

Towards a Soft Paternalism to Manage Information Systems in Organisations

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Vorwort

Wenn das letzte Wort gesagt ist, der letzte Punkt geschrieben und etwas ganz Neues beginnt, könnte es eigentlich egal sein, wie man bis hierhin gekommen ist. Und doch lohnt sich ein Blick zurück auf das Vergangene und Erlebte, auf das Fordernde und Prägende und auf die vielfältigen Begegnungen, die Teil der vergangenen Jahre und Teil von mir geworden sind.

Einen sehr wertvollen Beitrag zur fachlichen, aber auch persönlichen Weiterentwicklung und Finanzierung leistete das Studienförderwerk Klaus Murmann der Stiftung der Deutschen Wirtschaft. Ich danke sehr für die Möglichkeiten, die mir während der gesamten Förderzeit eröffnet wurden. Eine Erwähnung verdient das Auslandssemester in Norwegen, in dem ich mit dem Promotionsthema das erste Mal in Berührung kam.

Persönlich danke ich besonders für die stetige Unterstützung und langjährige Verbundenheit mit meinem Doktorvater Stefan Stieglitz. Ohne das Vertrauen in eine Betreuung, die so viel Freiheiten lässt wie möglich und so wenig Vorgaben macht wie nötig, hätte ich mich wohl nicht auf diese spannende Zeit eingelassen.

Die Promotionszeit wird aber erst durch die Mitdoktorandinnen und Mitdoktoranden zu einem Erlebnis und nur gemeinsam hält man das Auf und Ab bis zur ersehnten Annahme eines Artikels und letztlich bis zur Fertigstellung der Promotionsarbeit aus. Die Hilfskräfte, die nächste Generation der Forschenden, spielen eine nicht minder wichtige Rolle. Namentlich herausgreifen möchte ich Lea, die mich von Beginn an unterstützte und bis zuletzt eine große Hilfe blieb.

Keine Selbstverständlichkeit ist die Prägung meiner Eltern, die den akademischen Pfad ermöglicht, aber auch nicht erzwungen haben. Meinem Bruder bin ich dankbar, dass er so manchen Weg vorzeichnete und ich manchmal nur hinterherzugehen brauchte.

Meiner Frau danke ich von Herzen für die fast unendliche Geduld und das selten aufgebrauchte Verständnis, wenn die Konferenz am anderen der Welt stattfand oder die Forschung keinen Feierabend und keinen Urlaub kannte.

The first misconception is that it is possible to avoid influencing people's choices.

— Richard H. Thaler & Cass R. Sunstein

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Abbreviations

BCSS	Behaviour Change Support System
BE	Behavioural Economics
DSS	Decision Support Systems
HCI	Human-Computer Interaction
IS	Information Systems (Discipline)
IT	Information Technology
PT	Persuasive Technology

Abstract Deutsch

Unternehmen und andere Organisationen stehen oftmals vor der Herausforderung, dass Informationssysteme nicht in der Art und Weise genutzt werden, wie es für eine effektive und effiziente Verwendung nötig wäre. Die Gründe für dieses Verhalten, das für das Unternehmen aber auch den einzelnen Mitarbeiter zu Problemen führen kann, sind vielfältig und reichen von fehlendem Wissen über die Konsequenzen, Überforderung durch andauernde Veränderungen bis hin zu antrainierten Workarounds und Heuristiken, die den individuellen Ablauf einfacher gestalten. Zwar hat die Forschungsdisziplin, die sich mit Informationssystemen und dem Zusammenspiel von menschlichem Nutzer, System und organisationalem Kontext befasst, die Gründe für eine fehlende Akzeptanz von neuen Technologien oder die unzureichende Nutzung der Systeme von verschiedenen Perspektiven beleuchtet und Erklärungsmodelle entwickelt, die Herausforderungen sind jedoch oftmals geblieben. In dieser Dissertation wird eine paternalistische Perspektive auf problematische Verhaltensweisen in Informationssystemen herangezogen, die in anderen Disziplinen wie der Verhaltensökonomik stärker verbreitet ist. Dabei werden ausgehend von der Nudge-Theorie paternalistische Interventionsstrategien untersucht, die darauf abzielen, Entscheidungen des einzelnen Nutzers, die als problematisch anzusehen sind, abzuwenden bzw. zu verbessern. Die Prinzipien eines ‚schwachen‘ oder ‚liberalen‘ Paternalismus verbieten dabei, Optionen wegzulassen oder gegen die ausdrücklichen Präferenzen des einzelnen Nutzers zu agieren. Eine paternalistische Perspektive, die Interventionen in Entscheidungsprozesse beinhaltet, ist in der bisherigen Forschung zu Informationssystemen kaum vorhanden oder wurde nicht als solche behandelt. In dieser Dissertation werden verwandte Forschungszweige ergründet und entwickelt, wie eine schwach paternalistische und nutzerzentrierte Perspektive helfen kann, IT-Akzeptanz- und Nutzungsprobleme in Organisationen mit einer Digital-Nudging-Theorie zu untersuchen und zu verbessern. Dafür wurden sowohl Bedingungen für den Einsatz in Unternehmen untersucht und ein methodischer Baukasten für die Anwendung entwickelt, als auch Anwendungen in realen und experimentellen Umgebungen evaluiert.

Abstract English

Companies and other organisations are often faced with the challenge of information systems not being used effectively and efficiently. The reasons for this behaviour, which can lead to problems for both the company and the individual employee, are manifold, ranging from a lack of knowledge about the consequences of such usage and overstraining through constant changes, to trained workarounds and heuristics that make the individual process easier. Although the research discipline dealing with information systems and the interaction of user, system and organisational context has examined, from different perspectives, the reasons for a lack of acceptance of new technologies and the inefficient use of systems and has developed explanatory models, such challenges often remain. In this dissertation, a paternalistic perspective, which is more commonly used in other disciplines, such as behavioural economics, is applied to problematic behaviours in information systems usage. Based on the nudge theory, paternalistic intervention strategies are examined that aim to avert or improve individual users' decisions that are considered problematic. The principles of 'soft' or 'libertarian' paternalism that prohibit omitting options or acting against the explicit preferences of the individual user are considered. The paternalistic perspective on interventions in decision-making processes is minimally addressed in previous research on information systems or has not been classified as such. This dissertation brings together related fields of research and explains how a soft paternalistic and user-centred perspective can help to investigate and improve information technology acceptance and usage problems in organisations by using a digital nudging theory. To this end, conditions for use in companies were investigated, a methodological construction kit for application was developed and applications in real and experimental environments were evaluated.

1 Introduction

When we speak about Information Systems (IS) research, we usually think of information technology (IT) within an organisational context that offers new possibilities for solving tasks or satisfying existing needs. The sociotechnical paradigm has shaped the IS discipline and fostered the joint study of human and technical factors (Sarker, Chatterjee, & Xiao, 2013). This twin view on change enabled by IT used to be ‘decades ahead of computer science and software engineering’ (Beath, Berente, Gallivan, & Lyytinen, 2013, p. iv). Although the days of the identity crisis may be over, the sociotechnical paradigm – and therein the human part – serves as the core identity of IS (Benbasat & Zmud, 2003). In this dissertation, the human part in IS research is emphasised by studying how human behaviour in and with IS can be influenced by a paternalistic perspective.

1.1 Context and Research Motivation

User adoption, usage motives, factors that influence use intention and barriers are topics of several IS studies and theories. They include a strong behavioural aspect that takes into account that people do not always act rationally or as expected; rather, they are influenced by factors like peers, cognitive perception or experience. Studies applying these theories have greatly contributed to the IS discipline by explaining unanticipated behaviour and pointing to areas with a potential for improvement. However, the gap between anticipated and actual behaviour still exists, as if the insights we gained could not be utilised for future applications (Ferratt, Prasad, & Dunne, 2018). In other words, IS research has gained knowledge of human flaws that cause problematic behaviours, but it has largely refrained from using this knowledge as part of a more paternalistic management of IS.

In the realm of problematic behaviours, the field of behavioural economics (BE) proposed that no homo economicus exists that has all the information needed in a decision-making situation to objectively make the best decision (Arnott & Gao, 2019; Thaler & Sunstein, 2008). The field has widely adopted the dual process perspective, which differentiates between an automatic and a reflective processing (Alós-Ferrer & Strack, 2014; Samson & Voyer, 2012). In addition to explaining bounded rationality in decision-making, BE researchers have encouraged a paternalistic approach to lower the adverse consequences of problematic behaviour (Thaler & Sunstein, 2008) through the use of small changes in the choice architecture that lead the decision-maker to a certain option. These so-called

nudges anticipate biases and heuristics and either make the decision-maker aware of a potentially imprudent decision or prompt him or her to utilise the automatic decision-making function (Hansen & Jespersen, 2013). This is deemed a *soft* paternalistic approach because the decision-maker retains the freedom of choice. Governments have experimented with nudges in tax payment and health care with promising results (Schnellenbach, 2012). Furthermore, empirical research demonstrated that people accept nudges despite their paternalistic character (Reisch & Sunstein, 2016).

The BE nudge theory was not originally considered as an adaption to digital choice architectures (Jameson et al., 2013), but the conception of problematic behaviours and a soft paternalistic approach to resolve those issues provided a new perspective for IS research and organisational challenges, like the digital transformation and technology adoption (Weinmann, Schneider, & Brocke, 2016). A well-conceived paternalism could enable organisations to better guide their users in increasingly complex user interfaces and in a growing heterogeneity of tasks and tools (Lyytinen, 2010; Mirsch, Lehrer, & Jung, 2017).

In the computer science discipline, *persuasive technology* (PT, also *persuasion*) has incorporated the role of computers and technologies in influencing the behaviour and decisions of users (Fogg, 2003). Persuasion research, however, has not differentiated between the intent and the goal behind an intervention. For example, Fogg (2003, p. 3) listed the commerce domain as an application area for PT and specified that Amazon's recommendation system persuades users to buy more books and other products. As Lembcke et al. (2019) pointed out, only parts of what PT has suggested fulfils the requirements of the nudge idea from BE.

Starting with the nudge theory and a paternalistic approach that is designed to include the preferences and needs of a decision-maker, this dissertation examines a user-centred soft paternalism for organisations to improve decisions with information systems.

Scientific Relevance

The gap between the anticipated and the actual behaviour in various information systems causes problems and has remained an ongoing topic of research for decades (Ferratt et al., 2018). Instead of the gap being closed, it has become even more apparent with the existence of digital transformation and an increasing digitisation of formerly offline decisions in business and everyday life alike (Lyytinen, 2010; Weinmann et al., 2016).

Furthermore, today's information systems excel in providing a high degree of flexibility and openness to enable ease of use, creativity and employee satisfaction (D. J. Kim & Lee, 2015). The desired openness, however, makes predicting user behaviour even more difficult and potentially increases the gap between targeted and actual behaviours.

For this dissertation, the author studied previous knowledge from IS, BE and computer science to develop and evaluate new instruments to address behaviour-related challenges in organisational information systems. While IS research often remains at the explaining stage, this dissertation investigates how organisations can curtail problematic behaviours and reduce the growing complexity in digital choice environments with new approaches.

Practical Relevance

Organisations regularly introduce information systems that are underutilised due to inefficient or inappropriate usage (Ferratt et al., 2018). Companies have an economic interest in seeing that the planned usage of information systems, which may have legitimised the introduction of the system in the first place, is successful (Fink, 1998). However, users often stick to old habits or believe that their way of doing is more suitable. They dismiss that others are affected by their individual choices, leading to lower productivity at the organisational level. As such, there is a need to improve usage as much as possible.

