



## Research Article

# Working around inadequate information systems in the workplace: An empirical study in Romania

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## ABSTRACT

We explore how employees behave when faced with information systems (IS) that inadequately support their work. Inadequate IS often induce workaround behaviour, a phenomenon that is insufficiently understood in contemporary organisations. Drawing on workaround theory and coping theory, we develop a research model that links inadequate IS with corporate policy and employee attitudes to workaround behaviour. We test the model with data collected from 310 employees of Romanian organizations who currently use enterprise systems. We discuss the implications of the study for practice and research, as well as future directions and theoretical possibilities.

## 1. Introduction

Information Systems (IS) are widely recognized as contributing to the control and standardization of work, with positive impacts on individual and corporate performance (Madapusi & D'Souza, 2012; Röder, Wiesche, Schermann, & Krcmar, 2014). IS support a wide range of organizational functions from communication to personal productivity and the integration of people and processes on a global scale. In an ideal situation, employees are effectively supported by IS, and are able to complete their tasks effectively and efficiently. However, it sometimes happens that the extent to which IS support employees is sub-optimal (Choudrie & Zamani, 2016; Davison, Wong, Alter, & Ou, 2019; Davison, Wong, Ou, & Alter, 2021). For instance, the software embedded in IS may not map onto some (or all) of the processes that employees undertake, or it may cause those processes to become unnecessarily unwieldy. For instance, Davison et al. (2021) report how employees were inadequately supported in such regular activities as order management, inventory management and delivery management. In consequence, the employees created workarounds with Microsoft Excel, thereby ensuring that they could complete their work satisfactorily. Thus, although IS may help to control and standardize the ways in which employees

undertake work, IS may also, paradoxically, reduce the amount of control or autonomy that the employees have. If employees realize that IS hinder them from performing according to expectations or even renders them unable to complete tasks, then they may feel anxious since they may be evaluated negatively by their managers, or may cause customers to be dissatisfied. The scholarly debate concerning workarounds needs to look beyond the immediate actions associated with their creation to both their determinants and their consequences.

In order to overcome workplace difficulties associated with inadequate IS, employees may feel compelled to create and deploy workarounds (Alter, 2014), thereby ensuring that they can complete their work (Davison et al., 2021; Spierings, Kerr, & Houghton, 2017). Although workarounds can take a number of forms, they are commonly characterized by innovative behaviour and the spirit of bricolage (Levi-Strauss, 1966) as employees seek to take advantages of the affordances (Chen, Wei, Davison, & Rice, 2020) of any suitable technological resources that they can access (Davison & Ou, 2018). Microsoft Excel is often the software of choice for employees attempting to work around enterprise systems (Davison et al., 2021; Spierings et al., 2017), and social media applications are similarly popular where there is a need to work around corporate communication systems that inadequately

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support employees' communication requirements (Davison & Ou, 2017, 2018).

In this article, we report on a research investigation into the work-related behaviour of employees confronted with IS that inadequately support their work. We suggest that the phenomenon of employee reactions to inadequate IS is important for several reasons, both practical and theoretical. First, it is unlikely that managers want their employees to be inadequately supported. Therefore, a study into this phenomenon will, at the very least, be revealing and beneficial to organisational managers (cf Davison & Ou, 2017). Second, understanding how employees react to inadequate IS may contribute to the better design of such systems in the future. As Beerepoort, van de Weerd, & Reijers (2019) note, workarounds can help organizations understand mismatches between business processes and corporate software, providing the opportunity to enhance either the process or the software. Third, this research is aligned with prior work into shadow systems (Haag & Eckhardt, 2017; Haag, Eckhardt, & Schwarz, 2019), i.e. employee-driven ways of working that are tolerated by managers, even though they violate corporate expectations or policies (Röder et al., 2014). Given these various circumstances, we suggest that there are important practical and theoretical benefits to be achieved by carefully studying the phenomenon of workarounds through the lens of a structural model.

