10-9-2023

IT-Related Time Poverty: Identifying Antecedents and Consequences of a Lack of Time Related to IT Use

Manfred Schoch
University of Augsburg; Fraunhofer FIT, manfred.schoch@fim-rc.de

Christoph Weinert
University of Bamberg, christoph.weinert@uni-bamberg.de

IT-Related Time Poverty: Identifying Antecedents and Consequences of a Lack of Time Related to IT Use

Research Paper

Manfred Schoch[1,2] and Christoph Weinert[3]

[1] University of Hohenheim, Stuttgart, Germany
[2] Branch Business & Information Systems Engineering of the Fraunhofer FIT
manfred.schoch@fim-rc.de
[3] University of Bamberg, Bamberg, Germany
christoph.weinert@uni-bamberg.de

Abstract. Time poverty is the subjective perception of inadequate freely disposable time, which results in negative consequences for individuals. Although information systems (IS) research knows that information technology (IT) use change time perception, research is incomplete in explaining IT-related antecedents and consequences of time poverty. Because time is a scarce resource, individuals, organizations, and society have a responsibility to manage time to protect individuals from adverse consequences. We conduct a structured literature review to identify indications of how IT use influences time poverty and its adverse consequences. We identified 16 papers, which we analyzed with respect to different components of IT use and possible consequences of time poverty. Based on the data, we develop an overview of the antecedents and consequences of IT-related time poverty and a research agenda. We contribute to the research by introducing IT-related time poverty as a new IS construct and providing an in-depth research agenda.

Keywords: *Time Poverty, Sustainable Development Goals, IT Use, Digital Responsibility*

1 Introduction

Statistics show that 80 percent of employed Americans report that they “never had enough time” (Whillans 2019). When individuals have insufficient freely disposable time, they are time-poor (Irani and Vemireddy 2021). Thus, time poverty is defined as one's subjective perception of an inadequate amount of freely disposable time (Vickery 1977; Zheng et al. 2022). Psychology literature reveals multiple antecedents of time poverty that may be embedded in society, organizations, or individual psychology (Giurge et al. 2020). For example, work has become more complex and knowledge-intensive, which requires more time. Time is a scarce resource, and if the freely disposable time is limited, individuals tend to suffer from health issues and low well-being

(Urakawa et al. 2020; Zheng et al. 2022). Previous research has shown that 70% of time-poor individuals experienced fatigue and half of them felt exhausted (Giurge et al. 2020). This is, for example, because when individuals feel time-poor, they begin to sacrifice time normally spent for basic psychological needs, such as sleep or physical activity.

Although we know that information technology (IT) use changes time perception (Ivaturi and Chua 2021) and psychological research demonstrates initial evidence for IT-related antecedents, such as the always-on mentality (Giurge et al. 2020), information systems (IS) research pays little attention to the issue of time poverty. IT usage time for work and leisure averages nearly seven hours per day and has increased by 50 minutes per day over the past decade (Howarth 2023). Individuals also report spending more time on social networking platforms "than they should" (Ravindran et al. 2014). In addition, complex IS, IT interruptions, or computer failures tie up time by forcing users to deal with them to use IT effectively.

As time is a scarce resource, individuals, organizations, and society have a responsibility to manage time to prevent individuals from feeling time-poor and suffering from health problems and low well-being. Increased use of IT may be an accelerator of time poverty because IT makes it easier to spend time and changes the perception of time (Ivaturi and Chua 2021). On the other hand, IT may also be a cure for time poverty by helping us switch between multiple time-consuming tasks or automate them altogether. Thus, it is essential to understand the IT-related antecedents and consequences of time poverty, to understand how IT use contributes to the share of freely disposable time, and then to empower IT users to manage their time effectively to avoid adverse consequences. The importance of understanding IT-related time poverty is also evident in the seventeen Sustainable Development Goals (SDGs) (Nilsson et al. 2016). More concretely, the first goal is to reduce poverty in all forms, which includes time poverty. IS research is committed to addressing these global sustainability challenges (Ospina-Forero et al. 2022; Watson et al. 2021) and increasing digital responsibility (Mihale-Wilson et al. 2022). Consequently, addressing time poverty is of great importance for IS research. Thus, we directly address the issue by identifying the IS-related antecedents and consequences of time poverty in this paper and aim to answer the following research question:

What are IT-related antecedents and consequences of time poverty?

To answer this research question, we build upon psychological research to conceptualize IT-related time poverty. Based on a review of IS literature, we identify IT-related antecedents and consequences of time poverty. The results are summarized in a conceptual overview which we use to develop a research agenda for future research. Our findings contribute to the literature by focusing on time poverty from an IS perspective and suggesting ways to address digital responsibility. We identify IT-related antecedents and consequences and reveal fruitful avenues for future research by demonstrating how to investigate the topic of IT-related time poverty.

2 Theoretical Background on Time Poverty

According to the United Nations (UN) the fundamental understanding of poverty is the *"denial of choices and opportunities, a violation of human dignity [..]"* (Gordon 2005). From a research perspective, we understand poverty as having critically low levels of resources (Williams et al. 2016). However, poverty has different forms (Michel and Tanner 2021). Among others, individuals can also be time-poor.

The literature demonstrates that time is a complex concept that can be multiply conceptualized (Ivaturi and Chua 2021). By adopting a clock time vision, time is understood as a scarce resource that can be lost, spent, or wasted (Saunders et al. 2004).