New ideas are required to solve such challenges, potentially including the soft paternalistic approach investigated in this dissertation. However, the question arises as to how such paternalism can be applied in organisations and whether it can achieve the desired goals. A paternalistic approach can also be seen as a threat to autonomy, so that an understanding of factors influencing acceptance is important.

1.2 Research Questions

The aim of this dissertation is to investigate how soft paternalistic tools and management approaches can help to improve decisions in the digital workplace. This includes the reflection on and clarification of what an improved decision can be. It is based on the nudge theory from BE, which focuses on improving decisions with respect to the preferences of decision-makers and what benefits them. Nudging entails neither prohibitions nor mandates. Despite some critics' claim that the freedom of choice retained in nudging is merely theoretical window-dressing, this approach does represent an

attempt to improve decisions without setting strict guidelines or even sanctioning misconduct. However, decisions in information systems are not directly comparable with conventional decision environments. In the digital context, decisions are also manifested in interactions or non-interactions with a user interface. The user chooses one from many different options and behaviours that are possible. The chosen option is not necessarily the correct procedural step of a default workflow, the decision might cause failures in the long run or prevent efficient communication (Alter, 2010). Although examples differ and belong to various fields within the IS discipline, many such decisions can be considered preventable and problematic: preventable in that users can decide differently, and problematic because the decision can have an adverse implication for certain stakeholders, although not necessarily for the decision-makers themselves.

Due to the differences that are rooted in digital choice environments and organisational settings, the paternalistic perspective requires careful investigation for application in information systems. Furthermore, it is necessary to combine a paternalistic perspective of digital choice environments together with decision support systems (DSS), PT or behaviour change support systems (BCSS) (Arnott & Gao, 2019; Fogg, 2003; Oinas-Kukkonen & Harjumaa, 2009). They are comparable in terms of aiming at influencing people in IT to perform a target behaviour (Weinmann et al., 2016). However, the concepts have partially different goals, which need clarification.

In addition to the absence of a paternalistic perspective on organisational challenges in IS research, it is unclear how scholars and practitioners can approach a digital application of the nudging concept. As Mirsch et al. (2017, p. 2) stated, ‘digital choice environments are often designed by trial and error’. This dissertation aims to contribute to knowledge on how a soft paternalistic perspective can be effectively used to reduce problematic behaviours. As such, this dissertation first addresses the research question:

RQ1: How can a soft paternalistic perspective on digital choice environments help organisations to solve problematic behaviours in information systems?

Secondly, it is important to investigate how soft paternalistic interventions in the digital choice environment can be conceptualised and designed in such a way that the focus is on users, their needs and their preferences (Wang et al., 2014). The focus on the decision-makers, their reasons for deviating from a target behaviour and the intervention’s goal to help together differentiate the *soft* variant of paternalism from a *hard* paternalism

(Leggett, 2014). Thaler and Sunstein (2008) emphasised the importance of accepting soft paternalistic interventions: Decision-makers should judge the intervention themselves in a way that puts them in a better position.

In the IS context, it is not yet known how the soft paternalistic perspective affects users and which forms are more successful and accepted than others. For a theoretical understanding and practical application, it is important to determine how soft paternalism is perceived in an organisational IS context and how users react to the altered digital choice environments, as well as which factors have a particular influence on the perception and acceptance of such an approach. For example, previous results have shown that personalisation influences the perception of an intervention in digital contexts (Liang, Lai, & Ku, 2007). Certain personality traits have also been associated with increased susceptibility to persuasion (Meschtscherjakov, De Ruyte, Fuchsberger, Murer, & Tscheligi, 2016).

In this regard, a possible reactance to the interventions attributed to a threat to autonomy is also examined. Especially in the organisational context, the well-intentioned intervention must not backfire and create a worse situation than what existed before the intervention, which is why much importance is attached to acceptance and influencing factors, which are investigated in this dissertation with the following research question:

RQ2: Which factors influence the success and acceptance of a soft paternalism for problematic behaviours in information systems?

1.3 Thesis Structure and List of Publications

This dissertation was planned and conducted as a paper-based (cumulative) dissertation that comprises nine individual conference and journal articles. In this dissertation thesis, the articles, which can also stand alone, are used in combination to answer the research questions posed. The articles included in the thesis are listed in Table 1. Four of the papers (marked with * in Table 1) build the dissertation's core, as they closely relate to each other and mainly contribute to answering the research questions.

Chapter 2 defines and initially discusses the basic concepts of the research questions based on the related literature. Specifically, research streams and concepts like decision theory, BE and IS are linked, and the novelty of a paternalistic approach is developed.

In Chapter 3 the author discusses the research strategy pursued and lists the methodological approaches of the articles. The author also clarifies which articles primarily address which research question.

Chapter 4 recapitulates the most important results of the individual papers, which are necessary for the discussion. In Chapter 5, the author brings together the individual results against the background of the research questions. From the specific experiments and models, he develops a soft paternalistic perspective in IS management and discusses its conditions and limitations.

In Chapter 6, the author summarises the results and contributions of this dissertation thesis for science and practice. Furthermore, he identifies limitations of the research and makes suggestions for future research.

Table 1 depicts all research articles that form the dissertation. After the index, bibliographic details, including title, authors, publication year and outlet, are provided. The next columns identify the article type (CNF for conference paper, JNL for journal articles) and the ranking of the respective outlets regarding the VHB JourQual 3, as well as the CORE ranking. The last two columns depict the Journal Impact Factor of the outlet and the citation count of the specific publication according to Google Scholar, if available.

The articles are published in the *Journal of Behaviour & Information Technology*, the *HMD – Praxis der Wirtschaftsinformatik*, the *European Conference on Information Systems (ECIS)*, the *Hawaii International Conference on System Sciences (HICSS)* or the *Americas Conference on Information Systems (AMCIS)*. One article is in review at the *Information & Management*. These research articles have been planned, written, submitted and/or published over a four-year dissertation period beginning in 2016.

The papers primarily address one of the two research questions. Almost all articles are written in English except for one journal article, which is published in a German journal (HMD). All works are co-authored by one or more researcher(s). Most co-authors were affiliated with the University of Duisburg-Essen, Germany, but co-authors were also affiliated with the University of Münster, Germany, as well as with the University of Agder, Norway.

Table 1. List of Publications in Chronological Order

#	Publication	Type	VHB JQ3 ¹	CORE ²	JIF	Citations ³
1*	Title The DINU-Model – A Process Model for the Design of Nudges Authors Christian Meske, Tobias Potthoff ⁴ Year 2017 Outlet European Conference on Information Systems (ECIS)	CNF (Short)	B	A	/	30
2	Title Digital Nudging am Arbeitsplatz Authors Stefan Stieglitz, Tobias Potthoff, Tobias Kißmer Year 2017 Outlet HMD – Praxis der Wirtschaftsinformatik	JNL	D	/	/	9
3*	Title Enterprise Digital Nudging: Between Adoption Gain and Unintended Rejection Authors Tobias Kißmer, Tobias Potthoff, Stefan Stieglitz Year 2018 Outlet Americas Conference on Information Systems (AMCIS)	CNF (Short)	D	A	/	4
4	Title The Diffusion of Crisis-Related Communication on Social Media: An Empirical Analysis of Facebook Reactions Authors Björn Ross, Tobias Potthoff, Tim A. Majchrzak, Narayan Ranjan Chakraborty, Mehdi Ben Lazreg, Stefan Stieglitz Year 2018 Outlet Hawaii International Conference on System Sciences (HICSS)	CNF	C	A	/	13
5	Title Collaborative Service Blueprinting for Design Thinking: Evaluation of a Digital Prototype Authors Tobias Potthoff, Dominik Siemon, Konstantin Wilms, Sascha Möser, Marco Hellmann, Stefan Stieglitz, Susanne Robra-Bissantz Year 2018 Outlet Hawaii International Conference on System Sciences (HICSS)	CNF	C	A	/	3
6	Title Accommodated Emoji Usage: Influence of Hierarchy on the Adaption of Pictographs in Instant Messaging	CNF	/	AUS	/	1

¹ <https://vhbonline.org/vhb4you/jourqual/vhb-jourqual-3/teilrating-wi/> (accessed 2020-02-11).

² <http://www.core.edu.au/> (accessed 2020-02-11).

³ <https://scholar.google.de/citations?user=GwECOnAAAAJ&hl> (accessed 2020-02-11).

⁴ The author changed his name from Tobias Potthoff to Tobias Kroll in 2018.

	Authors	Tobias Kroll, Lea-Marie Braun, Stefan Stieglitz						
	Year	2018						
	Outlet	Australasian Conference on Information Systems (ACIS)						
7*	Title	Digital Nudging and Privacy: Improving Decisions about Self-Disclosure in Social Networks	JNL	/	A	1.429 (2018)	7	
	Authors	Tobias Kroll, Stefan Stieglitz						
	Year	2019						
	Outlet	Behaviour & Information Technology						
8	Title	Nudging People to Save Energy in Smart Homes with Social Norms and Self-Commitment	CNF (Short)	B	A	/	/	
	Authors	Tobias Kroll, Ute Paukstadt, Kseniya Kreidermann, Milad Mirbabaie						
	Year	2019						
	Outlet	European Conference on Information Systems (ECIS)						
9*	Title	Enterprise Digital Nudging: Balancing Intervention Intensity and Tailoring to Avoid Rejection	JNL	B	A*	4.120 (2018)	/	
	Authors:	Stefan Stieglitz, Milad Mirbabaie, Tobias Kroll, Tobias Kißmer						
	Year	<i>Under review (1st round)</i>						
	Outlet	Information & Management (I&M)						

Articles marked with an asterisk (*), (i.e. P1, P3, P7 and P9), build the core of the dissertation, while the others contribute with minor and specific aspects as explained and discussed later in this thesis.

2 Research Background

This chapter reviews literature on two building blocks of the dissertation. First, the author abstracts specific decisions, leading to a more generic outline of problematic behaviours in digital choice environments. Second, the author reviews intervention strategies and the idea of paternalism.

2.1 Problematic Behaviours in Digital Choice Environments

Research has used the term *problematic behaviours* to describe behaviours with potentially adverse effects, such as drug or Internet addiction (Young, 1998). In the IS domain, this term was also used to refer to obsessive email use in work contexts (Chen, 2007) and other behaviours related to email, such as phishing or privacy incidents (Ducheneaut, Zhao, & Weber, 2006). Problematic behaviour has also been described as bad behaviour (McGillicuddy, Bernard, & Cranfield, 2016); Turel and Qahri-Saremi (2016, p. 1088) defined it as ‘typically impulsive, often short lived behavior’.

Alter (2010) differentiated between four types of behaviours in information systems and the related research perspective: 1) *engineered behaviour* represents the traditional perspective on specific user interfaces that pre-set the behaviour as much as possible; 2) *guided behaviour* is the aim of assisting systems that can help users to avoid mistakes or take better options, such as in DSS; 3) *emergent behaviour* is the default in most contemporary information systems that offer functionalities that need to evolve while the system is used in an organisational environment; and 4) *undesirable behaviour* means unexpected outcomes that designers or other stakeholders view as adverse and that may result in inefficiencies or failures (Alter, 2010). Information systems can involve all of these behaviours, although emerging behaviour plays a greater role in a computer-rich ecology than it did when users only operated a few special software applications (Lyytinen, 2010). The fact that the desired use of IT is hardly engineerable but, instead, arises as an interplay of technology and the user has provided a new view on challenges associated with IT (Riemer & Johnston, 2014).

