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# Connectivity as a Two-Edged Sword: Mirroring the Multifaceted Field of Constant Connectivity

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**Abstract.** “Constant connectivity” is a phenomenon brought about by our interconnected world. However, it is not just a multidisciplinary field investigated by researchers from the IS field, organization studies, management studies and psychology, but also an actual challenge which knowledge workers face every day. This literature review provides a thematic but also methodological overview of this still young research field on three levels: (1) the paradigm funnel, (2) units of analysis (individual, organizational, societal) and (3) four different thematic streams in the literature. On the basis of the lacks discovered in the paradigm funnel, omitting society as unit of analysis, and thematic gaps in the existing literature, an avenue for future research is developed. Furthermore, as “constant connectivity” and virtual communication became success factors for companies, I reveal important managerial implications for practitioners derived from my thematic analysis.

**Keywords:** constant connectivity, connectivity skills, negative consequences of ICT abuse/addiction, paradigm funnel, paradoxical implications of ICT use.

## 1 Introduction

Connectivity became the central nervous system in our interconnected world and is gaining importance in today’s information society. In general, connectivity is defined “as the mechanisms, processes, systems and relationships that link individuals and collectives (e.g. groups, organizations, cultures, societies) by facilitating material, informational and/or social exchange” [1 p. 128, 2]. Although, connectivity is an all-embracing topic concerning all of us, I will focus on knowledge workers being particularly affected as they can take their work with them all the time and everywhere. This flexibility and mobility is grounded in the nature of their work as they produce and reproduce information and knowledge [3]. Nowadays, the access to information and knowledge is almost infinite, so that they can work anywhere and anytime. This stands in contrast to blue collar workers who are mostly bound to a site and predefined work processes. I agree with Alvesson [4] by defining knowledge work as “the skilful application of cognitive rationality based on superior knowledge” [4 p. 864]. Whilst connectivity as a “flattener” [5] can be regarded as a driver for global economy, constant con-

nectivity is a two-edged sword and is defined as being connected, available and responsive to work colleagues, friends or family members all the time and everywhere [6]. Being constantly connected has a lot of advantages for knowledge workers like higher efficiency, greater flexibility and mobility, improving client services and the freedom to work anywhere and anytime [7, 8, 9]. However, ‘too much’ connectivity, i.e. the phenomenon that professionals are always connected and feel aligned to work, results in a blurring of occupational and private life putting strain on professionals [10, 11].

People do not switch between the analogue and digital<sup>1</sup> world anymore, but seem to live in both at once [7]. This development is fascinating and precarious at the same time; expectations of availability and responsiveness increase, people suffer from the urge “to stay in the loop” and are exposed to a 24/7 information flow. It is still a young and underresearched phenomenon which is worth studying, as society has experienced, and is still experiencing an outpacing launch of new and complex technologies and knowledge workers have just begun “to put the digital office on steroids” [12 p. 64].

I focus on connectivity defined as technological and social ties between individuals [1]. In social sciences, the topic of “constant connectivity” is in vogue especially in disciplines like Information Systems [IS], psychology, organization studies and management research which is observable by a boost of new literature published in recent years. However, these publications differ to a great extent in terms of terminologies, applied methods, theoretical lenses and ontological as well as epistemological assumptions. As we live through a fast-pacing advancement of information and communication technologies [ICT] which leads into a continuous changing of knowledge workers’ workplaces, requirements, tasks, and challenges, the field of “constant connectivity” is permanently evolving. In this unstructured and continuously changing process it is important to stop and consider past ideas, topics, and the accumulated knowledge, compare it with actual developments and structure the existing insights in order to reflect on future directions and goals of the community. It is essential to provide an overview of the literature published not just in the IS community, but also in the field of organization studies, psychology and management. Synthesizing the different literature from the various domains is necessary to broaden our horizon in terms of learning from other domains and exchanging ideas about the phenomenon of “constant connectivity”.

The contributions of this retrospection are (1) to demonstrate the focus of this research field in the paradigm funnel, (2) to reveal congruencies and discrepancies that can be problematized, as well as to point out gaps in the existing literature, (3) to find voids in terms of underresearched units of analysis, and (4) to put forward a roadmap for further research highlighting the importance for practical application.