Research builds upon this clock time vision by separating the 24 hours of a day into four kinds of time (Charmes 2022; Irani and Vemireddy 2021). *Necessary time* (1) refers to basic physiological needs. This time is needed to satisfy basic needs such as sleep, food intake, health, and hygiene. *Contracted time* (2) refers to paid work, including any work that involves receiving payment for the activities or spending money on, for example, education (including travel to and from work or education and waiting times). *Committed time* (3) refers to the time we must spend on all activities we have previously committed to and that are unrelated to livelihood activities (the sum of 1 and 2) (Arora 2015). This time is spent on household care, care work, or leisure. For example, buying a horse ties up time because we must feed it, keep it clean, and possibly ride it. The time needed for those activities every day is then constrained in such a way that we cannot dispose this time freely. *Free time* (4) is the time that can be freely allocated. The amount of free time is calculated by removing all three other kinds of time from the 24 hours of a day. The remaining amount of time is freely disposable for each individual. It can be spent on leisure, rest, or other activities.

Time poverty occurs when individuals perceive that they do not have a sufficient amount of free time. Time-poor individuals think they have inadequate time for rest, leisure, or other activities they would like to do (Irani and Vemireddy 2021). Time poverty is defined as one's subjective perceptions of the amount of inadequate freely disposable time (Vickery 1977; Zheng et al. 2022). When individuals perceive that they do not have enough time to allocate freely, they are time-poor.

Time poverty research discusses additional time-related constructs which have a conceptual overlap with time poverty but are different and might interact with time poverty. Time pressure is the perception of scarce time for performing any type of activity (Zheng et al. 2022). This time pressure can be perceived for all kinds of time. For example, looking at the contracted time, individuals may feel they do not have enough time to accomplish all their work tasks. Time urgency (or scarcity) refers to the perception that the resource of time is limited, accelerating the pace of action. It includes the perception of limited time and the behavior of individuals to manage time actively (Zheng et al. 2022). Despite the differences, initial indications show that time pressure, urgency, and poverty are intertwined such that time pressure at work can lead to over hours, which can lead to the sacrifice of free time. On the contrary, time-poor individuals feel pressured to complete tasks quickly to protect the small amount of freely disposable time, leading to time urgency and additional time pressure. While time pressure

and time urgency are often discussed in relation to work demands (and thus contracted time), they equally apply to committed time or even necessary time.

Time poverty has been examined in relation to income poverty (Chatzitheochari and Arber 2012; Williams et al. 2016). Some papers focus on time poverty by developing a measurement scale for the construct (Whillans and West 2022). Most of the research on time poverty focuses on individual characteristics (e.g., gender, age) and household care (e.g., parenting), and work care factors (e.g., unemployment) (Chatzitheochari and Arber 2012; Kalenkoski et al. 2011; Nackerdien and Yu 2022; Vermeire et al. 2023). The aim of this research stream is to analyze which individual, household, and work factors increase the likelihood of time poverty. Regarding the consequences, the literature has focused on behaviors such as healthy diets, physiological activity, or health problems such as low well-being, stress, and fatigue (Qi and Dong 2018; Whillans and West 2022; Williams et al. 2016). It is remarkable that time poverty has been studied in countries where income poverty is also high, such as China, Ghana, India and Pakistan (Chatzitheochari and Arber 2012; Nackerdien and Yu 2022; Qi and Dong 2018).

3 Methodology

To answer our research question and to gain an understanding of how IT use contributes to time poverty, we conducted a literature review. Because literature in the area is scarce, we use a Grounded Theory approach (Wolfswinkel et al. 2013). The aim of this approach is to *"reach a thorough and theoretically relevant analysis of a topic"* (p. 1) and *"to point to well-rooted and fruitful new links between variables"* (p.2). The suggested five-stage processes involve coding the identified literature and allow researchers to achieve depth and breadth of analysis.

Following the five stages, we make several methodological decisions. First, we focus on literature in the field of IS because we aim to assess the state of the art and to derive implications for this field of research. We verified the lack of existing IS research on time poverty by broadly searching for time poverty (in AIS Electronic Library, which contains all leading conferences, AIS Senior Scholar Basket of Eight, and further unstructured search). Second, to adequately scope our contribution, we limit our search to the AIS Senior Scholar Basket of Eight. We did so because we found that time poverty was a new concept in IS research and that other time-related constructs had to be considered to develop a theory on IT-related time poverty. With this focus, we limit the scope of this broader search while ensuring to capture high-quality contributions. Because we perform an in-depth Grounded Theory analysis that requires manual coding of the papers, we limit our search to the past ten years (2013 to 2023). The vast majority of the papers on the subject originate from the 2000s with an increase in volume. Further, the relevance of the papers within our time frame drastically declines over time. Thus, there are certainly more contributions beyond these outlets and this time frame, but we consider them a good starting point for our analysis. It must also be mentioned that we looked for seminal work on time poverty and IS beyond our search results to ensure that we did not miss any papers doing conceptual work on the subject.

We selected our **search terms** following conceptual work on time poverty (Williams et al. 2016) and included constructs that relate to time poverty. Our search for these terms in the entire text body resulted in 63 papers. We screened the papers for relevance and excluded papers that did not discuss any of the constructs (e.g., because the terms only appear in the references). Next, the author coded the sections of the papers that discussed aspects of time. We discussed the resulting open codes, aggregated them where necessary, grouped them into categories (axial coding), and discussed relationships. Table 1 describes the five-stage process and summarizes our decisions.