Summarising the different types of behaviours for this dissertation’s aim, the understanding of problematic behaviour is strongly related to undesirable behaviour as described by Alter (2010). As a distinction, *problematic* does not directly imply a desired or preferred behaviour of the designer or product owner, for example, but instead

indicates that the behaviour is not optimal and can be improved. This understanding deliberately keeps the evaluating instance open: for example, in addiction research, the users themselves can regard their behaviour as problematic or an entity with a legitimate interest in the behaviour of individuals (society, science, companies).

2.2 Information Systems and Behavioural Economics on Problematic Behaviours

Considering this description of problematic behaviour, IS research has a long tradition of studying such behaviours, as well as IT decisions that are associated with the problematic behaviours, in particular (Browne & Parsons, 2012; Davern, Shaft, & Te’eni, 2012; Goes, 2013). For example, studies on technology acceptance, user adoption and DSS have characterised large parts of the IS discipline and produced models to explain unexpected behaviour or to optimise decisions (Ferratt et al., 2018; Fleischmann, Amirpur, Benlian, & Hess, 2014; Legris, Ingham, & Collerette, 2003). Due to a high prevalence of IT in most industries and job functions, the research focus has shifted from adoption and initiation of IT usage to ‘adapting, integrating and orchestrating’ rich IT landscapes (Lyytinen, 2010, p. 23). The usage of information systems in organisations requires many and recurring decisions by users. These decisions do not simply relate to sending a message or pressing the correct button, but also involve decisions for adopting new or continuing with existing company-wide systems (Bhattacherjee, 2001).

Early decision theory models approach decisions from an economic and value-maximising perspective and assume rational agents (Arnott & Gao, 2019). There, each option is associated with a probability and an outcome that serve as input for an expected utility function (Tsoukiàs, 2008). These models involve axioms (e.g. *transitivity*: if A is better than B, and B is better than C, then is A better than C), which are not always observable in real life. Simon’s theory of bounded rationality describes the attempt to resolve axiomatic principles in the economic (or classic) decision theory (see Arnott & Gao, 2019 for a detailed view on the development). While Simon prepared the ground for a behavioural decision theory, ‘the relatively new, but now dominant, social science experimental research methods [provided momentum] to explore the nature of human decision-making’ (Arnott & Gao, 2019, p. 3).

Modern BE – as a neighbouring discipline to IS – largely builds on experimental findings that reveal systematic biases and heuristics in human decision-making that are reasoned

with two distinct cognitive modes (Tversky & Kahneman, 1974): ‘System 1 operates automatically and quickly, with little or no effort and no sense of voluntary control. System 2 allocates attention to the effortful mental activities that demand it, including complex computations’ (Kahneman, 2011, pp. 20–21). Others characterised System 1 as default (Ferratt et al., 2018) or effortless and associative (Thaler & Sunstein, 2008), while System 2 is inhibitory, reflective and prudent (Turel & Qahri-Saremi, 2016) or slow (Thaler & Sunstein, 2008). The dual system concept has been used to explain several different problematic behaviours in IS, such as the problematic use of social networking sites or IT use (Ferratt et al., 2018; Turel & Qahri-Saremi, 2016).

One aspect of problematic behaviours are heuristics that people apply to conserve capacity in their reflective system: instead of collecting and processing all information, rules of thumb and prior experience are used as shortcuts to inform decision-making (Tversky & Kahneman, 1974). Heuristics, in general, can be a useful reduction strategy for arriving at a decision more quickly (Arnott & Gao, 2019). The availability heuristic, for example, allows people to evaluate the likelihood of an event based on available memories of similar events (Tversky & Kahneman, 1974): for example, people would evaluate the likelihood of contracting cancer based on cancer cases among acquaintances. However, heuristics are prone to systematically influence human decision-making towards what are normally not the best options, which then become problematic (Browne & Parsons, 2012; Fleischmann et al., 2014).

Although biases are always the result of cognitive processes, studies have differentiated between general cognitive biases, such as attention and memory, and motivational biases, such as the desirability of outcomes that lead to a biased result (Browne & Parsons, 2012; Montibeller & von Winterfeldt, 2015). Behavioural decision theories and more specific developments, like dual process theories or the empirical investigations of heuristics and structural biases, have been adopted in IS and implemented in models like the technology acceptance model (Fleischmann et al., 2014). However, as Arnott and Gao (2019) noted, for research on DSS, the field largely builds on rather outdated approaches like Simon’s phase model, which has been substituted in BE with models that better consider cognitive biases. These authors also summarised prior research, observing that contemporary BE have had just ‘modest use as a foundation theory in [...] IS research’ (Arnott & Gao, 2019, p. 7).

2.3 Intervention Strategies to Prevent Problematic Behaviours

Different areas of IS research have dealt with overcoming problematic behaviours and decision-making. Arnott and Pervan (2014) studied the genealogy of the DSS field. According to their bibliometric analysis, the traditional (economic) decision theory applied in operations management and optimisation became part of the 1970s DSS understanding, as did the behavioural decision theory. In addition to advances to support systems for groups and systems enriched with artificial intelligence, the authors listed business intelligence and business analytics as the most recent developments. Although researchers started early to question the empirical validity of underlying decision theories and, especially, the phase theorem (Lipshitz & Bar-Ilan, 1996), they have largely remained the standard in the DSS field. Hence, the most specialised field for decision-making within the IS discipline has failed to keep track of the advances in decision theory and BE (Arnott & Gao, 2019).

However, the study of cognitive biases has not remained bounded to the DSS field. Fleischmann et al. (2014) attested to an increasing though immature utilisation of cognitive biases in IS top journals apart from DSS. Most articles identified in their review discuss cognitive biases in the IS usage domain (e.g. adoption and acceptance), followed by IS management (e.g. outsourcing and security). It is noteworthy that single cognitive biases have achieved a better reputation and higher acceptance in the IS discipline than others. The status quo bias, for example, has been utilised in IS resistance studies as ‘theory’, while their dependency on behavioural decision theory and other biases were substituted with an economic cost-benefit focus (H.-W. Kim & Kankanhalli, 2009; Lee & Joshi, 2017).

While several areas within the IS discipline have utilised behavioural decision theories and results from BE to explain unexpected behaviour, their prescriptive potential and ability to anticipate and prevent problematic behaviours have largely been discounted (Arnott & Gao, 2019; Fleischmann et al., 2014; Oinas-Kukkonen & Harjumaa, 2009). Nevertheless, with the growing knowledge about factors that influence acceptance and adoption of information research, scholars questioned how interventions can support the adoption process and IT use. Venkatesh and Bala (2008) differentiated between pre-implementation interventions (design characteristics, user participation, management support and incentive alignment) and post-implementation interventions (training,

organisational support and peer support). Such developments can be understood as attempts to break the Cartesian view that suggested an identified and developed task-technology fit must lead to adoption and success (Riemer & Johnston, 2014), yet the utilisation of results from cognition research and BE have not happened systemically (Fleischmann et al., 2014; Lyytinen, 2010).

In addition to ideas of intervening in the adoption process or usage, which focused more on managerial and organisational interventions and less on decision-making, specialised systems were developed that aimed at influencing and changing users' behaviours. Scholars have studied them as, for instance, examples of a BCSS, which is a 'socio-technical information system with psychological and behavioral outcomes designed to form, alter or reinforce attitudes, behaviors or an act of complying without using coercion or deception' (Oinas-Kukkonen, 2013, p. 1225).

Likewise, the term PT evolved in the computer science field, referring to the use of IT to change users' behaviours and attitudes (Fogg, 2003). In addition to the neologism 'microsuasion', which is a smaller persuasive element within existing software such as email programs, BCSS and PT literature have mostly focused on IT artefacts that are solely designed to change behaviour or attitudes (Fogg, 2003; Oinas-Kukkonen & Harjumaa, 2009). Hence, the BCSS and PT fields have suggested little to prevent problematic behaviours in general information systems or to solve organisational tasks.

2.4 Paternalism in Information Systems

Despite the utilisation of decision theories in parts of the IS discipline and the proposition of systems to change behaviours, the discipline's philosophy has largely remained explanatory and neutral regarding problematic behaviours. Some ideas from BCSS and DSS have gone in the direction of paternalism, but very rarely have they been named as such. Fogg (2003, p. 236), for example, mentioned only in a footnote 'persuasion can become paternalism', indicating that this would not be worthwhile. A search in the IS-specific literature database AISeL and among the basket journals with the keywords 'paternalistic' or 'paternalism' yielded 75 results,⁵ which were mostly not related to behaviour interventions and decision support but rather to (organisational) culture (e.g. Feng, Zhu, Wang, & Liang, 2019). Even though the database does not cover several

⁵ As of December 2019

related outlets, the number indicates a low reception – especially before the rise of digital nudging.

Meredith and Arnott (2003, p. 1569) provided one rare and early example of IS research involving a paternalistic perspective that discusses ethical implications of DSS: In their principle of *Beneficence and Non-Malifence*, the authors see a ‘fine line between acting with beneficence, and slipping into paternalism’. It seems that paternalism is perceived as something that should have no place in influencing behaviour, as opposed to providing helpful interventions. However, the philosophical paternalism does not really know this distinction but, instead, is defined as the interference with individual liberty (Hausman & Welch, 2010; Mill, 1974).

In the management literature, the modern paternalistic management approach, which has been discussed for decades, is described as ‘breakthrough in leadership research’ (Pellegrini & Scandura, 2008, p. 586). Studies have suggested a *soft* or *libertarian* form of paternalism that reflects the decision-maker’s preferences and freedom of choice (Balebako et al., 2011; Thaler & Sunstein, 2003). Despite sustained debate about its ethical implications, the resulting nudge theory has given rise to evaluations that differentiate between paternalism that targets a better choice (a choice made by the decision-maker) and paternalism that targets a behaviour (without leaving the decision-maker much of a choice) (Hansen & Jespersen, 2013).

The IS discipline, however, has largely steered clear of naming its intervention research paternalistic. A blanket dismissal of a paternalistic philosophy seems hypocritical when one considers the achievements in DSS, PT and BCSS noted previously, which are intended to improve problematic behaviours. The inclusion of a paternalistic perspective would enable reflection on the ethical aspects and the study of the risks and adverse effects of the interventions (Meredith & Arnott, 2003). Figure 1 illustrates how the dependencies on the concepts presented are perceived in this dissertation. The entry points for the abstracted model are grey-coloured.

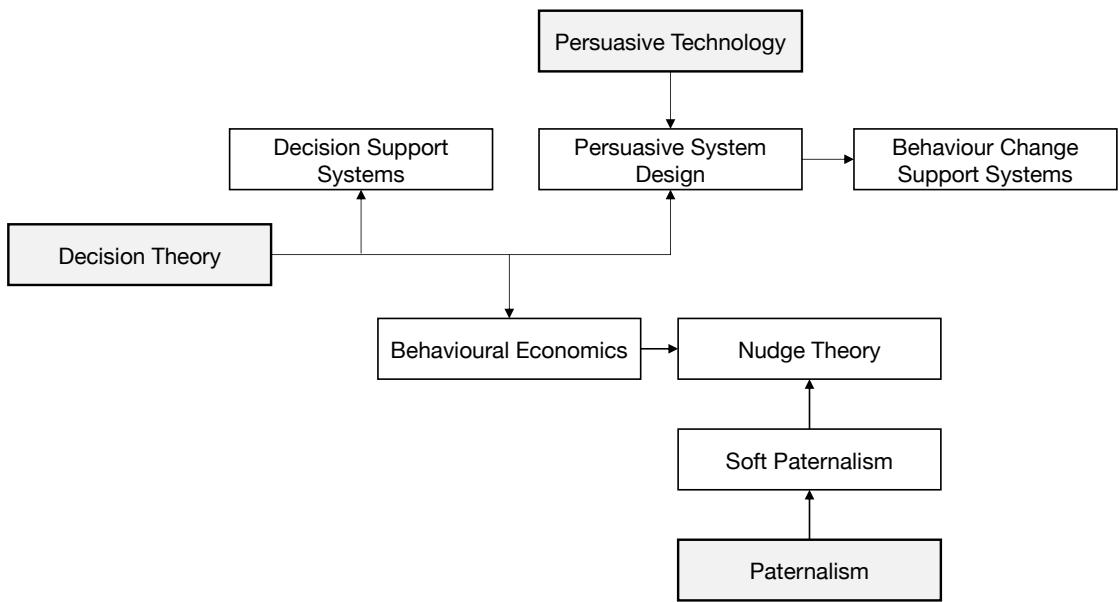


Figure 1. Model of the Related Concepts and Research Fields (Source: Own Construction)

3 Research Design

In this paper-based dissertation, a set of research articles published in or submitted to peer-reviewed conference proceedings and research journals jointly answer the stated research questions. The articles are mostly written as stand-alone studies and include different methodological approaches, such as a systematic literature review, interview study, regression analysis and structural equation modelling. This section demonstrates how the single articles match with the research questions. The different research approaches and methods are also explained.