Following the approach of Webster and Watson [13] the remainder of the paper is structured as follows: Subsequent to the introduction, I will present the procedure of my literature search. Thereafter, the identified relevant literature will be classified and analyzed on three levels:

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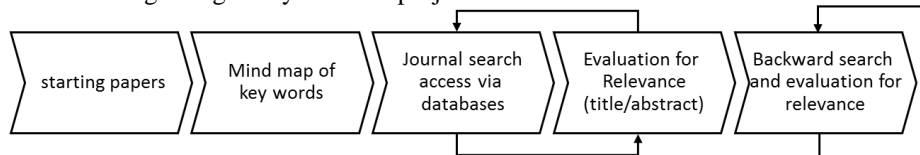
<sup>1</sup> In this paper analog-world interactions embrace face-to-face conversations, meetings, discussions etc. while virtual interactions encompass all kind of information exchange mediated by technological infrastructure.

- in terms of paradigmatic depth with the help of the paradigm funnel in order to provide insights on the levels of research ranging from explicit (observable) to implicit (unobservable) facts [7]
- on the thematic level pointing out convergences and divergences in the existing literature as indicators for cues of problematization and existing research gaps
- in terms of units of analysis (individual, organizational, societal).

Thereafter, I will point out the agenda for future research. This agenda consists of three major propositions. Firstly, adjusting the disequilibrium in the paradigm funnel in terms of suggesting more papers on the levels of “analytical methods” and “core assumptions”. In this respect, I further promote the critical research approach which is highly important in the field of “constant connectivity” not just arising from but also affecting the societal development. Therefore, I advocate research on a societal level by discovering a mismatch in the units of analysis. In addition, I will propose three thematic contributions which are derived from problematization as well as spotted gaps in the existing literature with important managerial implications. Concluding, I will summarize the contributions and highlight the practical relevance by pointing out that an efficient (virtual) communication strategy and functional connectivity patterns have become success factors for companies in today’s knowledge society.

## 2 Literature Search Process

After defining the scope of the review, the literature search process, which is demonstrated in Fig. 1, began with studying eleven seminal papers [1, 2, 6, 8, 9, 10, 11, 14, 15, 16, 17] for relevant artefacts. Those seminal papers result from an initial literature search at the beginning of my research project.



**Fig. 1.** Literature search process

Based on the findings of the first step and in consultation with my supervisor I drew a mind map of ideas and constructs of constant connectivity which were clustered into three blocks. Although, there were much more constructs in each block, I just list the terms which served as key words:

- Work in the virtual world: “knowledge work”, “remote workers”, “virtual teams”, “virtual leadership”, “lead / leading online”
- The virtual society: “information society”, “ubiquitous computing”, “social media”, “virtual communication”, “online behaviour / behavior”.
- The flip side of constant connectivity: “technology addiction”, “work-life conflict”.

In order to curtail the hits and specify the results the key term “connectivity” was combined with the key words above. Furthermore, the search scope was restricted to title

and abstract to prevent an unstructured amount of hits. Subsequent to the definition of key words I conducted a journal search via the databases EBSCOhost, JSTOR and sciencedirect. Though, as “constant connectivity” is not just adherent to the IS field but rather a multidisciplinary phenomenon I included journals of the fields of IS, organization studies, psychology and management studies. To capture the IS field, I scanned through the Association for Information Systems’ [AIS] basket of eight. To get insights into organization studies I searched in ‘Organizational Science’, ‘Organization Studies’ and ‘Organizational Dynamics’. In the management field I studied the journals ‘Academy of Management Journal’, ‘Journal of Consumer Research’, and ‘Strategic Management Journal’. In order to incorporate qualitative research papers I chose A+ to B Journals, except for Organizational Dynamics (C ranked) according to the VHB-Jourqual. For the psychology field, I scanned through CyberPsychology & Behaviour, Journal of Applied Psychology and Journal of Vocational Behaviour as renowned Journals which deal with IT use. Furthermore, I scanned the proceedings of IS conferences such as the International Conference on Information Systems, Hawaii International Conference on System Sciences and the Conference on Wirtschaftsinformatik.