Table 1. Five-stage grounded-theory method (based on Wolfswinkel et al. 2013)

Stages	**Task**	**Details for this paper**
Define	Sources	AIS Senior Scholar Basket of Eight
	In-/exclusion criteria	Papers from the last ten years that discuss or investigate the following constructs
	Search terms	"time poverty" OR "time scarcity" OR "time pressure" OR "time stress" OR "time urgency" OR "time famine"
Search	Search	Total sample: 63
Select	Refine sample	After screening: 31
		After full-text analysis: 16
Analyze	Coding	Open coding, axial coding
Present	Structure content	See below

4 Results

Our literature review resulted in 16 relevant papers in the context of IT-related time poverty. An overview of how these papers contribute to our understanding of IT-related time poverty is provided in Table 1.

Time poverty relates to time urgency and time pressure. Most of the identified papers relate to time pressure; only a few papers explicitly mention time urgency, time poverty, or critically low levels of time. Yet, several identified relationships can be mapped to IT-related time poverty. Our results emphasize that the phenomenon is fairly new and not extensively studied.

In our study, we aim to investigate the role of IT use on time poverty. We suggest that the emergence of IT-related time poverty necessitates an interaction (or a lack thereof) between the individual that experiences time poverty and the IT use of the individual. IT use is *"a user's employment of an [IT] system to perform a task"* (Burton-Jones and Gallivan 2007, p. 659). A rich conceptualization proposes that the elements *user*, *IT system*, and *task* are relevant for a complete understanding of *IT use* (Burton-Jones and Straub 2006). User refers to the individual using an IT system, including its personality and characteristics. IT system encompasses the technology that is used to perform a task. Task is the function being performed with the help of the IT system. We believe that all parts of a rich conceptualization of IT use may influence time perception and, thus, IT-related time poverty. Therefore, we analyze the literature

aiming to identify IT-related antecedents of time poverty from all parts of IT use as well as its IT-related consequences. We provide an overview of our findings in Fig. 1.

First, we demonstrate the identified IT-related antecedents of time poverty structured according to user, IT systems, task, and IT use (Burton-Jones and Gallivan 2007).

Table 2. Descriptive summary of IT-related antecedents and consequences of time poverty

#	Author	Year	Descriptive Summary
1	Arnott and Gao	2022	Information overload increases time pressure, which impairs decision-making & increases biases
2	Benlian	2022	Agile work practices cause time pressure, which may be positive or negative; high IT mindfulness helps handle it
3	Cram et al.	2022	Time pressure prohibits that gig workers deal with algorithmic transparency & well-being
4	Liang and Xue	2022	Time pressure impairs decision-making, narrows breadth of IT use and increases negative perception of IT
5	Yazdanmehr et al.	2022	Complex IT security demands require time and effort; particularly problematic for low self-efficacy employees without help
6	Ghasemaghaei and Turel	2021	Complex and timely data requires time and cognitive effort to process, may cause stress & reduces knowledge sharing (time pressure)
7	Ivaturi and Chua	2021	Ubiquitous technology creates ubichronic perception of time, separates work into smaller chunks, stretches it throughout the day & blurs boundaries (time urgency)
8	Riemenschneider and Armstrong	2021	Time pressure is part of IT professionals' identity, influenced by pace of technology change, uncertainty, and job task pace
9	Benlian	2020	IT has positive and negative influences related to time pressure; Spillover effects between private and work life
10	Bouayad et al.	2020	Time pressure may impair decision-making and the use of recommender systems in healthcare; there may be a habituation to time pressure
11	Tams et al.	2020	IT-induced interruptions create spillover effects between private and work domains
12	Venkatesh et al.	2020	Citizens of poor/rural areas need time to understand and use healthcare IT
13	vom Brocke et al.	2020	IT can impose time pressure through urgency cues, and addictive features may cause individuals to spend more time
14	Phang et al.	2019	IT changes the time sequencing of work and family life to be more fluid and flexible (time urgency)
15	Addas and Pinsonneault	2018a	Email load and IT-induced interruptions may increase perception of time loss and time pressure
16	Addas and Pinsonneault	2018b	IT-induced interruptions increase time pressure and have ripple effects on coworkers

User characteristics that lead to a lack of time and in turn to IT-related time poverty use are discussed. Poverty has long been discussed as a social problem that originates from inequalities between individuals (Gordon 2005). While much work on time poverty centers around gender inequality, the literature on IT-related time poverty does not. Yet, in a study on healthcare IT adoption of rural Indians, Venkatesh et al. (2020) state that individuals under investigation are slow to understand IT and need additional time to adopt IT. Further, individuals with less experience and training in IT are said to experience more time pressure (Bouayad et al. 2020).

Demands that relate to the **IT systems** may relate to time poverty. Multiple studies deal with demands related to IT-induced interruptions (Addas and Pinsonneault 2018a, 2018b). Such interruptions are said to impair workflows and have high cognitive costs, which reduce efficiency and thus may draw out contracted time. Similarly, a growing number of emails, and other sources of communication are drivers of information overload (Addas and Pinsonneault 2018a). Information overload may increase the perception of time pressure (Arnott and Goa 2022). Another aspect is our growing dependence on timely data sets to fulfill work demands that may require immediate attention and are increasingly complex and large (Ghasemaghaei and Turel 2021). Such data sets take time to process and reduce cognitive resources for other activities. Further, the pace of change and uncertainty regarding new IT is a driver for the perception of many IT professionals that they do not have enough time to meet their work demands (Riemenschneider and Armstrong 2021). The growing dependency on IT at the workplace and beyond have also increased the need for IT-security measures that impose complex IT security demands on individuals (Yazdanmehr et al. 2022). Such demands require substantial time and may create the perception of overload and may cause anxiety. This is particularly true for individuals with low self-efficacy (Yazdanmehr et al. 2022). Lastly, modern IT often includes addictive functionality that increases the amount of time spent on the internet beyond initially planned levels – this is particularly true for individuals with low self-efficacy. This may cause individuals to lose social contact and thus social capital – at least in the physical world. Modern IT – particularly in the private domain – often includes addictive functionality that increase the amount of time spent on the internet beyond initially planned levels (vom Brocke et al. 2020). This is may cause individuals to lose social contact and, thus, social capital.