3.1 Research Strategy

As expressed in the research questions, this dissertation project is divided into two parts that together aim to offer the IS discipline a soft paternalistic perspective for solving problematic behaviours, especially in organisational contexts. Despite the outlined related work, the dissertation and its research strategy have mainly been built around the nudge theory because it offers the most developed ideas for how to apply a soft paternalistic approach to problematic behaviours. The first research question is addressed by investigating what persuasive approaches in the IS field have been achieved in comparison to the nudge theory. Also, the perception of organisations and users regarding the paternalistic character is studied. This second part complements the first by applying, evaluating and improving specific intervention elements to alter problematic behaviours. In analogy to and extension of BE's nudge theory, which uses the term 'theory' as an integrating and clarifying framework, the author finally develops a digital nudging theory, which should serve as a basis for a soft paternalistic perspective in IS.

In total, nine papers have been written that address one or both research questions. Table 2 relates each paper (P1-9) to the research questions RQ1 and RQ2. An X marks the primary assignment; (x) means that the paper also addresses the research question indicated.

Table 2. Classification of Papers to Research Questions

Paper	Title	RQ1	RQ2
P1	The DINU-Model – A Process Model for the Design of Nudges	X	
P2	Digital Nudging am Arbeitsplatz	X	
P3	Enterprise Digital Nudging: Between Adoption Gain and Unintended Rejection	X	(x)
P4	The Diffusion of Crisis-Related Communication on Social Media: An Empirical Analysis of Facebook Reactions	(x)	X
P5	Collaborative Service Blueprinting for Design Thinking: Evaluation of a Digital Prototype	X	
P6	Accommodated Emoji Usage: Influence of Hierarchy on the Adaption of Pictographs in Instant Messaging	X	
P7	Digital Nudging and Privacy: Improving Decisions about Self-Disclosure in Social Networks	X	
P8	Nudging People to Save Energy in Smart Homes with Social Norms and Self-Commitment	X	
P9	Enterprise Digital Nudging: Balancing Intervention Intensity and Tailoring to Avoid Rejection	(x)	X

3.2 Applied Research Methods

In this dissertation, different research methods were applied to answer the research questions. The author mostly followed a positivist philosophy, which includes the belief in an objective reality and the ability to discover the truth by verifying and falsifying theories (Recker, 2013). This philosophy is also substantiated with BE's strong positivist nature, which this dissertation uses as a reference (Arnott & Gao, 2019). Consequently, most studies were quantitative and applied statistical methods to check hypotheses that were derived from the literature.

Nevertheless, the first paper (P1) contains a systematic literature review as defined by vom Brocke et al. (2009) and Cooper (1988). Literature research provides valuable insights, especially if the related research streams, their achievements and their boundaries are not yet clear. A more interpretive perspective was taken in the interview

study in P2, as well as in the user test in P6. The author of this dissertation developed a focus on survey and experiment research methods, the associated data collection methods and analysis approaches like inferential statistics (P3, P6-9). Social media analytics also provided useful access to empirical data (P4).

Table 3. Overview of Applied Research Designs

Paper	Research Approach	Research Method	Data Collection Method
P1	Qualitative, descriptive research	Literature research	Systematic literature review
P2	Qualitative, descriptive research	Content analysis	Interviews
P3	Quantitative, exploratory research	Survey research	Online questionnaire
P4	Quantitative, exploratory research	Case study research	Social media analytics
P5	Mixed methods, descriptive research	Case study and survey research	Observation, questionnaire
P6	Quantitative, descriptive research	Experimental research	Online questionnaire
P7	Quantitative, descriptive research	Survey research	Online questionnaire
P8	Quantitative, descriptive research	Experimental research	Online questionnaire
P9	Quantitative, descriptive research	Survey research	Online questionnaire

4 Research Results

This chapter presents the results of the individual studies and relates them to the research questions. Tables 4 and 5 provide an overview with a concise summary of the papers. Subsequently, the papers' results are presented in more detail. Papers on RQ1 (*How can a soft paternalistic perspective on digital choice environments help organisations to solve problematic behaviours in information systems?*) primarily yielded soft paternalism or comparable ideas in prior research and a conceptual view on problematic behaviours as well as soft paternalism in organisations (Table 4).

Table 4. Summary of Dissertation Papers Primarily Addressing RQ1

Paper	Summary
P1 (Meske & Potthoff, 2017)	Combining the ideas and elements identified in a systematic literature analysis, a three-phase process model was developed to approach the digital nudging environment. The model is separated into (1) analysing, (2) designing, and (3) evaluating, including a feedback loop. The results also include possible nudging elements and considerations.
P2 (Stieglitz, Potthoff, & Kissmer, 2017)	Based on semi-structured interviews with employees of a large company, the authors showed how participants evaluated specific digital nudges that could support their work. The study provides information about which digital nudge types were accepted by the participants and which might be most appropriate for application in a business context.
P3 (Kissmer, Potthoff, & Stieglitz, 2018)	The focus of this study was the identification of factors that facilitate reactance. The article presents different individual characteristics and suggests a susceptibility to digital nudging based on prior works. Results of the research-in-progress include a hypotheses model and operationalised constructs.
P5 (Potthoff et al., 2018)	In this mixed-methods study, a software prototype to support organisations with their innovation processes was evaluated. Qualitative user tests with experts were used to investigate in-depth requirements regarding functionality and interaction possibilities. The collaborative features were tested in a group assessment that included statistical analyses. The results show

a need for more guidance, especially for inexperienced users. Interventions are discussed to foster regular usage.

P6

(Kroll, Braun, & Stieglitz, 2018)

Computer-mediated communication often lacks nonverbal cues and can cause ambiguity and uncertainty regarding the meaning of messages. With the communication accommodation theory, the results demonstrate the impact of a hierarchy on the usage of pictograms, which can partly replace nonverbal cues known from face-to-face communication. Hierarchical differences are described as reasons for problematic communication behaviour. The authors reported that interventions could help to improve such situations.

Papers addressing RQ2 (*Which factors influence the success and acceptance of a soft paternalism for problematic behaviours in information systems?*) demonstrated how specific intervention strategies can succeed methodologically and what needs to be considered to avoid intervention failures (Table 5).

Table 5. Summary of Dissertation Papers Primarily Addressing RQ2

Paper	Summary
P4 (Ross et al., 2018)	In this paper, the framing of social media posts by official emergency organisations was studied. Posts related to terrorist events were collected, along with the numbers of shares, likes and emotional reactions associated with them. A regression analysis revealed that, for example, images and videos positively affected the number of reactions by factors of 2.2 and 3.9, respectively. In addition, text length was shown to have a negative influence on the number of shares.
P7 (Kroll & Stieglitz, 2019)	In this paper, the efficacy of privacy-related nudges of the social networking site Facebook is investigated. The results indicated that the privacy-related nudges implemented by Facebook did not influence trust, control or risk effectively. Further, no difference on self-disclosure behaviour was found.
P8 (Kroll, Paukstadt, Kreidermann, & Mirbabaie, 2019)	To reduce energy consumption and CO2 emissions, behavioural interventions beyond technology advances must be considered. This paper addresses how digital nudging can help to influence the energy-saving behaviour of consumers through a smart home app. It concretises the usage of digital nudges in the field of Green IS.
P9 (Stieglitz, Mirbabaie, Kroll, & Kissmer, <i>in review</i>)	This study empirically examined how a potential rejection of digital nudges can be explained and mitigated. The findings revealed a minor effect of individual traits, such as a need for consensus, and revealed a major effect of the nudge's characteristics, such as its intensity. This study completes the research in progress published in P3.

4.1 Integration of Findings from Nudging and Persuasion Literature

As discussed in P1, the phrase ‘digital nudging’ was coined in 2016 when studies first suggested a digital adaptation of the nudging concept from the BE field. Gregor and Lee-Archer (2016) considered a digital form of nudging only for government processes, which has also been discussed outside of the IS domain before. In a *Business & Information Systems Engineering* article, Weinmann et al. (2016, p. 434) referred to digital nudging as having ‘a significant impact on future information systems research and practice’. In the same work, the authors, however, called for ‘clarifications of the theoretical mechanisms [...] the design of theoretically based design recommendations’ (Weinmann et al., 2016, p. 435). In P1, the authors responded to the call for research and studied prior work on persuasive interventions that can build the foundation for an informed digital nudging concept. This article provides an important basis for the current dissertation and for the studies of other scholars considering the number of citations recorded. The authors of this article first developed and provided a consolidated definition for digital nudging that reflects the potential of digital choice environments and relates to the same conditions as its offline predecessor: digital nudging is ‘a subtle form of using design, information and interaction elements to guide user behavior in digital environments, without restricting the individual’s freedom of choice’ (P1, p. 2589).

Due to the different perspectives on decision support and interventions but mostly without a clear paternalistic reference, the systematic literature analysis presented in this article is aimed at the integration of nudging from BE and persuasion from the human-computer interaction (HCI) literature as well as from PT and BCSS as specialised forms of DSS. The literature search resulted in 30 articles in which specific strategies (e.g. default nudge), success factors of interventions and examples were examined. As a main result, P1 presents how nudging and persuasion literature complements a soft paternalistic intervention approach, including both persuasive elements and considerations for their application (Table 6). The continuing influence of results from HCI persuasion research also becomes apparent in P3, which adopts the idea of a susceptibility to persuasion.

Table 6. Influential Parts from Nudging and HCI Persuasion Literature (Source: P1)

Digital Nudging Elements	Nudging	Persuasion
Anchoring	X	
Customised information / Tailoring	X	X
Decision staging / Tunnelling	X	X
Default setting	X	
Framing	X	
Informing	X	
Limited time window	X	
Praise and reward / Gamification		X
Pre-commitment	X	
Priming	X	
Reminders	X	X
Simplification / Reduction	X	X
Social influence / Social comparison	X	X
Warning	X	
Digital Nudging Considerations		
Ability		X
Context	X	
Credibility		X
Motivation		X
Possibility of human flaws	X	
Problems with given choice architecture	X	
Triggers		X

4.2 Problematic Behaviours and Application of Soft Paternalistic Interventions

To provide early validation of the idea of a soft paternalism to address problematic behaviours related to information systems, the digital nudging concept in a digital workplace setting at a multinational company was suggested and investigated qualitatively in P2. The authors conducted interviews to learn how employees and managers perceive digital nudging as a managerial instrument that may solve usage and adoption problems. In general, the interviewees confirmed the suitability of digital nudging in an organisational context. Interestingly, some found such interventions to

change problematic behaviours for others, but they did not identify themselves as part of the target group. The persuasive intensity was also discussed as important for the suitability of digital nudging.