Searching for literature and evaluating the papers for relevance was an ongoing circular process. To determine the relevance of the paper, I read the titles and abstracts, and scanned the body of the paper in uncertain cases. After this reciprocal search and evaluation process, I ended up with 18 papers which were studied in detail. In the next step I conducted a backward search to deepen relevant topics. Again, as soon as one paper was identified as interesting it was evaluated for its relevance as described above.

I ended up with 24 research papers which will be classified into the paradigm funnel as well as in the four different topics according to their unit of analysis in section 3.

### **3 Connectivity as Multifaceted Field**

#### **3.1 The “Constant Connectivity” Literature in the Paradigm Funnel**

As stated above, “constant connectivity” is a multifaceted phenomenon. However, in this diversity I identified four different streams which I named (1) The nature of constant connectivity, (2) Paradoxical implications of constant connectivity, (3) ICT abuse/addiction and negative effects of constant connectivity and (4) Connectivity and Performance. My target is to go beyond the classification and synthesis of the body of literature, but provide a holistic picture of the connectivity field by making use of the “paradigm funnel”. The “paradigm funnel” is a tool that allows me to investigate, structure and analyze the composition of the existing literature and to identify which methodologies, theories and methods are primarily used in the connectivity field [18]. The notion of the paradigm funnel roots in the interplay and reconciliation of the different four levels in a paradigm which range from (1) observed facts (2) applied methods, (3) theories, and (4) core assumptions. In order to classify the various papers into the four levels, I tried to elicit the main objective of the papers by asking the questions: Was the goal of the author(s) (1) to show what is observed in nature, (2) to test analytical methods, (3) to explore or verify a theory or (4) to challenge the core assumptions of an existing theory [18]. As can be seen in Table 1 the focus of my identified literature is

“to show what is observed in nature” (empirical observations) and to “verify and explore a theory” (specific theories) which are represented by 54% and 38% respectively [18].

**Table 1.** Classification of research articles into the levels of the paradigm funnel (adapted from Nairn, Berthon, and Money [14])

Level	Research focus	Papers	Percentage
1	Empirical observations	[2, 7, 9, 11, 14, 15, 17, 19, 20, 21, 22, 23, 24]	54%
2	Analytical methods	[25]	4%
3	Specific theory	[1, 5, 6, 16, 26, 27, 28, 29, 30]	38%
4	Deep assumptions	[8]	4%

To justify the allocation of the papers to the specific level in the “paradigm funnel”, I present examples of each category in detail and reveal the reasons for the classification into the respective domain.

The research process on the first level, “empirical observations”, focuses on the generation of data [18]. Middleton and Cukier [9] explicitly observed the dual perspective on mobile email (dys-)functionality by conducting interviews with 13 BlackBerry users. The interviewees described their dysfunctional usage patterns whilst, at the same time, praising the mobile devices as highly functional and efficient. Moreover, by conducting a survey and applying the partial least square method to analyze the data Soror, Steelman and Limayen [15] explore the effect of deficient self-regulation on excessive mobile phone use. They found out that self-deficient regulation and habit are triggers for excessive mobile phone use and identified boredom as the primary emotional stimuli for deficient self-regulation. These papers stand just exemplarily for the purpose of all papers in this category which is the generation of data.

Having a closer look at the domain of “analytical methods” the authors in this category try to structure and manipulate the data with chosen methods [18]. Bianchi and Phillips [25] devised the “mobile phone problem use scale” as a useful self-assessment instrument and therefore introduced a new analytical method against the “addiction potential scale”. The purpose of this category is to prove, if the applied methods and instruments to analyze data are correct or if there are other methods available which would provide a richer understanding of the examined phenomenon [18].

With regard to the third level “specific theory”, the goal of the authors is to generate generic theoretical mechanisms. [18]. Maruping and Agarwal [30] develop a theoretical model based on the task-technology fit theory and media synchronicity theory. The bottom line of this model is to identify the best ICT for interpersonal processes such as conflict management, motivation and confidence building, as well as affect management at various stages of virtual team development and how the interplay of these factors affect team effectiveness [30]. Wilson, Boyer O’Leary, Metiu and Jett [29] develop the model of perceived proximity which is a dyadic construct that describes a person’s perception of how far or close another person is. The authors state that perceived proximity is a product of communication and identification processes as well as individual

factors such as openness to experience and experience with dispersed work and socio-organizational factors like network structure and structural assurance [29].