We identify aspects of the **tasks** that may increase the probability of a lack of time and in turn IT-related time poverty. For instance, agile practices that are present in many IT-related jobs are said to have the potential to increase time pressure and the perception of a lack of time (Benlian 2022; Riemenschneider and Armstrong 2021). This may be due to suddenly assigned urgent projects or little influence over due dates (Riemenschneider and Armstrong 2021). Not only is agility often used in IT projects, but IT systems are often a critical factor in agile project management. Further, frequent time-consuming (digital) meetings shift attention away from tasks that are perceived as more meaningful and can increase the perception of time pressure (Benlian 2022). In addition, research suggests that the relevance of tasks plays an important role in the perception of time in a way that less relevant tasks that are time-consuming are considered particularly costly (Ghasemaghaei and Turel 2021).

We identify **IT use** demands that may influence IT-related time poverty. The presence of IT-induced interruptions during non-work are mentioned as a source of spillover effects that directly affect available free time (Benlian 2020; Tams et al. 2020). We consider this a demand associated with IT use because individuals can turn off notifications or devices to counteract such interruptions if social norms allow it. An interesting contribution regards ubiquitous IT use. The authors conceptualize that ubiquitous IT use may change our perception of time to what they call ubichronic time. Ubichronic time is a discontinuous view of time that allows individuals to work in short blocks of time that are spread across the workday and contain shorter tasks (Ivaturi and Chua

2021). Such an approach to IT use and to work stretches the workday, blurs boundaries, and biases individuals towards working longer (Ivaturi and Chua 2021).

Second, we identify several indications of the **consequences of IT-related time poverty.** Many studies that focus on time pressure clearly relate it to a decrease in performance or decision quality that are often associated with heuristic thinking or a lack of mental focus due to limited cognitive capacity (e.g., Arnott and Gao 2022; Liang and Xue 2022; Riemenschneider and Armstrong 2021). While time pressure does not necessarily need to translate to time poverty, it is easy to see that a lack of performance may be compensated by longer work hours to maintain a successful social status or social capital at work. In a similar vein, research proposes that transient capital is impaired through a lack of time. In contrast to social capital, transient capital is a property of an individual and refers to the sum of positive and negative (social) encounters over time (Ivaturi and Chua 2021). Further, IT-related time poverty may directly relate to the well-being and health of individuals. For example, users embedded in a ubiquitous IT environment may sacrifice sleep to gain personal time – a clear symptom of time scarcity or time poverty – which has detrimental consequences that may include burnout (Ivaturi and Chua 2021). Further, direct effects of time pressure on anxiety (Liang and Xue 2022), insecurity (Benlian 2022), or stress-related strains (Yazdanmehr et al. 2022) may occur. Lastly, IT-related time poverty also may have consequences that relate to IT use. Research has identified that time pressure may result in less IT use and amplification of negative perception of IT (Liang and Xue 2022).

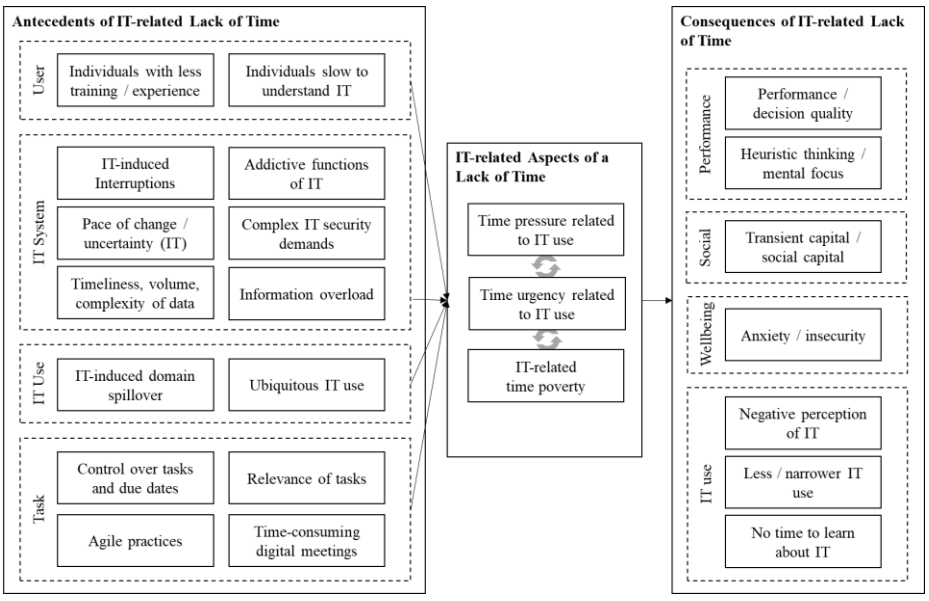

Figure 1. Overview of factors studied in relation to an IT-related lack of time

Further and related to the aforementioned limited cognitive capacity, users tend to focus on a narrower set of IT when under time pressure and revert to those features that have previously proven to be useful (Liang and Xue 2022). This narrow focus may also

inhibit users from learning about IT, which has been investigated in relation to algorithmic transparency (Cram et al. 2022). Further, users under time pressure may be reluctant to use knowledge sharing tools, particularly regarding complex knowledge (Ghasemaghaei and Turel 2021).