The results from P2 led to a subsequent paper (P3), which conceptualised human and system characteristics of a soft paternalistic approach. Through this approach, the list of intervention strategies was enriched with two conceptual dimensions (intensity and tailoring) that allow for a better comparison and assessment of the elements. Furthermore, in P3 the authors suggested personal characteristics of users that may be considered when using soft paternalistic approaches. The paper depicts prior works that suggested a susceptibility to persuasion in IT (Meschtscherjakov et al., 2016) and combines the susceptibility with individual characteristics, such as a need for consensus or autonomy.

Demonstrating the wide range of problematic behaviours in the IS field, the authors of P5 investigated how inexperienced users of a tool related to business innovation are susceptible to resignation. Persuasive techniques and automated moderators used to prevent dissatisfaction and enable productivity are discussed. Another area of problematic behaviours in organisations is related to employee communication. As elaborated on in P6, modern computer-mediated communication does not transport nonverbal cues, which can result in ambiguous messages and inefficiencies. In the paper, the authors explain, using the communication accommodation theory, why employees communicate inefficiently, although they may know better ways.

A set of papers from among those considered for this dissertation aim at providing access to a soft paternalistic perspective and to an application of ideas from nudging and persuasion to problematic behaviours in organisational information systems by either providing examples of applications (P2-3, P7-9) or developing models and guidelines (P1, P3). Based on the literature examined for the study in paper P1, the authors developed an initial process model for the application of digital nudging (DINU model). In this model, three steps are distinguished: analysing, designing and evaluating. In addition to the identified elements and considerations in the design phase noted previously, P1 also introduced terms to describe the various parties involved in a soft paternalistic intervention: the nudgee is the person who is targeted with the intervention; the nudger (or choice architect) designs the intervention and is responsible for reflecting on the reasons for the problematic behaviour as well as for checking for adherence to the soft

paternalism (e.g. full freedom of choice). A reduced depiction of the DINU model from paper P1 is presented in Figure 2.

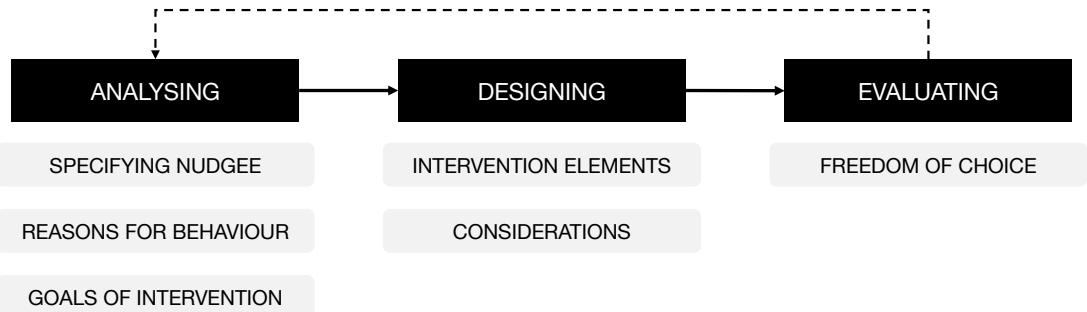
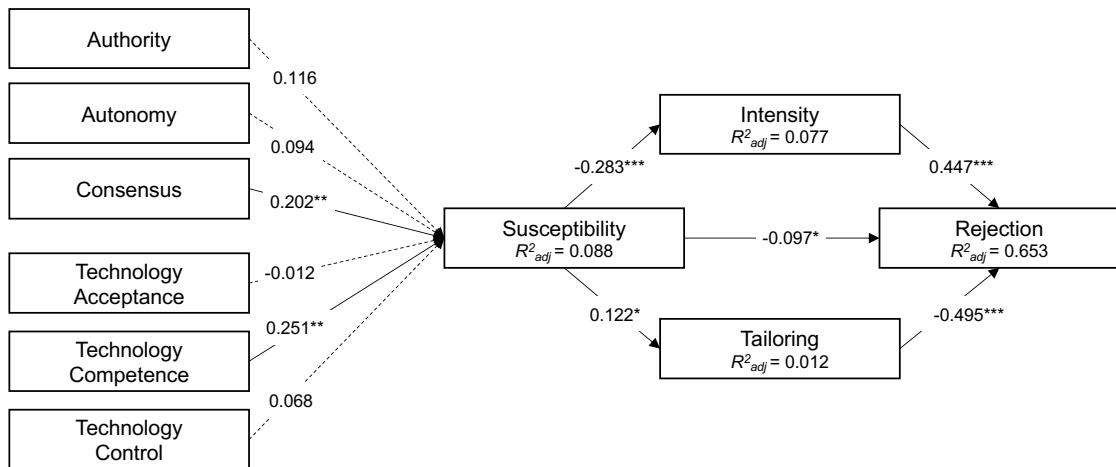


Figure 2. Reduced Digital Nudging Process Model (Source: Based on P1)

4.3 Acceptance of Soft Paternalistic Interventions

Based on the results from paper P2, the authors questioned when digital nudges as soft paternalistic interventions are accepted in organisations, when they are rejected and what a user-centred, soft paternalistic approach needs to consider.

Both P9 and the preceding conceptual paper P3 relate digital nudging to the reactance theory and potentially adverse effects of well-intentioned interventions. Reactance has been explained as a threat to an individual's autonomy and the attempt to retain the threatened freedom (Clee & Wicklund, 2002). Since a soft paternalistic perspective should uphold the individual's autonomy, the authors of P9 investigated what factors influenced the rejection of digital nudges that are meant to support the user. The results showed that individual characteristics, such as the need for consensus or a technology commitment, are less influential (see Figure 3). However, the paper demonstrated that there is a susceptibility built from personality and experience that influences the assessment of proposed interventions. The largest influence on the rejection behaviour was, however, found for the characteristics of the intervention, which include the persuasive intensity and degree of tailoring. While a more intense intervention results in a higher rejection, a better tailored one lowers the rejection behaviour (P9).



* p < 0.05, ** p < 0.01, *** p < 0.001

Figure 3. Research Model and Results of the Rejection Study (Source: P9)

Despite essays regarding the manipulative character of soft paternalistic interventions and the associated threat on individuals' autonomy, the results from P7-9 suggest to differentiate the specific intervention as acceptance and efficacy depend on it.

4.4 Evaluation of Soft Paternalistic Interventions and their Success

The last part of the results comprises findings regarding the application and evaluation of soft paternalistic interventions. The authors conducted experiments with different digital nudges and in different domains to gather experience and improve the overall approach. Due to the challenging accessibility of organisational environments, the author of this dissertation also used empirical data from other domains that had been suggested for the application of digital nudging (Acquisti, 2009; Weinmann et al., 2016).

The authors of P7 examined the effectiveness of interventions in a social network that remind users to review their privacy settings. In this context, the privacy paradox refers to the fact that users deem privacy important but do not behave accordingly. This study made use of actual digital nudges used by a social network. The results revealed that the presentation did not support a behaviour change. The paper discusses different reasons for this, such as the lack of trust in the provider and doubt about the seriousness of the intervention. Furthermore, the network used reminders with a low persuasive intensity and presented them infrequently.

Another evaluation of digital nudging involved interventions with the elements of social norm and pre-commitment. For that, an online experiment was conducted to evaluate whether the two nudges within a smart home app could alter energy-saving behaviour

(P8). The experimental group that received both digital nudges showed the strongest energy-saving behaviour, which occurred significantly more often than it did in the control group that did not receive any digital nudges. Still, the study also showed that the effectiveness of a social norm nudge strongly depends on the cogency of the presented norm. A simple majority for the preferred option may be insufficient. Also, the pre-commitment did not work alone. Therefore, the authors also suggested combining different digital nudging elements.

In P4, the authors investigated how information and the framing of information can be operationalised to trigger a wished behaviour. The posts from emergency management organisations in a social network were annotated to determine if different information categories and text features triggered different levels of interaction. For example, the text length was decisive for the interaction measure. This indicated that longer texts are less likely to prompt interaction and vice versa, knowledge which can be useful within organisations. Such specific results demonstrate how small variations in the choice architecture alter the outcome.

5 Discussion

The individual papers each addressed aspects that stand on their own, such as a process model for the design of digital nudges (P1), insights from a company about problematic behaviours (P2) or learning from inefficient interventions (P7). Together they help to draw a bigger picture and to answer the proposed research questions. In the next section, the soft paternalistic perspective is examined more deeply as a management approach to reduce problematic behaviours in digital choice environments (RQ1). The evaluative parts of factors that influence acceptance and success of a soft paternalistic perspective are discussed thereafter (RQ2). The last part of the discussion considers both research questions from an abstract position and brings them together in the digital nudging theory.

5.1 Soft Paternalism as a Next Generation IS Management Instrument

Although the IS discipline has a long tradition in supporting decisions and behaviour change within and through information systems, it has partly lost its connection to modern decision models from the behavioural decision theory and more recent literature from the BE field (Arnott & Gao, 2019). At the same time, digital choice environments have become less predestined and are prone to being used ineffectively (Alter, 2010). In P2 and P9, the authors showed that former IS adoption and management approaches are not sufficient in fast changing environments. Organisations, hence, lose control of technology usage, while the efficient utilisation of technology is decisive in almost every business function for the organisation's competitiveness (Ferratt et al., 2018; Fink, 1998; Legris et al., 2003).

Management literature suggested a paternalistic perspective to solve organisational challenges. With the original nudge theory, the BE field developed such an instrument for policymakers to reduce problematic behaviours outside the digital sphere (Leggett, 2014). The proposition has been criticised and its ethical implications debated because of nudging's paternalistic character (Hansen & Jespersen, 2013). Its broad reception, including the Nobel Memorial Prize in Economic Sciences awarded to Richard Thaler in 2017 for his research work on this topic, however, have socialised and endorsed the need for a paternalism within certain boundaries to preserve welfare and success of organisations and society (Thaler & Sunstein, 2003). The nudging aspect of BE not only incorporates a paternalistic philosophy, but also further defines the form of paternalism

that can be justified against accusations of being manipulative and limiting autonomy (Hansen & Jespersen, 2013; Wilkinson, 2013). Thaler and Sunstein (2003) demarcated this ideologically shaped paternalism as libertarian paternalism since it does not force people to act in a certain way, nor does it remove adverse options. Also, it requires that individual decision-makers are expected to have different goals than their behaviour would suggest or that – as discussed in papers P2 and P3 – the individual behaviours hinder a higher goal, such as productivity at an organisational level, which also benefits the decision-makers (Thaler & Sunstein, 2008; Weinmann et al., 2016).

In P5 and P6, the authors depicted the importance of individual behaviour within organisational communication and collaboration processes. For sure, many ideas have been developed on how to motivate people in creative processes (P5). Gamification, for example, has received much attention in recent years (Liu, Santhanam, & Webster, 2017). However, gamification also involves a soft paternalistic part that is not discussed as such: User interface/user experience designers anticipate that game elements trigger engagement. They use this knowledge to increase the likelihood of the desired behaviour or to rule out problematic behaviour. How, then, can problematic behaviour be improved with soft paternalism when gamification is not suitable, such as in P6, when cross-hierarchical communication underutilised non-verbal cues?