The emphasis of all nine studies is to put forward theoretical generative mechanisms and to underline them with empirical findings in some cases [18].

In the category of “core assumptions” the authors challenge deep ontological, epistemological, methodological and axiological assumptions of the commonly used paradigm in this field [18]. Mazmanian [8] appeals against the assumptions of the frames of reference theory. She advocates the existence of a shared understanding of heterogeneous practices regarding the use of mobile devices ending up in a stable scenario where employees did not fall into the trap of constant connectivity.

In the following, I will explore the different topics in the connectivity literature in depth by distinguishing between the (1) individual, (2) the organization and (3) the society as units of analysis. I distinguish between three levels as the reasons for ubiquitous connectivity can be found on these levels and in turn affects them in a distinctive way. This investigation should reveal convergences and divergences that lay the foundation for the thematic avenues for future research in the following section.

### 3.2 The Four Streams in the Constant Connectivity Literature

**The Nature of Constant Connectivity.** Studying the existing literature, I revealed two opposed perspectives on the attributes of the connectivity metaphor. Firstly, as duality of connects and disconnects [1, 2, 26, 28] and secondly, connectivity as truly constant [5, 6, 14, 27].

*Connectivity as Duality of Connects and Disconnects.* Regarding connectivity through the eyes of social actors (on an individual level) there are amongst other attributes important factors that preclude connectivity to be truly constant. For example, individuals enact actor agency, meaning it is still their own choice to connect themselves to the virtual world. Furthermore, the attribute latent potentiality which is the possibility to use virtual communication channels depending on the needs and desires of social actors [1, 28]. Therefore, the possibility to connect oneself always exists though, the actual use of connectivity is context-specific. People switch between three levels of connectivity called hyper-, hypo-, and requisite connectivity ranging from information overload in the case of hyper-connectivity, being in a state of “flow” in the state of requisite connectivity and suffering from sluggish internet connection or poor telephone reception in the case of hypo-connectivity [2, 7, 26, 31]. Though, people do not just experience different states of connectivity they can be classified as specific connector types i.e. hyper-connector, hypo-connector and dynamic connector which are characterized by distinctive connectivity patterns [2]. This dynamic perspective underlines the statement that connectivity can never be constant.

*Connectivity as Truly Constant.* Looking at connectivity on an organizational level, the Internet-based computing platform and the extended investment in technological infrastructure enables us to exchange data throughout the world. The easiness, flexibility and speed of information transition in a real-time format has led to a 24/7 interconnectivity between individuals and organizations [5, 6]. Zooming inside organizations, constant connectivity can be seen as outcome of the spiral of escalating engagement.

Due to the whipping up of individual and collective use of ICT, standards and norms of availability and responsiveness are shifted, ending up in a scenario of pervasive and constant connectivity [14]. On an individual level, dimensions of social influences such as, for example, informative and relationship centered variants have a significant impact on technology adoption and leads to the blurring of social and work-related boundaries and finally to ubiquitous connectivity [27]. The bottom line of those opposite perspectives is that I adopt the notion of near constant connectivity as we are exposed to intrusive connectivity, but are still able to consciously decide to disconnect from the virtual world [7].

**Paradoxical Implications of Constant Connectivity.** Two paradoxes in the field of connectivity are observed. On the one hand the paradox of constant connectivity and, on the other hand, the far-but-close paradox whereby all studies investigate the phenomenon on an individual and/or organizational level.