IS that inadequately support employees may occur in any organization and in any country. The ability of employees to cope with an inadequate system (cf Lazarus & Folkman, 1984), and their consequent willingness to take steps to work around inadequate IS, are more difficult to gauge, not least because there are few prior studies in this area. Davison & Ou (2017, 2018) and Davison et al., (2019, 2021) have undertaken a number of related studies in China and Hong Kong, while Beerepoort et al. (2019) examined the situation in the Netherlands. In the current paper, we consider the Romanian context. Unlike countries in Western Europe, implementation of IS in Romania was delayed with major developments not happening in most organizations until after 2000. After Poland, Romania is the second largest market in East Central Europe. With a real GDP growth of 4.2% in 2019, it is considered one of the most dynamic economies in the European Union.

Following Romania's accession to the EU in 2007, the IT sector has been transformed with new firms offering software solutions for business processes and implementation services. While initially considered a low cost economy for offshoring production, other domains like IT, telecom, energy and pharmaceuticals became very appealing for foreign investors and represent a substantial contribution to the country's growth. Offering low labour costs, corporate taxes and substantial investment incentives, Romania also attracted lower-value-added and labour-intensive production of standardized cars and components. This combination of relatively low labour costs with and the skilled workers with considerable knowledge of technology constitute Romania's advantage as a dependent market economy (Nölke & Vliegthart, 2009).

In the last two decades, Romanian enterprises have made more progress in adopting or updating their IS, integrating people and processes across the enterprise. Nevertheless, by 2019 no more than 23% of firms had implemented an Enterprise Resource Planning (ERP) system, which is significantly lower than the EU-27 average of 36%,<sup>1</sup> though there are signs that the adoption rate is rising and IS are credited with benefiting organizations in such contexts as: business process management (Păvăloaia, Hurbean, & Fotache, 2019); unified data organization and management (Muntean, Brândas, & Cîrstea, 2019); support for decision making processes (Almasan, Circa, Zarzycka, & Dobroszek, 2016); and enhancing both productivity and organizational performance (Albu, Albu, Dumitru, & Dumitru, 2015; Madapusi & D'Souza, 2012). However, we recognize that the implementation of IS in Romanian

enterprises would not only bring benefits but potentially also drawbacks since, as elsewhere, the standardization of processes with software often leads to misfits that may damage the organization and its various stakeholders (e.g. Soh, Sia, & Tay-Yap, 2000; Davison, 2002; Worthen, 2002). Hence, we suggest that an investigation of employee behaviour when confronting inadequate IS in the Romanian context could contribute insights and knowledge to the IS research community and will help us to answer our research question: *How do organizational employees behave when required to use information systems that inadequately support their working requirements?*

Following this introduction, we review the literature related to the way employees may experience IS that inadequately support their requirements. We focus in particular on the workarounds that employees practice when faced with inadequate IS. We then introduce the theoretical development and our research model with seven hypotheses. We test the model with survey data collected from 310 respondents, all of whom work in Romanian organizations. Six of the seven hypotheses are supported. We discuss the implications of our findings for research and practice, and consider future research opportunities.

## 2. Literature review

There is a very substantial literature dealing with the adoption and diffusion of IS in organizations. The vast majority of published articles document the positive impact of IS (Laumer & Eckhardt, 2012). However, the last decade has also seen increased attention to what some call the 'dark side' of IS (Tarafdar, D'Arcy, Turel, & Gupta, 2015a). One of these dark sides relates to the phenomenon where employees are dissatisfied with the IS that they are expected to use, deeming it inadequate to meet their legitimate work needs. While some employees may simply do the best that they can in the circumstances, others deliberately take actions to address the inadequate IS, devising workarounds that enable them to complete their work.