In general, soft paternalistic interventions should enable better decisions in digital choice environments and, hence, solve the problematic behaviours that organisations face with increasing IT complexity. Though the conception of a problematic behaviour and an appropriate decision may be subjective, a soft paternalistic perspective in IS management places a duty on the digital choice architect to study the individual's preferences and errors in detail and to be able to justify the intervention despite its manipulative character and against the accusations of a threatened autonomy (P2, P3).

Besides occasional works that utilised the findings on biases and heuristics (Fleischmann et al., 2014; Lee & Joshi, 2017), the studied research fields of persuasion, PT or BCSS in P1 did not consider a paternalistic perspective, although some works about privacy refer to nudging (Acquisti, 2009; Wang et al., 2013). However, the latter works position themselves in the nudging tradition with a specific focus on privacy in digital environments instead of referring to literature on PT or proposing a soft paternalistic perspective for further digital applications. Therefore, a broader idea and tradition of soft

paternalism in the IS discipline is required and will be taken up again in the last section of the discussion.

5.2 Evaluating and Improving Soft Paternalistic Interventions

Through RQ2, the dissertation aims to provide insights into factors that influence the success and acceptance of soft paternalistic interventions to solve problematic behaviours in organisations.

Despite the organisational context of the research questions, the evaluation of specific soft paternalistic interventions took also place in environments that were more easily accessible than organisations and were suggested for digital nudging (Weinmann et al., 2016). This procedure allowed the researchers to show that digital nudging does not automatically enable better decisions but must be accompanied by well-conceived and properly aligned intervention decisions. In the study on privacy-related interventions, for example, an opposite effect was actually observed because the intervention drew the users' attention to risks associated with their current practice instead of showing how to protect themselves. This finding, however, increased the awareness of unexpected outcomes, as also examined in the studies for P3 and P9. Moreover, the experiment with a smart home app in P8 demonstrated that two intervention elements have a greater effect than a single element, which also allows for a decrease in the persuasive intensity of each intervention. It further revealed the methodological struggles of properly defining a social norm that is also perceived as such by the relevant individuals. Such implications apply to organisational settings as well.

The authors of P4 investigated how different ways to present textual information can be utilised to encourage a preferred decision. Data from Facebook were analysed and showed the effects of different framings on the reaction counts (e.g. likes or comments). Although the specific findings were bounded to the context, they demonstrated the general efficacy of (textual) framing strategies for interventions. Framing has a long tradition in the nudging literature in BE (Tversky & Kahneman, 1981) but has also been studied in IS (Angst & Agarwal, 2009). As almost all tools and systems include textual interfaces, the authors deemed a more detailed analysis of their intervention potential as contributing. The study presented, in particular, that linguistic cues, such as specific words, can trigger a target behaviour. Linguistic cues can be seen as a more specific framing strategy but might be acknowledged as their own element in a consolidated list (see Table 7).

The evaluation of interventions also involved the perception of soft paternalistic interventions and the question as to how this perception is established in order to learn if further adaption is needed. As suggested by Meschtscherjakov et al. (2016), people have an individual susceptibility to persuasion, which can determine an intervention's success (P2, P9). In P3, an instrument to measure susceptibility to digital nudging was developed in order to study its effect on the intervention. Personality-related factors suggested by research to influence again a susceptibility to persuasion (e.g. belief in authorities or importance of autonomy) could not be confirmed in an organisational context. The susceptibility itself had an impact, but more on the evaluation of the intervention's characteristics than on the intervention's acceptability.

As soft paternalistic interventions are often deemed as manipulative and threatening to autonomy, more research is needed on how people perceive digital nudges with regard to the feeling of being manipulated. Such a perception of manipulation is expected to cause well-intentioned interventions to backfire as investigated in P9 (Stibe & Cugelman, 2016). Referring to critics on the soft paternalistic approach, a more nuanced discussion on the manipulative and autonomy threatening character of specific interventions seems reasonable. To better understand which intervention characteristics impact the perception of manipulation or the success of the intervention, P3 classified interventions according to their persuasive intensity and degree of tailoring. With increasing intensity, the intervention will deliver the target behaviour, yet the detection of a persuasive attempt will become more likely as well. Tailoring itself, which is listed as an intervention element, refers to adapting a decision situation to the decision-maker. Since tailoring implies a strong focus on the decision-maker and the use of individual information, it has a high persuasive intensity (P1). At the same time, interventions tailored to the decision-makers were more successful and were perceived by the decision-makers as providing positive assistance (P9).

Combining the results from papers P2, P3 and P9, the author of this dissertation suggests three intensity levels – *low*, *medium* and *high* – and initially assigned different intervention elements that have been identified or used in this dissertation to each level (Table 7).

Table 7. Persuasive Intensity of Different Intervention Elements

Low	Medium	High
Default setting	Anchoring	Customised information
Decision staging	Praise and reward	Tailoring
Framing	Priming	Limited time window
Informing	Reminders	Warning
Linguistic cues	Social norms	
Pre-commitment		
Simplification		
Reduction		

5.3 Towards a Digital Nudging Theory for Solving Problematic Behaviours

The proposition of a soft paternalistic approach for managing IT adoption and usage and for solving problematic behaviours per se may offer new possibilities in IS research since organisations and managers may reflect again on their role as influencing variables also in the IT area. The discussion on the evaluation of interventions contributes to the understanding of such interventions and deepens the knowledge for their application. As one more step in this dissertation, the author suggests further developing and adapting the original nudge theory to fit a digital choice environment. In the following, the author outlines the parts identified in different dissertation papers regarding a digital nudging theory.

The initial DINU model derived from the literature review in P1 enabled accessibility to soft paternalistic interventions. The model strongly integrates research streams that are mostly independent but complementary, such as nudging, which includes single digital applications, and intervention research in IS, which includes PT and BCSS. The model entails three high-level steps and lists elements that can be used as digital nudges. This model has been used not only as a basis for subsequent papers used in this dissertation but also has provided a methodological view on digital nudging for other researchers and practitioners. For example, the ‘three-phase [DINU] model for the design of digital nudges provides valuable input’ for the development of the later digital nudge design method by Mirsch, Lehrer and Jung (2018, p. 4).

The improvement of existing and proposal of new models and methods for how to apply digital nudges confirms the relevance of the approach. Nevertheless, the various proposals differ in specific steps and intervention elements – each well justified and useful (Lembcke et al., 2019; Mirsch et al., 2017, 2018). The digital nudging theory should allow

for the integration of different models on digital nudging and yet propose a bigger picture, including aspects lacking in current models, such as the soft paternalistic character and the understanding of problematic behaviour, as well as the ambiguity of the digital nudges' outcomes.

Likewise, the DINU model (P1) focuses on different persuasive elements from which a choice architect chooses and merely mentions the requirements of a soft paternalistic approach, such as the nudgee's preferences, biases that led to a problematic behaviour and the freedom of choice. Even if this already shows a difference from PT, which does not know the soft paternalism and the condition of an honest intention, the difference from a hard paternalism needs to become very clear in the digital nudging theory. This may sound like a nuance at first, but it is fundamental when arguing for a *soft* form of paternalism. Since researchers have begun using digital nudging as a generic intervention technique and have named intervention examples as digital nudging, including triggers to increase sales (Djurica & Figl, 2017; Schaer & Stanoevska-Slabeva, 2019; Schneider, Weinmann, & vom Brocke, 2018), the digital nudging theory should define its preconditions as valid for application within organisations as well as in guiding customers and other individuals.

Considering the related work on BE as well as this dissertation's results and developed understanding, the digital nudging theory should stand in the tradition of the nudge theory from BE, which conceives of the approach as small changes in a given choice architecture that before the intervention had fostered 'bad decisions' (Thaler & Sunstein, 2008, p. 5). In P1 the authors provide a definition that is close to Thaler and Sunstein's (2008) definition of nudging and adds specifics for a digital application (p. 2589): Digital nudging is 'a subtle form of using design, information and interaction elements to guide user behaviour in digital environments, without restricting the individual's freedom of choice.' The underlying soft paternalistic perspective requires the intervention to provide a value directly or at least indirectly for the decision-maker: as Thaler and Sunstein (2008, p. 5) put it, nudging should make 'life longer, healthier, and better'. This is the precondition for entering the field of deliberately altering the choice architecture (Lembcke et al., 2019; Thaler & Sunstein, 2008; Wilkinson, 2013).

Figure 4 highlights the role of the soft paternalism within this high-level digital nudging theory. The concept of a problematic behaviour, as discussed in-depth in a previous section of this dissertation thesis, involves decisions that are deemed not optimal by an

evaluating instance. The soft paternalism perspective, however, further limits the variety of problematic behaviours, as the applied intervention must target a direct or indirect value for the decision-maker. Lastly, the digital nudging theory incorporates the idea that soft paternalistic interventions aimed at solving problematic behaviours can backfire and make the problematic behaviour even worse (P9).

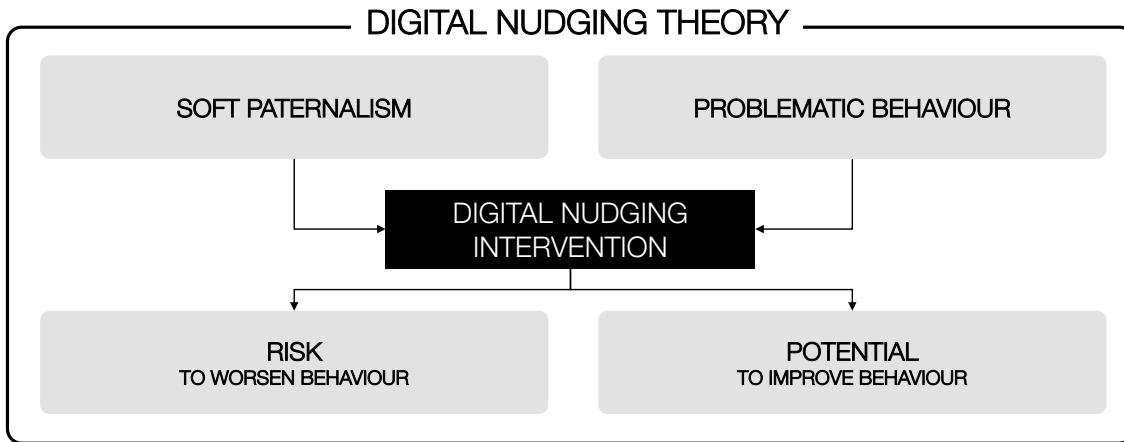


Figure 4. Digital Nudging Theory (Source: Own Construction)

All articles and models the author identified since the beginning of this dissertation project presented digital nudging as promising and successful or, in rare cases, to have no effect due to an incorrect application (Hummel & Maedche, 2019). In P3 and P9, specifically, the authors studied how well-intentioned interventions may be perceived as manipulative and autonomy threatening. The authors showed that the application of digital nudging can lead to worse behaviours than existed before the intervention. A potential rejection behaviour in response to the soft paternalistic intervention needs to be anticipated, especially in organisational contexts (Stibe & Cugelman, 2016). Despite the above propositions and its potential to solve problematic behaviours, soft paternalism is still a specific form of paternalism and should be used with caution. As this is not sufficiently reflected in current digital nudging research (P3), the digital nudging theory includes the aspect of risk, which means an unwanted outcome of the intervention.

6 Conclusion

In the concluding chapter, the dissertation's research and practical implications are summarised. The author also reflects on limitations and suggests future research.

6.1 Research Implications

Organisations still face underutilised IS due to problematic decisions and behaviours of individual users. This dissertation contributes to the IS discipline with the introduction of a soft paternalistic perspective on problematic behaviours in organisational information systems. Although related disciplines have discussed paternalism in a specific individual-centred form, few studies consider this soft paternalism in IS. Since paternalism can correctly be accused of threatening individuals' autonomy and a liberal society, this dissertation provides guidance and requirements for an application that respects the freedom of choice. By developing the digital nudging theory, the thesis contributes with a frame for future research on soft paternalism in IS, including its requirement, boundaries, potential and risks.