*The Constant Connectivity Paradox.* The use of ICT is directly related to enhanced work satisfaction and increased work-life conflict at the same time [24]. The use of ICT outside of normal working hours provides employees perceptions of control and productivity and, therefore, increases their work satisfaction. On the other hand, this enabled flexibility of ICT to work anywhere and anytime leads to a shift of norms and expectations on an organizational level and people suffer from the urge of working everywhere and all the time, which in turn increases work-life conflict [2, 14, 24]. Therefore, people often praise their mobile devices for greater mobility and flexibility, whilst at the same time, report from actual feelings of excessive demands, stress and work-life conflict [2, 14, 17]. This paradoxical scenario could be explained with the help of organizational culture as “psychic prison” where individuals become “trapped by constructions of reality that, at best, give an imperfect grasp of the world” [9, 32 p. 216]. The respondents become trapped within the “functional usage“ view suppressing unconsciously the dysfunctional perspective [9].

*The Far-but-Close Paradox.* This paradox deals with the possibility of feeling close to a person who is geographically far away. This is enabled via communication and identification processes to overcome physical distances and perceive proximity to peers. Those processes are in turn affected by individual as well as socio-organizational factors [29].

**ICT Abuse/Addiction and Negative Effects of Constant Connectivity.** The following stream of literature deals with problematic mobile phone and ICT abuse respectively, the discussion about the existence of technology-addiction and the negative consequences of constant connectivity.

*Causes of Technology Addiction.* On an individual level, there are several factors which trigger problematic mobile phone use. For example deficient self-regulation and habit strength hamper individuals to resist against the urge to connect themselves [15]. Furthermore, excessive mobile phone use is a function of age, extraversion and low self-esteem [25]. Regarding this phenomenon from a societal perspective, ICT abuse is based on the development of a culture of instant digital gratification. Nowadays, we



live in a society which is always in a rush and people are scared of any form of micro-boredom so that they switch to the virtual world every spare minute [19].

However, the discussion about declaring technology addiction i.e. excessive ICT use as a medical disease is still open [15, 19, 25].

*Manifestation of Negative Connectivity.* Although, the use of ICT can be seen as integral and essential part of job roles, which keep knowledge worker up-to date and informs them about new developments [6], connectivity especially the email function of mobile devices brings a lot of negative side-effects [2, 16]. On an individual level, employees declare email not just as a source but even as a symbol of stress [16]. On an organizational level, this attitude towards connectivity could even lead to dysfunctional work environments where people are stressed, absent even while present and suffer from depression [2] often going back to escalating expectations concerning availability and responsiveness [14]. Furthermore, due to a blurring of work- and social related connectivity enabled by social media, it is important to point out the negative effects of “socializing online” [22, 23]. Due to ubiquitous connectivity, people suffer from “social overload” a state where individuals feel that they give too much social support to other members of a social network [22]. However, not just active participation but also passive following on Facebook increases jealousy and in turn decreases the user’s life satisfaction.

**Connectivity and Performance.** In this stream, connectivity is seen on the one hand as a threat on performance and on the other hand as enabler for performance.

*Connectivity as a Threat on Performance.* Taking a broader view on today’s knowledge society the “key to success in the knowledge economy may be the art of simultaneous connection and disconnection” [11 p. 18]. Therefore, the wise handling of pervasive interruptions like emails becomes more and more important as they can rip knowledge workers out of their constructive workflow [11, 20]. These disruptions will harm our inventive thinking which is crucial for the development of our knowledge society [11]. Breaking down this development on an individual level, decision making abilities are at risk as individuals are overwhelmed with too much information and are unable to notice important facts or challenge dubious statements [19]. Whilst Murphy [11] is the only author in this stream who investigates connectivity and performance from the societal point of view, all other papers reveal the effects of connectivity on work outcome on an individual and organizational level respectively.

*Connectivity as Enabler for Performance.* In the context of virtual teams, it is crucial that team members can manage interpersonal processes with the help of the adequate ICT and create a shared understanding of heterogeneous patterns of ICT use in order to increase satisfaction, group cohesion and team commitment which, in turn, affects their effectiveness [8, 30]. Due to an optimized matching of ICT functionalities and team tasks with respect to the temporal stage of team development, the overall effectiveness will increase and people get into a state of “flow” “where communication is highly effective, efficient and balanced in accordance with their needs and the demands of the task or situation at hand” [7, 26, 30]. Furthermore, due to an increase of geographically distributed teams, it will be more and more important for superiors to learn how to lead online. It is crucial for leaders to invest time in online communications as this positively

correlates to the perception of closeness amongst peers. These feelings of closeness in turn correlate to a perceived leadership proactivity and effectiveness, however, are moderated by the time spent online [21].

