innovations"*. The following case study objects fit the criteria: AGVibez – creates tactile audio shirts; Rosafella – creates compostable clothes; Tree-House place – houses and platforms in the trees that do not harm the trees; Rhinoboards – electric mountain bikes.

3. Results

3.1. Literature analysis

Based on the literature review, authors have concluded that main the research field for IM, IMS and OC is social sciences (business administration and IT management). Research level for all terms is mainly organisational level, but focus is on systems and/or structures.

Literature analysis highlights that competences in literature are specified according to the context, for example, sustainability context: STARA competences are related with green organisational innovative evidence (Ogbeibu et al., 2021) or sustainable market competences (Mehta & Ali, 2021); digitalisation context: six competences for digital transformation entrepreneurship are defined by Schiuma et al. (2021) or competences in organisational cyber risk management (Băndoi et al., 2022) etc. In this paper authors will focus on technology management context and basic organisational context.

Competences could be overlooked when looking at only management (f.e., Olafenwa et al., 2021) or employee level (f.e., Chaturvedi et al., 2022) – in this paper authors look at both levels – as management of web-based IMS are as important as IM on an individual level.

OC are defined as the ability of the organisation and individual to effectively take part and manage IM in web-based IMS to support realisation of organisational goals and objectives. In this paper authors includes not only overall OC (focus ability of the organisation and individual to effectively take part and manage IM) but also concentrate to technology management competences as authors focuses on web-based IMS (focus on ability of the organisation and individual to effectively take part and manage web-based IMS). "Technology management competences model" relates to the primary research object because web-based IMS are technologies that should be managed and special competences for that are needed. According to the Adaptive Structuration Theory – developed by Poole (2013) implies that the application of information communication technologies (ICT) alone does not automatically lead to better outcomes and depends on system and structure relations and competences of users
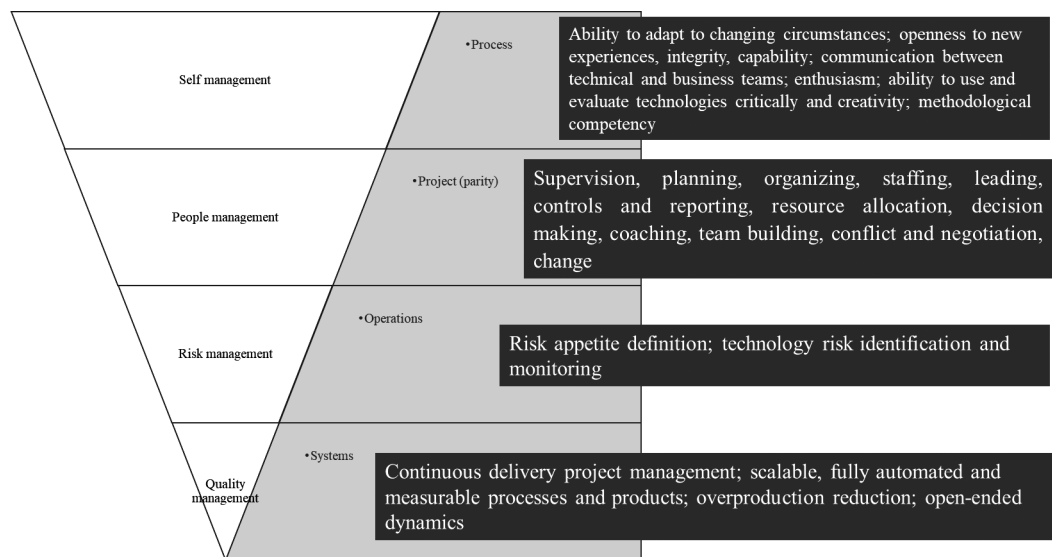
Figure 3. Technology management competences model (source: created by authors)

(organisational level and individual level) are very important in this adaptation process for better appropriation.

Based on the main common point, authors have created a framework of potential OC in web-based IMS context based on technology management competences model (based on Doggett et al., 2013). See in Figure 3.