5 IT-related Time Poverty – a Research Agenda

From the analysis of the literature, we develop next a research agenda to demonstrate fruitful avenues for future investigations of IT-related time poverty (see Table 3). These potential areas of research are relevant because time is a limited resource, and investigating these questions may help us understand what role IT plays in the development of IT-related time poverty and how to design and use IT to mitigate its adverse effects.

Table 3. Possible areas of inquiry for all areas

Area		Possible areas of inquiry
Antecedents of IT-related time poverty	User	• How do diversity aspects, such as gender, influence IT-related time poverty?
	IT system	• What role does the design of IT systems play in IT-related time poverty?
	Task	• What role do different forms of digital work (e.g., gig work) play in the emergence of IT-related time poverty?
	IT use	• How does IT use in the private domain affect IT-related time poverty?
Aspects of IT-related time poverty		• What exactly is the reciprocal relationship between time pressure and time urgency with IT-related poverty? • What potential positive relationship exist between IT use and IT-related time poverty and what are moderators for the relationship?
Consequences of IT-related time poverty		• What role does circularity, e.g., of IT use (both an antecedent and an outcome), play in IT-related time poverty? • What is the digital responsibility of individuals, organizations, and society to address IT-related time poverty? • How can we design modern IT systems and new digital workplaces to counteract IT-related time poverty?

User characteristics and their effects on IT-related time poverty: The literature on time poverty focuses on social inequality issues, such as gender differences, or the role of time poverty in countries that have high-income poverty (e.g., Chatzitheochari and Arber 2012; Kalenkoski et al. 2011; Nackerdien and Yu 2022; Vermeire et al. 2023.). In contrast, IS literature that deals with a lack of time often discusses time pressure in relation to work demands and, thus, contracted time. In light of increased digital responsibility and the social implications of IS (Mihale-Wilson et al. 2022), future work should investigate IT-related time poverty from a diversity perspective.

IT system and their effects on IT-related time poverty: The design of IT artifacts plays an important role in IS research. Consequently, conceptual work at the overlap of IS and well-being has identified it as an important aspect to improve IT use and mitigate its consequences (Tarafdar et al 2019). Early contributions at the overlap of time and IS design have indicated that the IS design can indeed influence the sense of time, which may, for example, stimulate user engagement (Rapp 2022). The role of the design of IS systems in counteracting time poverty warrants further research.

Tasks and their effects on IT-related time poverty: Tasks and task design are essential to understanding IT use. The literature indicates that not only do tasks affect our perception of time (Ghasemaghaei and Turel 2021) but also that we might have to rethink work arrangements to suit ubiquitous IT use and modern ways of working (Ivaturi and Chua 2021). Future work should investigate what role different forms of digital work (e.g., gig work) play in the perception of IT-related time poverty and how work tasks (and potentially private tasks) may be shaped to reduce it.

IT use and its effects on IT-related time poverty: Our literature review reveals that the majority of IS contributions on the role of time are from the realm of work-related IT use. However, limited insights exist on how IT use in the private domain may affect IT-related time poverty. Yet, committed time and necessary time are equally important for understanding time poverty. For example, it would be interesting to investigate whether IT use in the private domain may have positive effects on IT-related time poverty. Further, ubiquitous IT use may increase flexibility and thus positively influence the efficient allocation of time under certain conditions (Ivaturi and Chua 2021).

Aspects of IT-related time poverty: While research from psychology indicates that there is a relationship between time pressure, time urgency, and time poverty (Zheng et al. 2022), our understanding of how they interplay and under which circumstances time pressure may have an increased chance to lead to time poverty, is not well understood. This is particularly relevant because previous IS research has primarily focused on the construct of time pressure related to IT use. Future work should shed light on the relationship between time pressure related to IT use and IT-related time poverty.

Most papers identified in our literature review discuss a lack of time due to IT use from a negative point of view and discuss how IT use can lead to time pressure or how time pressure may have negative consequences regarding IT use. While this is understandable and has greatly enriched our understanding of the phenomenon, it seems obvious that there may also be positive aspects of IS use in this relationship. Two contributions have highlighted this duality against the backdrop of spillover effects and agile work (Benlian 2020, 2022). Yet, little research has investigated the bright and dark side of IS use in relation to IT-related time poverty.

Consequences of IT-related time poverty: Our literature review provides different consequences which may relate to IT-related time poverty. Many of them match research on general time poverty. One aspect of the outcomes is particularly striking: IT use is both an antecedent and a consequence of IT-related time poverty, indicating potential circularity. Research from the realm of IS coping has similarly indicated such a relationship (Salo et al. 2020). Future work should investigate this circularity, for example, to identify perpetuating effects. Further, future research should focus on how the consequences of IT-related time poverty can be counteracted on different levels (such as individuals, organizations, and society). Several contributions hint at possibilities, such as seeking external resources for individuals, providing better training (for organizations), or designing better technologies (IT providers). Yet, the aspect of digital responsibility in relation to IT-related time poverty and where which responsibilities lie, are not well understood. In particular, previous literature indicates that we need more sophisticated designs of IT systems and novel ways of structuring work itself to

accompany human-centered ubiquitous IT use, and the possibilities of flexible work to harness IT as a means to reduce IT-related time poverty (Ivaturi and Chua 2021).