### 3.3 The Units of Analysis in Focus

Having investigated the four different topics in respect to their units of analysis, a noticeable focus on the individual as well as on the organizational level has been revealed as shown in Table 2.

**Table 2.** Classification of the relevant papers into the different topics of literature and their unit of analysis

Topics	Concepts	Individual	Organization	Society
The nature of Constant Connectivity	Connectivity as duality of connects and disconnects	[1, 2, 7, 26, 27, 28]		
	Connectivity as truly constant	[5, 6, 7, 14, 27]	[5, 6, 14]	
Paradoxical Implications of Constant Connectivity	The constant connectivity paradox	[2, 9, 14, 17, 24]	[2, 9, 14, 24]	
	The far-but-close paradox	[29]	[29]	
ICT Abuse/Addiction and Negative Effects of Constant Connectivity	Causes of technology addiction	[15, 25]		[19]
	Manifestation of negative connectivity	[2, 6, 14, 16, 22, 23]	[2, 14, 16]	
Connectivity and Performance	Connectivity as a threat on performance	[11, 19, 20]	[20]	[11]
	Connectivity as enabler for performance	[7, 8, 21, 26]	[7, 8, 21, 30]	

As some papers could be classified into two topics as well as more than one unit of analysis, they appear in several cells in the matrix. For example, Wajcman and Rose [6] refute the negative image of interruptive ICT leading to a fragmentation of knowledge workers' workday. The employees in their study see the use of ICT as essential to fulfill their job roles in the sense of being up to date, gathering information and interacting with colleagues. This interaction with ICT in turn is influenced by the functionality of the specific ICT used, the corporate culture and the job role occupied. As the authors study the use of ICT by employees during the workday in an organizational context, I classified this paper not just on the individual, but also on the organizational level. Furthermore, as Dery et al. [7] not only deny that connectivity is truly constant by claiming that to be connected depends on the one hand on the individuals' free will to connect themselves as well as on the social pressures to be available and responsive. But the authors also point out that the image of smartphones has changed during the last five years and that their interviewed employees have acquired capabilities to regulate the connective flow affecting their work satisfaction and efficiency [7]. I allocated this paper not just into the topic of "The nature of Constant Connectivity" but also into the stream of "Connectivity and Performance".

## 4 Avenues for Future Research

In the following section, I will present the agenda for future research derived from (1) insights of the paradigm funnel, (2) the focus on the units of analysis, and (3) cues for problematization as well as spotted gap in the existing literature. This will be followed by important managerial implications.

**First Avenue: Insights of the Paradigm Funnel.** Analyzing the levels of the paradigm funnel, I identified a lack of studies challenging the analytical methods and core assumptions. In terms of analytical methods, there is a great number of studies (10 research papers) using qualitative research methods like interviews, focus group interviews, and on-site observations [2, 6, 7, 8, 14, 16, 17, 20, 26, 27]. In contrast, there are only five papers with quantitative research approaches (5) such as surveys or experiments [15, 21, 22, 24, 25]. This could be an indicator for the still young research field which has to be “understood” at first hand through the eyes of social actors [33]. However, a next step could be to investigate if the applied methods, especially interviews and focus group interviews used to map data to theory, are adequate or if alternative methods would provide more valuable results and a richer understanding of the phenomenon [18].

Furthermore, the challenging of core assumptions would provide further insights and enrich the connectivity community with new perspectives. So far, most of the studied papers in the field of connectivity adapt a constructivist approach which can be identified on the basis of the authors’ research design and the formulation of the research question. However, regarding the pervasive effects of “constant connectivity” from a critical perspective would bring about important societal implications and thought-provoking impulses [33, 34]. As revealed in the third stream of the literature review, the abuse of ICT which could even lead into addictive behavior can result in social overload, envy, increased stress level, work-life conflict, and even depression [2, 14, 22, 23]. Therefore, research has proven that the use of ICT does have problematic implications for individuals and for the society as a whole. For future research, it is important to adopt a more radical approach which does not just indicate the negative consequences of ICT, but is capable of changing the awareness of people and to inspire them to reflect upon and alter their own online behavior.