All competences can be divided into four main categories according to technology management competence model by Doggett et al. (2013):

(1) Process competences – ability to transform (process) inputs into outputs, within defined parameters and with specific properties. (2) project competences – a (one-off) process with a limited scope, defined parameters, resulting in a unique product, service or improvement/change; (3) systems competences – ability to manage technology within a given context; (4) operations systems – specific industrial knowledge/experience within a given context.

Analytical, communicative, social, and monitoring components within the structure of OC framework are identified by Obukhova et al. (2020) and included in this research to reflect the ability of the organisation and of the individuals to effectively take part in IM process. In this research, each of the four components is expressed in IM context: The analytical component is defined as the analysis of the activities and/or tasks performed within IM context. The communicative component is defined as the readiness, capability and ability in the IM process for social perception, including but not limited to – communication, evaluation and feedback within IM context. It includes the ability to communicate and clearly express an individual's point of view, prevent and to resolve conflicts. The social component is defined as the ability, capability, and willingness to perform professional activities in a collaborative setting, including ability and willingness to collaborate and take responsibility for the IM outcomes. Lastly, the monitoring competence is defined as the ability, capability, and willingness to perform systematic monitoring of the progress and effectiveness of IM efforts, for each

individual to monitor their own personal and professional development. The ability to plan, update and estimate/forecast own work.

3.2. Network analysis

To identify new trends in the field network, analysis of the keywords was executed. Keywords in title, abstract, keywords by using the following function: "*(TITLE-ABS-KEY ("competences") OR TITLE-ABS-KEY ("organisational AND competences") AND TITLE-ABS-KEY ("idea AND management"))*". Limited to: Social Sciences; Business, Management and Accounting; Computer Science; Engineering; Decision Sciences; Economics, Econometrics and Finance. This led to identifying 681 documents. For further investigation, ". RIS" and ". CVS" files were exported from Scopus database for further analysis.

The identified keywords were investigated using the tool VOSviewer to detect their interconnections (van Eck & Waltman, 2022). It is possible to observe the development of the topic and to deduce new perspectives. The result can be seen in the Figure 4.

The system of linked keywords is represented as a network. The colours point to the clusters in which most of the keywords of a group occur together. The size of the node shows the connection degree of the keywords. 255 keywords included 4 clusters, 19408 links found.

As seen, the most affiliating keyword is "innovation". This is also the most connected keyword in its cluster with terms "company", "manager", "industry", "creativity". The second largest node is the keyword "education". Third "creation" but fourth "originality value". VOSviewer also shows some other keywords as highly important (e. g. "originality value", "creation"). This can be explained by the meaning of the network analysis: not the frequency but the weighting of the connections is emphasised.

First cluster shows that the research focus of IM and OC research is related to innovations and industries
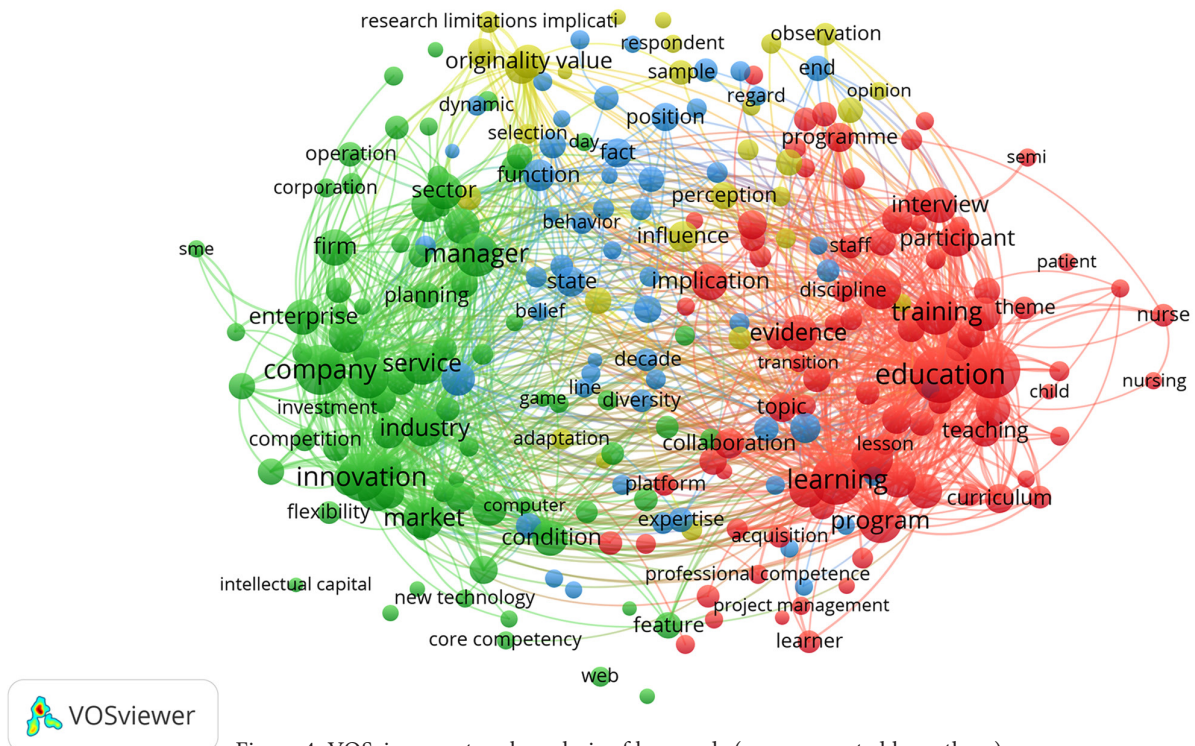
Figure 4. VOSviewer network analysis of keywords (source: created by authors)