6 Discussion, Contributions, and Limitations

IS research pays little attention to the scarce resource of time and knows little about how IT use is related to time poverty, which is understood as the perception of low levels of freely disposable time. However, IT use ties up time, and time-poor individuals suffer from health problems and low well-being. Therefore, this paper aims to identify IT-related antecedents and consequences of time poverty. We increase our understanding of the relationship between IT use and time poverty by analyzing and summarizing relevant IS literature. We derive antecedents and consequences of IT-related time poverty from the literature. Based on the data, we develop a research agenda that highlights several areas for further research. In doing so, we make several research contributions.

First, we examine time poverty from an IS perspective. On the one hand, previous literature on time poverty has mainly focused on antecedents related to society, organizations, public administration, or individuals (Giurge et al. 2020). Yet, the role of IT has largely been overlooked. On the other hand, IS research has shown that time perception is heavily influenced by IT use (Ivaturi and Chua 2021), but has neglected the issue of time poverty. We contribute to the literature by investigating how IT use is related to time poverty and provide a valuable starting point for future in-depth exploration of IT-related time poverty.

Second, we contribute to the current body of knowledge by addressing a first-order effect of IT use on one of the SDGs. Previous research has shown that IT use has a positive impact on SDGs. For example, smart grid technology reduces greenhouse gas emissions (Watson et al. 2021). We contribute to the body of research (Ospina-Forero et al. 2022; Watson et al. 2021) by identifying IT-related antecedents and consequences to holistically understand IT-related time poverty, enabling researchers and practitioners to counteract IT-related time poverty.

Third, previous IS literature shows that IT use changes the perception of time (Ivaturi and Chua 2021). However, only a few IS papers focus on the scarce resource of time (Ivaturi and Chua 2021; Venkatesh et al. 2020). Thus, IS literature has largely overlooked the phenomenon of IT-related time poverty. Nonetheless, our literature review shows that IS research is beginning to suggest aspects of IT use that may influence the perception of freely disposable time – which touches on the subject of IT-related time poverty. We contribute to existing research in the field (Ivaturi and Chua 2021; Venkatesh et al. 2020) by reviewing IS literature and identifying IT-related antecedents and consequences of IT-related time poverty. Based on this analysis, we develop a research agenda that identifies several valuable areas for future research. The research agenda distinguishes between different areas of antecedents related to IT use, such as users, IT systems, IT use itself, and tasks (Burton-Jones and Straub 2006). Further, we discuss the consequences of IT-related time poverty and ways to mitigate them. For each, we provide specific areas of inquiry. In summary, prior to this study, time poverty received

little to no attention within the IS discipline. Now, we provide a clear overview of the IT-related antecedents and consequences of IT-related time poverty and guide future research to explore this phenomenon in depth.

The issue of time poverty is highly relevant to individuals, organizations, and society. In the modern world, IT use is often considered ubiquitous (Ivaturi and Chua 2021), and it comes with both positive and negative consequences and implications (Benlian 2020). Regarding IT-related time poverty, these consequences are often ethical and social in nature. Thus, researchers and practitioners alike have an obligation to understand the role of IT use in this phenomenon and contribute to mitigating its various adverse effects on individuals, organizations, and society. For individuals, it is important to understand how IT use consumes their time, especially how it reduces their freely disposable time - particularly important in light of increased autonomy and flexibility at the workplace. Our paper identifies how IT use relates to IT-related time poverty so that individuals can develop countermeasures to time poverty. Reduced time poverty can increase resilience to stressors and free up mental resources necessary to make more prudent decisions. For organizations, the scarce resource of time is becoming increasingly critical. For example, the majority of a representative sample of Americans would sacrifice money to have more time (Whillans and Dunn 2019). Work is becoming more complex and time fragmented, so understanding the drivers and consequences of time poverty enables organizations to manage the impact of IT use on their workforce's time contingency. For society, it is essential to understand how IT use influences time poverty, as the time spent using IT increases every year (Howarth, 2023).

Certainly, our paper is not without limitations which allow for future work. First, while we made sure to capture all contributions that directly relate to IT-related time poverty, our broader literature review is limited to the top IS journals and the last ten years. Even though we find show that literature on the subject is new, as all relevant contributions have emerged over the last five years, we cannot rule out that there are other relevant contributions. While we consider this sufficient for or our goal of introducing the concept of IT-related time poverty in this conference paper, future work should take a larger corpus into account. We further recognize that additional and more nuanced conceptual work on IT-related time poverty is necessary.

7 Conclusion

This paper focuses on time poverty – the perception of having only a small amount of freely disposable time – and identifies possible antecedents and consequences of IT-related time poverty. We conducted a structured literature review to examine how IT use affects time poverty and its negative consequences. We identified 16 relevant articles that were analyzed in terms of the various components of IT use and the potential consequences of time poverty. Based on the data, we provide an overview and a research agenda on the antecedents and consequences of IT-related time poverty. We contribute to the research by introducing IT-related time poverty as a new IS construct and by providing a detailed research agenda.

References

Addas, S., and Pinsonneault, A. 2018a. "E-mail interruptions and individual performance: Is there a silver lining?" *MIS Quarterly* (42:2), 381-A20 (doi: 10.25300/MISQ/2018/13157).

Addas, S., and Pinsonneault, A. 2018b. "Theorizing the Multilevel a of Interruptions and the Role of Communication Technology," *Journal of the Association for Information Systems* (19:11), pp. 1097-1129 (doi: 10.17705/1jais.00521).