It has been shown how the suggested digital nudging idea differs from related research on PT and BCSSs and why it also goes beyond the long tradition of research on DSS. It has been stressed with the soft paternalistic perspective why digital nudging stands in the tradition of the nudge theory from BE and not of persuasion research in the HCI field. Nevertheless, both streams have complemented and will continue to complement digital nudging.

On a methodological level, this work and the included digital nudging process model have influenced the accessibility of soft paternalistic interventions and progress in further design models. The first evaluations of intervention elements within this thesis contribute to the successful application of digital nudging in research and practice. The inclusion of a potential backfiring behaviour due to the intervention point to side effects that were mostly overlooked before but are deemed especially important for the organisational context.

6.2 Practical Implications

On a practical level, this dissertation was strongly motivated by problematic behaviours occurring in companies and organisations. The proposed soft paternalistic and user-

centred intervention approach is expected to impact organisations in their IT management and adoption strategies. Some of this dissertation's studies were conducted at companies and enabled practice-oriented research throughout the thesis.

The developed digital nudging process model was designed to allow researchers and practitioners alike to understand how digital nudges need to be designed to comply with the requirements of soft paternalism. The integrated overview of different intervention elements also informs managers and designers that consider the application of digital nudges.

While much related research has reported successful application domains and use cases for digital nudging, this dissertation also sheds light on the adverse outcomes that soft paternalistic interventions can generate. It is stressed how companies need to anticipate and avoid the risks of interventions backfiring from the beginning. The persuasive intensity and degree of tailoring were identified as distinctive features that can be used in practice to determine the application. Furthermore, the evaluation studies produced an indication of best practices, such as the combination of different intervention elements and the credibility and seriousness in providing support with the intervention.

6.3 Limitations

Despite the reported evaluations that tested the soft paternalistic approach with digital nudging in mostly organisational environments, the author cannot prove the concept's generalisability. The dissertation focuses on a solution for problematic behaviours in digital environments. As part of the IS discipline, a more organisational perspective was adopted, although this meant that the variety of problematic behaviours outside of organisations had to be largely disregarded at this stage. The proposed digital nudging theory needs further investigation and refinement within organisations that go beyond the reported company cases and outside organisations as well. The investigation of intervention effects outside the organisational context have enabled more insights into digital nudging success that are expected to be transferable to organisational settings. However, more applications within organisations need to verify such indications in the future.

Considering the IS discipline as the main audience for this contribution, this dissertation takes an interdisciplinary perspective on IT and user behaviour. The author reviewed the

results of other disciplines and borrowed ideas that originated in psychology, cognitive science and BE. As the main goal was to transfer, integrate and apply the achievements to a digital environment, this dissertation and the related papers could not go into much detail on the concepts used (e.g. social norms, dual process theory), nor did the author's background in IS allow for such in-depth analysis of these topics. Although the interdisciplinarity of this dissertation enabled a new perspective on problematic behaviours in the IS discipline, the author could have missed specifics that researchers from other fields deem important. This also applies to an in-depth discussion on the ethical implications of digital nudging and the underlying soft paternalism. As such, the author acknowledged and stressed the importance of studying ethical implications and debating the suitability of soft paternalistic approaches throughout the dissertation papers included in this research but could only touch on selected ethical aspects.

This dissertation was planned and conducted as a paper-based (cumulative) thesis with different individual conference papers and journal articles that jointly answered the stated research questions. The advantages of peer-reviewed publications, including intermediate results shared with the community and valuable feedback on such publications, come along with challenges regarding the incremental research process that relates each paper to the overall goal.

6.4 Future Research

Perceiving digital nudging and soft paternalism as a novel perspective that goes beyond previous ideas in PT or DSS, this dissertation calls for more studies that apply the digital nudging theory in organisations and experiments on specific interventions. Studies may address one individual aspect of the theory (e.g. problematic behaviours) or intersections (e.g. problematic behaviour and risks of soft paternalistic interventions). Describing behaviour as problematic involves a normative understanding of correct behaviour. Although the term problematic behaviour was coined as an application field for soft paternalistic interventions in this work, the digital nudging theory developed here begins where problematic behaviour has already been identified initially. Future research could take on the normative character in order to make more dynamic distinctions between behaviour considered problematic and behaviour not yet considered problematic.

The growing field of digital nudging in the IS discipline and beyond will help to identify application areas that have not yet been considered. However, this dissertation discussed

the differences between a soft paternalistic intervention that tries to help the individual user (at least indirectly) and interventions that make use of the same mechanisms for monetary or other reasons. Future studies should elaborate on this distinction and try to develop a consensus on what can be counted as a digital nudge and what would – in Thaler's words (2018, p. 431) – be better called a digital *sludge*.

References

- Acquisti, A. (2009). Nudging privacy: The behavioral economics of personal information. *Security & Privacy Economics*, 72–75. <https://doi.org/10.3233/978-1-61499-057-4-193>
- Alós-Ferrer, C., & Strack, F. (2014). From dual processes to multiple selves: Implications for economic behavior. *Journal of Economic Psychology*, 41, 1–11. <https://doi.org/10.1016/j.joep.2013.12.005>
- Alter, S. (2010). Designing and Engineering for Emergence: A Challenge for HCI Practice and Research. *AIS Transactions on Human-Computer Interaction*, 2(4), 127–140. <https://doi.org/10.17705/1thci.00018>
- Angst, C. M., & Agarwal, R. (2009). Adoption of Electronic Health Records in the Presence of Privacy Concerns: The Elaboration Likelihood Model and Individual Persuasion. *MIS Quarterly*, 33(2), 339. <https://doi.org/10.2307/20650295>
- Arnott, D., & Gao, S. (2019). Behavioral economics for decision support systems researchers. *Decision Support Systems*, 122(February), 113063. <https://doi.org/10.1016/j.dss.2019.05.003>
- Arnott, D., & Pervan, G. (2014). A Critical Analysis of Decision Support Systems Research Revisited: The Rise of Design Science. *Journal of Information Technology*, 29(4), 269–293. <https://doi.org/10.1057/jit.2014.16>
- Balebako, R., Leon, P. G., Almuhamdi, H., Kelley, P. G., Mugan, J., Acquisti, A., ... Sadeh, N. (2011). Nudging users towards privacy on mobile devices. *CEUR Workshop Proceedings*, 722(July 2015), 23–26.
- Beath, C., Berente, N., Gallivan, M., & Lyytinen, K. (2013). Expanding the Frontiers of Information Systems Research: Introduction to the Special Issue. *Journal of the Association for Information Systems*, 14(4), !-XVI. <https://doi.org/10.17705/1jais.00330>
- Benbasat, I., & Zmud, R. W. (2003). The Identity Crisis within the IS Discipline: Defining and Communicating the Discipline's Core Properties. *MIS Quarterly*, 27(2), 183. <https://doi.org/10.2307/30036527>
- Bhattacherjee, A. (2001). Understanding Information Systems Continuance: An Expectation-Confirmation Model. *MIS Quarterly*, 25(3), 351. <https://doi.org/10.2307/3250921>
- Browne, G., & Parsons, J. (2012). More Enduring Questions in Cognitive IS Research. *Journal of the Association for Information Systems*, 13(12), 1000–1011. <https://doi.org/10.17705/1jais.00318>
- Chen, A. J. W. (2007). Technology Overdose: Exploring Obsessive Work - Related Email Use. *SAIS 2007 Proceedings*, 160–165.
- Clee, M. A., & Wicklund, R. A. (2002). Consumer Behavior and Psychological Reactance. *Journal of Consumer Research*, 6(4), 389. <https://doi.org/10.1086/208782>
- Cooper, H. M. (1988). Organizing knowledge syntheses: A taxonomy of literature reviews. *Knowledge in Society*, 1(1), 104–126. <https://doi.org/10.1007/BF03177550>

- Davern, M., Shaft, T., & Te’eni, D. (2012). Cognition Matters: Enduring Questions in Cognitive IS Research. *Journal of the Association for Information Systems*, 13(4), 273–314. <https://doi.org/10.17705/1jais.00290>
- Djurica, D., & Figl, K. (2017). The Effect of Digital Nudging Techniques on Customers’ Product Choice and Attitudes towards E-Commerce Sites. *Americas Conference on Information Systems (AMCIS)*, 1–5.
- Ducheneaut, N., Zhao, J. L., & Weber, R. (2006). *E-Mail Management : A Techno-Managerial Research Perspective*. 17(June). <https://doi.org/10.17705/1CAIS.01743>
- Feng, G., Zhu, J., Wang, N., & Liang, H. (2019). How Paternalistic Leadership Influences IT Security PolicyCompliance:The Mediating Role oftheSocial Bond. *Journal of the Association for Information Systems*, 20, 1650–1691. <https://doi.org/10.17705/1jais.00581>
- Ferratt, T., Prasad, J., & Dunne, E. J. (2018). Fast and Slow Processes Underlying Theories of Information Technology Use. *Journal of the Association for Information Systems*, 19(1), 1–22. <https://doi.org/10.17705/1jais.00477>
- Fink, D. (1998). Guidelines for the Successful Adoption of Information Technology in Small and Medium Enterprises. *International Journal of Information Management*, 18(4), 243–253. [https://doi.org/10.1016/S0268-4012\(98\)00013-9](https://doi.org/10.1016/S0268-4012(98)00013-9)
- Fleischmann, M., Amirpur, M., Benlian, A., & Hess, T. (2014). Cognitive biases in information systems research: A scientometric analysis. *European Conference on Information Systems (ECIS)*, 1–21. Tel Aviv, Israel.
- Fogg, B. J. (2003). *Persuasive Technology: Using Computers to Change what We Think and Do*. <https://doi.org/10.1007/978-3-540-77006-0>
- Goes, P. B. (2013). Editor’s Comments: Information Systems Research and Behavioral Economcis. *MIS Quarterly*, 37(3), III–VIII.
- Gregor, S., & Lee-Archer, B. (2016). The digital nudge in social security administration. *International Social Security Review*, 69(3–4), 63–83. <https://doi.org/10.1111/issr.12111>
- Hansen, P. G., & Jespersen, A. M. (2013). Nudge and the Manipulation of Choice. *European Journal of Risk Regulation*, 4(1), 3–28. <https://doi.org/10.1017/S1867299X00002762>
- Hausman, D. M., & Welch, B. (2010). Debate: To nudge or not to nudge. *Journal of Political Philosophy*, 18(1), 123–136. <https://doi.org/10.1111/j.1467-9760.2009.00351.x>
- Hummel, D., & Maedche, A. (2019). How Effective Is Nudging? A Quantitative Review on the Effect Sizes and Limits of Empirical Nudging Studies. *Journal of Behavioral and Experimental Economics*, (March). <https://doi.org/10.1016/j.soec.2019.03.005>
- Jameson, A., Berendt, B., Gabrielli, S., Cena, F., Gena, C., Verner, F., & Reinecke, K. (2013). Introduction. In *Foundations and Trends in Human-Computer Interaction: Vol. 7. Choice Architecture for Human-Computer Interaction* (pp. 3–12). <https://doi.org/10.1561/1100000028>
- Kahneman, D. (2011). *Thinking, Fast and Slow*. London, GB: Penguin Books.