(green cluster). Second cluster reveals education, training and learning aspects of this topic (red cluster). Third cluster – creation, creativity, and functions (blue cluster) – with focus more on web-based aspects and creation elements in IM. Lastly, the fourth cluster (yellow cluster) – design methodology and originality value focusing on methods and outputs.

3.3. Case studies analysis

Four innovative company IM experience gathered through podcast interviews was analysed: AGVibez – creates tactile audio shirts; Rosafella – creates compostable clothes; Tree-House place – houses and platforms in the trees that do not harm the trees; Rhinoboards – electric mountain bikes (see in Table 4). Contains a summary of the main competences mentioned regarding IM in the case studies.

Case studies confirm and support the created OC model of basic and technological competence management models.

4. Discussions

In this research, authors have identified the academical trends in research, their interactions, and future developments in the field of IM, IMS and OC using bibliometric and network publication analysis. The approach taken in this study is limited primarily by limited availability of theoretical sources and the sheer broadness of the topic, requiring limitations in research scope. Because of this, the main limitation within this research is limited availability of databases to source full-text high-quality literature sources, and the relatively simplistic keywords used during the search. Regarding the limited literature, the authors were restricted to only 4 different databases to perform the 3-stage literature review; for the network analysis, the authors were restricted to a single database – "Scopus". As a result, this has potentially limited the possibility of identifying all future trends, organisations, authors, and research areas that would require further research.

Table 4. Case study results (source: created by author's)

Case Studies/ Competences	AGVibez	Tree house place	RHINO	Rosafella
Basic	Basic organisational competences: analytical, communicative, social, and monitoring (Obukhova et al., 2020)			
Technology	Technology management competences: system, project, process, operations (Doggett et al., 2013)			
3 sub-competences in IM mentioned:	Digital competences Creativity Competences to learn	Digital competences Idea generating competences Intelligence to create and select ideas, communicate ideas	Creativity Problem identification Vision and imagination	Creativity Competences and skills to get out of normal state Idea evaluation competences

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Regarding the keywords used during the research – because of the complexity of the research topic, the chosen keywords to perform the literature search could lead to missing other relevant literature that could contribute to the research in unexpected ways.

For instance, this could have prevented the researchers from further detailing specific features and methods of IM and IMS, preventing the researchers from identifying less known OC terms that could add value to the investigation. However, while broader access to databases and improved search keywords would enrich the investigation, it would also add additional layers of complexity to the research and potentially making the research unmanageable.

The approach taken in this research has limited the generalizability of the developed model, as the research dimensions identified are based on available theory. By adding a layer of practical knowledge through the four case studies, the researchers have made first steps to increase the link with practice, thus improving reliability and validity of the research. To further improve the developed model and increase the reliability of the results, it is necessary to perform additional case studies to add to the body of knowledge resulting from this research. The current research only reflects limited aspects of IM, IMS and OC in practical/organisational context.