**Second Avenue: Focus on the Units of Analysis.** By looking at the units of analysis in Table 2 it is evident that there is a lack of studies on the societal level which goes in line with the insights of the paradigm funnel. The research community still focuses on the individual and organizational level. However, the phenomenon is much broader, affects and is affected by the developments in our information society e.g. the culture of instant digital gratification [19]. Due to the improving technological infrastructures, the phenomenon of “constant connectivity” is just at the beginning of its evolution - it is currently changing and will continue to change the way people live, work and communicate. The extensive use of ICT has not just changed employees’ job roles in terms of extended working hours, multitasking and increased pressures to be available and responsive, but also affects their private and family life as people report marriage crisis, lack of recovery and even health problems [2, 14]. Beside individual factors this development is rooted in the organizational culture which not just affects but even indirectly

controls the employees' online behavior and is, therefore, responsible for the unintended negative effects [9]. This insight has important managerial implications, as organizations have to understand that it is their duty to establish a workplace that supports heterogeneous practices of ICT use to avoid employees falling into the trap of constant connectivity and suffer from its negative consequences [8]. Employees rarely have the capabilities to change their own connectivity patterns i.e. if, when, and with whom they connect in the virtual world, as they are captured in the organizational machinery with its norms and standards of availability and responsiveness. Having revealed the responsibility of organizations in terms of connectivity it is highly relevant to research how such organizational cultures that foster to "go the extra mile" have been evolved on a societal level [7]. For future research, it will be important (1) to reveal the norms and values in our information society in order to forecast any precarious developments. Furthermore, it would be highly interesting, to investigate (2) the role of social media as I assume that social media increases the overall connectivity level as people are forced to meet not just their work-related commitments via for example emails but also their social commitments on social media platforms. Moreover, it is important, to explore (3) the lifestyle and personal attitudes towards family and career as factors that affect organizational cultures and could indirectly lead to dysfunctional connectivity patterns of individuals.

**Third Avenue: Cues for Problematization and Spotted Gaps.** On the basis of the investigation of the four different topics, I identified three different themes that should be developed in further research.

Although the different states of connectivity (hyper-, hypo- and requisite connectivity/connective flow) and the three different types of connectors i.e. hyper-connector, hypo-connector and dynamic connectors respectively are already introduced in the first stream "the nature of constant connectivity", the question how states of connectivity change over time, and how an optimal state of connectivity can be achieved and maintained has not yet been addressed [2, 26, 28]. Knowing about the triggers that change connectivity states has a great managerial impact as it is important for project managers to effectively control dysfunctional connectivity employing means of negotiation, coordination and control. Furthermore, there is a lack of studies which investigate connectivity and its group dynamics in a project context where unintended factors like project drift, software breakdowns or escalating project costs [35] as well as intended factors like upcoming deadlines and deliverables occur and influence connectivity levels and intensity. Therefore, it is important to further develop Kolb et al.'s [26] connectivity model by identifying influencing factors that cause changes of connectivity states in a project context. Understanding these triggers leading into hyper-, or hypo-connectivity is crucial for managers to effectively prevent dysfunctional connectivity and therefore enhance their teams' productivity and efficiency. It is important not to take the dysfunctional connectivity patterns of project team members as given, but search for reasons and implement best practices to guide them into requisite connectivity. A further step would be to study (1) the dimensions that influence the level of connectivity on an individual basis as well as in the whole group, (2) the role of the individuals, if and how they can affect the overall connectivity level and, finally, (3) which consequences the overall connectivity level has on project outcomes.

The second stream of literature has shown the paradoxical scenario of employees praising their ICT for their flexibility and mobility whilst simultaneously suffering from work-life conflict, job creep and even depression [2, 9, 14]. This behavior is mainly rooted in the spiral of escalating engagement and the organizational culture. However, whilst the reasons for the occurrence of such a paradoxical scenario are already identified, there is a lack of studies which investigate how such problematic connectivity patterns i.e. when, how and with whom individuals connect themselves virtually, are actually constructed. It will be important to go one step back and investigate the origins of connectivity patterns, how they evolve and how they are shaped through ongoing interactions. Knowing about this construction process of connectivity patterns, different control modes such as clan, behavior, outcome or self-control could be applied to prevent the development of dysfunctional connectivity patterns on an individual as well as organizational level and increase the general effectiveness and productivity [36, 37].