- Kim, D. J., & Lee, J. (2015). Open Innovation Maturity Model for the Government: An Open System Perspective. *International Conference on Information Systems (ICIS)*, 1–11. Fort Worth, Texas, USA.
- Kim, H.-W., & Kankanhalli, A. (2009). Investigatin User Resistance to Information Systems Implementation: A Status Quo Bias Perspective. *MIS Quarterly*, 33(3), 567–582.
- Kissmer, T., Potthoff, T., & Stieglitz, S. (2018). Enterprise Digital Nudging: Between Adoption Gain and Unintended Rejection. *Americas Conference on Information Systems (AMCIS)*. New Orleans, USA.
- Kroll, T., Braun, L.-M., & Stieglitz, S. (2018). Accommodated Emoji Usage: Influence of Hierarchy on the Adaption of Pictogram Usage in Instant Messaging. In *Australasian Conference on Information Systems (ACIS)* (pp. 1–11). <https://doi.org/10.5130/acis2018.dm>
- Kroll, T., Paukstadt, U., Kreidermann, K., & Mirbabaei, M. (2019). Nudging People to Save Energy in Smart Homes With Social Norms and Self-Commitment. *European Conference on Information Systems*. Stockholm, Sweden: AIS.
- Kroll, T., & Stieglitz, S. (2019). Digital Nudging and Privacy: Improving Decisions about Self-disclosure in Social Networks. *Behaviour & Information Technology*. <https://doi.org/10.1080/0144929X.2019.1584644>
- Lee, K., & Joshi, K. (2017). Examining the use of status quo bias perspective in IS research: need for re-conceptualizing and incorporating biases. *Information Systems Journal*, 27(6), 733–752. <https://doi.org/10.1111/isj.12118>
- Leggett, W. (2014). The politics of behaviour change: Nudge, neoliberalism and the state. *Policy and Politics*, 42(1), 3–19. <https://doi.org/10.1332/030557312X655576>
- Legris, P., Ingham, J., & Collerette, P. (2003). Why do people use information technology? A critical review of the technology acceptance model. *Information & Management*, 40(3), 191–204. [https://doi.org/10.1016/S0378-7206\(01\)00143-4](https://doi.org/10.1016/S0378-7206(01)00143-4)
- Lembcke, T., Engelbrecht, N., Brendel, A. B., & Herrenkind, B. (2019). Towards a Unified Understanding of Digital Nudging by Addressing its Analog Roots. *Pacific Asia Conference on Information Systems (PACIS)*. China.
- Liang, T.-P., Lai, H.-J., & Ku, Y.-C. (2007). Personalized Content Recommendation and User Satisfaction: Theoretical Synthesis and Empirical Findings. *Journal of Management Information Systems*, 23(3), 45–70. <https://doi.org/10.2753/mis0742-1222230303>
- Lipshitz, R., & Bar-Ilan, O. (1996). How problems are solved: Reconsidering the phase theorem. *Organizational Behavior and Human Decision Processes*, 65(1), 48–60. <https://doi.org/10.1006/obhd.1996.0004>
- Liu, D., Santhanam, R., & Webster, J. (2017). Toward Meaningful Engagement: A Framework for Design and Research of Gamified Information Systems. *MIS Quarterly*, 41(4), 1011–1034. <https://doi.org/10.25300/MISQ/2017/41.4.01>
- Lyytinen, K. (2010). HCI Research: Future Directions that Matter. *AIS Transactions on Human-Computer Interaction*, 2(2), 22–25. <https://doi.org/10.17705/1thci.00012>

- McGillicuddy, A., Bernard, J. G., & Cranefield, J. (2016). Controlling bad behavior in online communities: An examination of moderation work. *International Conference on Information Systems (ICIS)*, 1–11. Dublin, Ireland.
- Meredith, R., & Arnott, D. (2003). On Ethics and Decision Support Systems Development. *Pacific Asia Conference on Information Systems (PACIS)*, 1562–1575. Adelaide, Australia.
- Meschtscherjakov, A., De Ruyte, B., Fuchsberger, V., Murer, M., & Tscheligi, M. (2016). The Persuasive Potential Questionnaire (PPQ): Challenges, Drawbacks, and Lessons Learned. *Lecture Notes in Computer Science*, 9638, 162–175. <https://doi.org/10.1007/978-3-319-31510-2>
- Meske, C., & Potthoff, T. (2017). The DINU-Model – A Process Model for the Design of Nudges. *European Conference on Information Systems (ECIS)*, 2587–2597. Guimarães, Portugal: AIS.
- Mill, J. S. (1974). *On Liberty* (G. Himmelfarb, ed.). Harmondsworth, GB: Penguin Books.
- Mirsch, T., Lehrer, C., & Jung, R. (2017). Digital Nudging: Altering User Behavior in Digital Environments. In J. Leimeister & W. Brenner (Eds.), *Wirtschaftsinformatik 2017* (pp. 634–648). St. Gallen, Switzerland.
- Mirsch, T., Lehrer, C., & Jung, R. (2018). Making Digital Nudging Applicable: The Digital Nudge Design Method. *International Conference on Information Systems (ICIS)*, 1–16. San Franciso, USA.
- Montibeller, G., & von Winterfeldt, D. (2015). Cognitive and Motivational Biases in Decision and Risk Analysis. *Risk Analysis*, 35(7), 1230–1251. <https://doi.org/10.1111/risa.12360>
- Oinas-Kukkonen, H. (2013). A foundation for the study of behavior change support systems. *Personal and Ubiquitous Computing*, 17(6), 1223–1235. <https://doi.org/10.1007/s00779-012-0591-5>
- Oinas-Kukkonen, H., & Harjumaa, M. (2009). Persuasive Systems Design: Key Issues, Process Model, and System Features. *Communications of the AIS*, 24, 485–500.
- Pellegrini, E. K., & Scandura, T. A. (2008). Paternalistic Leadership: A Review and Agenda for Future Research. *Journal of Management*, 34(3), 566–593. <https://doi.org/10.1177/0149206308316063>
- Potthoff, T., Siemon, D., Wilms, K., Möser, S., Hellmann, M., Stieglitz, S., & Robra-Bissantz, S. (2018). Collaborative Service Blueprinting for Design Thinking: Evaluation of a Digital Prototype. *Hawaii International Conference on Information Systems (HICSS)*.
- Recker, J. (2013). *Scientific Research in Information Systems*. <https://doi.org/10.1007/978-3-642-30048-6>
- Reisch, L. A., & Sunstein, C. R. (2016). Do Europeans like nudges? *Judgement and Decision Making*, 11(4), 310–325. <https://doi.org/10.1017/CBO9781107415324.004>
- Riemer, K., & Johnston, R. B. (2014). Rethinking the place of the artefact in IS using Heidegger's analysis of equipment. *European Journal of Information Systems*, 23(3), 273–288. <https://doi.org/10.1057/ejis.2013.5>

- Ross, B., Potthoff, T., Majchrzak, T. A., Chakraborty, N. R., Lazreg, B., & Stieglitz, S. (2018). The Diffusion of Crisis-Related Communication on Social Media: An Empirical Analysis of Facebook Reactions. *Hawaii International Conference on Information Systems (HICSS)*, 2525–2534. <https://doi.org/10125/50207>
- Samson, A., & Voyer, B. G. (2012). Two minds, three ways: dual system and dual process models in consumer psychology. *AMS Review*, 2(2–4), 48–71. <https://doi.org/10.1007/s13162-012-0030-9>
- Sarker, S., Chatterjee, S., & Xiao, X. (2013). How “Sociotechnical” is our IS Research? An Assessment and Possible Ways Forward. *ICIS 2013 Proceedings*, 1–24. Retrieved from <http://aisel.aisnet.org/icis2013/proceedings/GeneralISTopics/9>
- Schaer, A., & Stanoevska-Slabeva, K. (2019). Application of digital nudging in customer journeys – A systematic literature review. *Americas Conference on Information Systems (AMCIS)*, 1–10. Cancun, Mexico.
- Schneider, C., Weinmann, M., & vom Brocke, J. (2018). Digital nudging. *Communications of the ACM*, 61(7), 67–73. <https://doi.org/10.1145/3213765>
- Schnellenbach, J. (2012). Nudges and norms: On the political economy of soft paternalism. *European Journal of Political Economy*, 28(2), 266–277. <https://doi.org/10.1016/j.ejpol eco.2011.12.001>
- Stibe, A., & Cugelman, B. (2016). Persuasive backfiring: When behavior change interventions trigger unintended negative outcomes. *Lecture Notes in Computer Science*, 9638, 65–77. https://doi.org/10.1007/978-3-319-31510-2_6
- Stieglitz, S., Potthoff, T., & Kißmer, T. (2017). Digital Nudging am Arbeitsplatz. *HMD Praxis Der Wirtschaftsinformatik*, 54(6), 965–976. <https://doi.org/10.1365/s40702-017-0367-5>
- Thaler, R. H. (2018). Nudge, not sludge. *Science*, 361(6401), 431–431. <https://doi.org/10.1126/science.aau9241>
- Thaler, R. H., & Sunstein, C. R. (2003). Libertarian Paternalism. *The American Economic Review*, 93(2), 175–179.
- Thaler, R. H., & Sunstein, C. R. (2008). *Nudge - Improving Decisions about Health, Wealth and Happiness*. New Haven & London: Yale University Press.
- Tsoukias, A. (2008). From decision theory to decision aiding methodology. *European Journal of Operational Research*, 187(1), 138–161. <https://doi.org/10.1016/j.ejor.2007.02.039>
- Turel, O., & Qahri-Saremi, H. (2016). Problematic Use of Social Networking Sites: Antecedents and Consequence from a Dual-System Theory Perspective. *Journal of Management Information Systems*, 33(4), 1087–1116. <https://doi.org/10.1080/07421222.2016.1267529>
- Tversky, A., & Kahneman, D. (1974). Judgment under Uncertainty: Heuristics and Biases. *Science*, 185(4157), 1124–1131. <https://doi.org/10.1126/science.185.4157.1124>
- Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science*, 211(4481), 453–458. <https://doi.org/10.1126/science.7455683>

- Venkatesh, V., & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. *Decision Sciences*, 39(2), 273–315.
<https://doi.org/10.1111/j.1540-5915.2008.00192.x>
- vom Brocke, J., Simons, A., Niehaves, B., Reimer, K., Plattfaut, R., & Cleven, A. (2009). Reconstructing the Giant: On the Importance of Rigour in Documenting the Literature. *European Conference on Information Systems (ECIS)*.
- Wang, Y., Leon, P. G., Acquisti, A., Cranor, L. F., Forget, A., & Sadeh, N. (2014). A field trial of privacy nudges for facebook. *ACM Conference on Human Factors in Computing Systems (CHI)*, 2367–2376. <https://doi.org/10.1145/2556288.2557413>
- Wang, Y., Leon, P. G., Chen, X., Komanduri, S., Norcie, G., Scott, K., ... Sadeh, N. (2013). From Facebook Regrets to Facebook Privacy Nudges. *Ohio State Law Journal*, 74, 1370–1335. <https://doi.org/10.1525/sp.2007.54.1.23>.
- Weinmann, M., Schneider, C., & Brocke, J. vom. (2016). Digital Nudging. *Business & Information Systems Engineering*, 58(6), 433–436. <https://doi.org/10.1007/s12599-016-0453-1>
- Wilkinson, T. M. (2013). Nudging and manipulation. *Political Studies*, 61(2), 341–355. <https://doi.org/10.1111/j.1467-9248.2012.00974.x>
- Young, K. S. (1998). Internet Addiction: The Emergence of a New Clinical Disorder. *CyberPsychology & Behavior*, 1(3), 237–244.
<https://doi.org/10.1089/cpb.1998.1.237>

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