Based on the limitations, the authors have drawn several suggestions for further study directions. Firstly, more case studies are necessary to help and bridge the gap between OC and the use of web-based IMS. Secondly, further research could include both – enrichment of the identified competences by adding a layer of (sub-) competences or by discovering competences that have been missed in this study. Lastly, further research could focus on looking at the OC in web-based IMS context, by looking at specific process, input and/or output elements (Mansikka et al., 2017). The current study is limited at creating OC in web-based IMS context, therefore further research should focus on OC in web-based IMS context, by including concrete and detailed elements of web-based IMS and looking at OC necessary. As the theoretical literature sources were limited because of availability of databases, further research could explore other directions from which this topic can be approached.

Conclusions

The result of this investigation adds to a relatively scarce body of literature on OC in the context of web-based IMS and IM. Among the findings, the main contribution is the development of basic and technological OC model in the context of basic IM and IMS.

The following components were identified within the structure of basic OC framework: Analytical, communicative, social, and monitoring components but from technology management competences: process competences, project, systems competences, operations systems.

The systematic literature analysis (with the addition of content analysis) and the network analysis have identified a growing trend and interest of researchers regarding OC and web-based IMS. This interest from researchers is expanding across several scientific research fields and interests. In further research, the authors will apply "Gephi" besides VOSviewer for network citation analysis (Cherven, 2015). The case studies performed within this research further lend credibility and practical application of the developed basic and technological OC model in the context of IM and IMS.

Theoretical implications. The findings of this research provide a clearer picture of the current state-of-the research about OC within the context of IM and IMS. It serves as the basis for further empirical research works looking at OC in web-based IMS and their applications.

Case studies have proved that both overall OC and technology management competences are important in IM context nowadays as more and more organisations apply web-based IMS.

This research is part of a broader project, which seeks to establish an integrated framework for organisations that they can use to improve and support them with their managerial decisions and the use of web-based IMS. The goal is to develop a generalised generic framework, to leave room for flexibility and adaptability to the different sectors, industries, and organisation specific requirements.

Implications for practice and society. This study highlights what kind of competences should be stimulated to successfully apply web-based IMS. Based on the research results, authors recommend for enterprises that apply or plan to use web-based IMS in the planned learning activities include subjects that stimulate overall OC and technology management competences. From overall OC the focus should be on – analytical, communicative, social, and monitoring competences. From technology management perspective the focus should be on – (1) Process competences – ability to transform (process) inputs into outputs, within defined parameters and with specific properties. (2) project competences – a (one-off) process with a limited scope, defined parameters, resulting in a unique product, service or improvement/change; (3) systems competences – ability to manage technology within a given context; (4) operations systems – specific industrial knowledge/experience within a given context.

Future research studies. As a result, the findings of this research contribute to the creation of this integrated framework, and therefore are subject to further research. In further studies, the authors plan to involve subject matter experts in improving the reliability and generalisability of the model, through further validation of the identified (potential) competences and to range them for a more general model. These experts will include IMS professionals in addition to OC and IMS researchers. It is necessary to not only rely on theoretical and scientific community but also industry experts that help to balance theoretical and practical views on the subject.

Further research could focus the attention on the four clusters revealed by SCOPUS network analysis. First cluster shows that the research focus of IM and OC research is related to innovations and industries (green cluster). Second cluster reveals education, training and learning aspects of this topic (red cluster). Third cluster – creation, creativity, and functions (blue cluster)- focus more on web-based aspects and creation elements in IM, but fourth cluster (yellow cluster)- design methodology and originality value focus on methods and outputs.

In the future, this topic needs to be further explored from the technological, scientific and social framework setting. The interest in IMS, and especially web-based IMS, has grown across many sectors and specific industries. Therefore, it is expected that the importance of IMS will further increase all over the world, and with specific attention in the field of organisational management.

Lastly, authors hope that this research and its conclusions will further stimulate discussion and interest in the scientific community in regards to potential OC relevant for web-based IMS applications.

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Contribution

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