Arnott, D., and Gao, S. 2022. "Behavioral economics in information systems research: Critical analysis and research strategies," *J Inf technol* (37:1), pp. 80-117 (doi: 10.1177/02683962211016000).

Arora, D. 2015. "Gender Differences in Time-Poverty in Rural Mozambique," *Review of Social Economy* (73:2), pp. 196-221 (doi: 10.1080/00346764.2015.1035909).

Benlian, A. 2020. "A Daily Field Investigation of Technology-Driven Stress Spillovers from Work to Home," *MIS Quarterly* (44:3), pp. 1259-1300 (doi: 10.25300/MISQ/2020/14911).

Benlian, A. 2022. "Sprint Zeal or Sprint Fatigue? The Benefits and Burdens of Agile ISD Practices Use for Developer Well-Being," *Information Systems Research* (33:2), pp. 557-578 (doi: 10.1287/isre.2021.1069).

Bouayad, L., Padmanabhan, B., and Chari, K. 2020. "Can Recommender Systems Reduce Healthcare Costs? The Role of Time Pressure and Cost Transparency in Prescription Choice," *MIS Q* (44:4), pp. 1859-1903 (doi: 10.25300/MISQ/2020/14435/).

Burton-Jones, A., and Gallivan, M. J. 2007. "Toward a Deeper Understanding of System Usage in Organizations: A Multilevel Perspective," *MIS Quarterly* (31:4), pp. 657-679 (doi: 10.2307/25148815).

Burton-Jones, A., and Straub, D. W. 2006. "Reconceptualizing System Usage: An Approach and Empirical Test: An Approach and Empirical Test," *Information Systems Research* (17:3), pp. 228-246 (doi: 10.1287/isre.1060.0096).

Charmes, J. 2022. "Variety and change of patterns in the gender balance between unpaid care-work, paid work and free time across the world and over time: A measure of wellbeing?" *Wellbeing, Space and Society* (3), p. 100081 (doi: 10.1016/j.wss.2022.100081).

Chatzitheochari, S., and Arber, S. 2012. "Class, gender and time poverty: a time-use analysis of British workers' free time resources," *The British journal of sociology* (63:3), pp. 451-471 (doi: 10.1111/j.1468-4446.2012.01419.x).

Cram, W. A., Wiener, M., Tarafdar, M., and Benlian, A. 2022. "Examining the Impact of Algorithmic Control on Uber Drivers' Technostress," *J. Manage. Inf. Syst* (39:2), pp. 426-453 (doi: 10.1080/07421222.2022.2063556).

Ghasemaghaei, M., and Turel, O. 2021. "Possible negative effects of big data on decision quality in firms: The role of knowledge hiding behaviours," *Information Systems Journal* (31:2), pp. 268-293 (doi: 10.1111/isj.12310).

Giurge, L. M., Whillans, A. V., and West, C. 2020. "Why time poverty matters for individuals, organisations and nations," *Nature human behaviour* (4:10), pp. 993-1003 (doi: 10.1038/s41562-020-0920-z).

Gordon, D. 2005. *Indicators of Poverty & Hunger*. https://www.un.org/esa/socdev/unyin/documents/ydiDavidGordon_poverty.pdf. Accessed 7 March 2023.

Howarth, J. 2023. *Alarming Average Screen Time Statistics (2023)*. https://explodingtopics.com/blog/screen-time-stats. Accessed 28 February 2023.

Irani, L., and Vemireddy, V. 2021. "Getting the measurement right! quantifying time poverty and multitasking from childcare among mothers with children across different age groups in rural north India," *Asian Population Studies* (17:1), pp. 94-116 (doi: 10.1080/17441730.2020.1778854).

Ivaturi, K., and Chua, C. 2021. "Rethinking time: ubichronic time and its impact on work," *Eur J Inf Syst*, pp. 1-16 (doi: 10.1080/0960085X.2021.1966326).

Kalenkoski, C. M., Hamrick, K. S., and Andrews, M. 2011. "Time Poverty Thresholds and Rates for the US Population," *Social Indicators Research* (104:1), pp. 129-155 (doi: 10.1007/s11205-010-9732-2).

Liang, H., and Xue, Y. 2022. "Save Face or Save Life: Physicians' Dilemma in Using Clinical Decision Support Systems," *Information Systems Research* (33:2), pp. 737-758 (doi: 10.1287/isre.2021.1082).

Michel, J., and Tanner, M. 2021. "Poverty Is Not Poverty: The Reality on the Ground Including the Rural-Urban Divide and How We Can Turn the Tide on NCDs," in *Lifestyle and Epidemiology - Poverty and Cardiovascular Diseases a Double Burden in African Populations [Working Title]*, IntechOpen.

Mihale-Wilson, C., Hinz, O., van der Aalst, W., and Weinhardt, C. 2022. "Corporate Digital Responsibility," *Business & Information Systems Engineering* (64:2), pp. 127-132 (doi: 10.1007/s12599-022-00746-y).

Nackerdien, F., and Yu, D. 2022. "Defining and measuring time poverty in South Africa," *Development Southern Africa*, pp. 1-20 (doi: 10.1080/0376835x.2022.2028606).

Nilsson, M., Griggs, D., and Visbeck, M. 2016. "Policy: Map the interactions between Sustainable Development Goals," *Nature* (534:7607), pp. 320-322 (doi: 10.1038/534320a).