As discovered in the third and fourth stream in the literature review, research has shown how mobile devices have changed the mode of operation of knowledge workers and shed light on the reasons and the negative and positive consequences [16, 17]. Prior work particularly emphasizes the intrusive effect of mobile email devices on work-life boundaries and emphasizes how the opportunity to work anywhere and anytime mutated into a working mode of everywhere and all the time. Not only societal and organizational pressures, but also the individual's attitude towards work is driving this development [2, 8, 14]. For example, the uptake of mobile email devices has led to an escalating engagement and a decreasing autonomy of employees due to a reciprocal whipping up of individual and collective use of ICT [14]. Building on these findings, I argue that knowledge workers have to acquire a new social skill to cope with ubiquitous connectivity. Such social skills, defined as connectivity skills, and employed when interacting with other people at an interpersonal level [38] become more and more important in our interconnected world [39]. In other words, as knowledge work increasingly takes place in a virtual world, employees have to enact choice (agency) in terms of if, how and when to interact with other people "online" in those virtual offices [7]. Knowledge workers will have to go through a learning process in order to develop the skill to select an appropriate level of connectivity for the situation at hand. It would be highly interesting to investigate, how employees change their behavior of handling constant connectivity over time, develop coping mechanisms and even change the image of connectivity skill as a social skill.

## **5 Conclusion**

The aim of this literature review was to present an overview of the "connectivity literature" in the fields of IS, organization studies, management studies and psychology by structuring the multifaceted, multidisciplinary and still unsorted research field and to develop avenues for future research. Therefore, I am contributing to the "connectivity community" as I do not just present the different streams in the literature and discover gaps and topics to problematize but dig deeper in terms of methodological analysis. The analytical investigation took place on three levels of investigation: (1) the paradigmatic

depth with the help of the paradigm funnel, (2) the level of units of analysis (individual, organizational, society) and (3) the thematic level bringing about important managerial implications.

By revealing the focus of studies in the paradigm funnel as well studying the units of analysis I highlight the need for applying a more critical perspective and motivate researchers to investigate this phenomenon on a societal level. The topic of dysfunctional connectivity in terms of information overload and ineffective virtual communication is a current topic in big corporations as well as small and medium-sized enterprises. Many companies face the challenge how to cope with the fast-paced technological developments and how to best use the potential of highly functional ICT for their professional purposes. Employees complain about an overwhelming information flow, increasing work pressures and ongoing interruptions affecting their workflow [2, 16]. However, particularly in our current knowledge society, effective virtual communication has become a success factor for companies of whatever size and industry. Therefore, (1) knowing about the influencing factors that lead to a change of the levels of connectivity and (2) understanding the construction process of (dys-) functional connectivity patterns is highly important for companies nowadays. Due to this knowledge, team managers can control triggers that lead to dysfunctional connectivity states (hypo- and hyper-connectivity) and enhance the efficiency and productivity of the whole team. Counteracting, the evolution of dysfunctional connectivity patterns in an early stage is critical, as ineffective virtual communication could lead into misconceptions and conflict and affect the project outcome. In accordance to the construction of connectivity patterns, it is very important that employees learn how to cope with ubiquitous connectivity as part of their job role and develop connectivity skills in terms of their own virtual communication strategy to enhance their own efficiency and effectiveness. Some limitations have to be acknowledged. First, the fact that two key words have a negative intonation which could affect the results of the literature review. Second, the developed concepts are in a primary state and have to be further explored in future research.

“Constant connectivity” is not just a field of research, but a challenge knowledge workers face every day. Although, the extensive technological developments enable a greater flexibility, mobility and self-dependence, it is important to be conscious about the two-edged sword of constant connectivity and its negative effects to prevent imprisonment in the virtual world.

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