Ospina-Forero, L., Castañeda, G., and Guerrero, O. A. 2022. "Estimating networks of sustainable development goals," *Information & Management* (59:5), p. 103342 (doi: 10.1016/j.im.2020.103342).

Phang, C. W., Luo, X., and Fang, Z. 2019. "Mobile Time-Based Targeting: Matching Product-Value Appeal to Time of Day," *J. Manage. Inf. Syst* (36:2), pp. 513-545 (doi: 10.1080/07421222.2019.1598696).

Qi, L., and Dong, X. 2018. "Gender, Low-Paid Status, and Time Poverty in Urban China," *Feminist Economics* (24:2), pp. 171-193 (doi: 10.1080/13545701.2017.1404621).

Rapp, A. 2022. "Time, engagement and video games: How game design elements shape the temporalities of play in massively multiplayer online role-playing games," *Information Systems Journal* (32:1), pp. 5-32 (doi: 10.1111/isj.12328).

Ravindran, T., Yeow Kuan, A. C., and Hoe Lian, D. G. 2014. "Antecedents and effects of social network fatigue," *Journal of the Association for Information Science and Technology* (65:11), pp. 2306-2320 (doi: 10.1002/asi.23122).

Riemenschneider, C., and Armstrong, D. 2021. "The Development of the Perceived Distinctiveness Antecedent of Information Systems Professional Identity," *MIS Q* (45:3), pp. 1149-1186 (doi: 10.25300/MISQ/2021/14626).

Salo, M., Makkonen, M., and Hekkala, R. 2020. "The interplay of IT users' coping strategies: Uncovering momentary emotional load, routes, and sequences," *MIS Quarterly* (44:3), pp. 1143-1175 (doi: 10.25300/MISQ/2020/15610).

Saunders, C., Craig Van Slyke, and Vogel, D. R. 2004. "My Time or Yours? Managing Time Visions in Global Virtual Teams," *Academy of Management Executive* (18:1), pp. 19-31.

Tams, S., Ahuja, M., Thatcher, J., and Grover, V. 2020. "Worker stress in the age of mobile technology: The combined effects of perceived interruption overload and worker control," *The Journal of Strategic Information Systems* (29:1), p. 101595 (doi: 10.1016/j.jsis.2020.101595).

Urakawa, K., Wang, W., and Alam, M. 2020. "Empirical Analysis of Time Poverty and Health-Related Activities in Japan," *Journal of Family and Economic Issues* (41:3), pp. 520-529 (doi: 10.1007/s10834-020-09671-2).

Venkatesh, V., Sykes, T. A., and Zhang, X. 2020. "ICT for Development in Rural India: A Longitudinal Study of Women's Health Outcomes," *MIS Q* (44:2), pp. 605-629 (doi: 10.25300/MISQ/2020/12342).

Vermeire, J., Crucke, S., Mutesi, J., and Vinck, A. 2023. "Tackling climate change under time-poverty: Cooperatives as temporal pacers," *Sustainable Development* (31:1), pp. 253-264 (doi: 10.1002/sd.2387).

Vickery, C. 1977. "The time-poor: A new look at poverty," *Journal of Human Resources* (12:1), pp. 27-48.

vom Brocke, J., Hevner, A., Léger, P. M., Walla, P., and Riedl, R. 2020. "Advancing a NeuroIS research agenda with four areas of societal contributions," *Eur J Inf Syst* (29:1), pp. 9-24 (doi: 10.1080/0960085X.2019.1708218).

Watson, R. T., Elliot, S., Corbett, J., Farkas, D., Feizabadi, A., Gupta, A., Iyer, L., Sen, S., Sharda, R., Shin, N., Thapa, D., and Webster, J. 2021. "How the AIS can Improve its Contributions to the UN's Sustainability Development Goals: Towards A Framework for Scaling Collaborations and Evaluating Impact," *Communications of the Association for Information Systems* (48:1), pp. 476-502 (doi: 10.17705/1CAIS.04841).

Whillans, A. 2019. "Time for happiness: Why the pursuit of money isn't bringing you joy – and what will. Harvard Business Review.," *Harvard Business Review*.

Whillans, A., and West, C. 2022. "Alleviating time poverty among the working poor: a pre-registered longitudinal field experiment," *Scientific reports* (12:1), p. 719 (doi: 10.1038/s41598-021-04352-y).

Whillans, A. V., and Dunn, E. W. 2019. "Valuing time over money is associated with greater social connection," *Journal of Social and Personal Relationships* (36:8), pp. 2549-2565 (doi: 10.1177/0265407518791322).

Williams, J. R., Masuda, Y. J., and Tallis, H. 2016. "A Measure Whose Time has Come: Formalizing Time Poverty," *Social Indicators Research* (128:1), pp. 265-283 (doi: 10.1007/s11205-015-1029-z).

Wolfswinkel, J. F., Furtmueller, E., and Wilderom, C. P. M. 2013. "Using grounded theory as a method for rigorously reviewing literature," *Eur J Inf Syst* (22:1), pp. 45-55 (doi: 10.1057/ejis.2011.51).

Yazdanmehr, A., Li, Y., and Wang, J. 2022. "Employee responses to information security related stress: Coping and violation intention," *Information Systems Journal* (doi: 10.1111/isj.12417).

Zheng, X., Zhang, Q., Li, X., and Wu, B. 2022. "Being busy, feeling poor: The scale development and validation of perceived time poverty," *International Journal of Selection and Assessment* (30:4), pp. 596-613 (doi: 10.1111/ijsa.12395).