Workaround arrangements devised and practiced by employees are attracting increasing attention because it is recognized that they can benefit organizations in ways that formal corporate systems cannot (Beerepoort et al., 2019). There are many definitions of workarounds, with one of the more comprehensive explaining that a workaround is "a goal-driven adaptation, improvisation, or other change to one or more aspects of an existing work system in order to overcome, bypass, or minimize the impact of obstacles, exceptions, anomalies, mishaps, established practices, management expectations, or structural constraints that are perceived as preventing that work system or its participants from achieving a desired level of efficiency, effectiveness, or other organizational or personal goals" (Alter, 2014, p.1044). This lengthy definition is notable for its general nature: it does not explicitly refer to computers or IS. Further, it takes an awedly positive stance, implying that workarounds help employees get their jobs done satisfactorily (Davison & Ou, 2017), yet it also recognises that workarounds deviate from standard organization practices (Azad & King, 2012). Indeed, Beane (2017) argues that although workarounds are deviant, they are tolerated by managers for the simple reason that they contribute to organizational productivity. Meanwhile, Beerepoort et al. (2019) suggest that sometimes workarounds are the only way to get work done.

It is recognised that workarounds are unlikely to be static, unless they are simple one-time fixes that are not repeated because a situation is resolved (Kobayashi, Fussell, Xiao, & Seagull, 2005). Alter (2014) integrates a larger body of workaround research into a complex process theory of how and why workarounds may be created, with an analysis of different types of workaround. The process model starts with (1) an identification of the intentions, goals and interests of different stakeholders (employees, managers, software system designers) related to the way work is undertaken; this is followed (2) by an analysis of the structure of work that is undertaken, and (3) the associated perception that a workaround is needed so as to address problems in work

<sup>1</sup> [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=E-business\\_integration](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=E-business_integration)

processes. Different workarounds can be identified (4) with one (or more) selected (5) developed and executed (6) and evaluated (7) in terms of how well the workaround addresses the problems previously identified, as well as broader consequences in the organizational context. The process model demonstrates that workaround behaviour is intricately connected with the adequacy of IS, since inadequate IS are associated with problems in natural work processes; workarounds are also influenced by constraints in the organizational context, such as policies that stipulate how work should be done, and an individual's performance goals. As either the organizational situation changes, or perhaps as the IS that are being worked around change, so feedback about the efficacy of the workaround may lead to its enhancement (Safadi & Faraj, 2010). In the longer term, if the underlying situation does not change and there is continued need for the workaround, it may become institutionalized as part of the regular organizational routine (Malaurent & Avison, 2015; Pentland & Feldman, 2008).

Although the practice of workarounds can be examined from a process theory perspective (i.e. with longitudinal, qualitative measurements), the determinants of workarounds have been investigated to a markedly lesser extent, especially from the variance theory angle.<sup>2</sup> Employees may create and engage in workarounds to make life easier by enabling them to ignore systemic controls (Malaurent & Avison, 2015) or to undertake daily routines in an enterprise system (Kwayu, Abubakre, & Lal, 2021). These types of workaround are consistent with the behaviour described by Lazarus & Folkman (1984) in their exposition of coping theory, as we explain below. In some organizations, enterprise social media may needlessly complicate work practices, with employees seeking to avoid it (Choudrie & Zamani, 2016), but in other contexts, employees may deliberately use social media where it helps them to bypass inadequate software that is embedded in business processes (Davison & Ou, 2017, 2018). Workarounds were also identified as essential when dealing with misfits between work process requirements and corporate software (van Beijsterveld & Van Groenendaal, 2016; Davison et al., 2021). Workarounds thus embody the spirit of coping behaviour (Lazarus & Folkman, 1984) and permit employees to "maintain congruence with their work objectives" (Malaurent & Karanasios, 2020, p.656). The application of workarounds by employees appears to constitute a form of coping behaviour that employees enact when they deal with inadequate software.

As indicated above, Alter's theory of workarounds (2014) can be strengthened by linking it to coping theory, as developed by Lazarus & Folkman (1984). Workarounds, in their various instantiations, almost invariably constitute a way of coping with a situation. For instance, when individual employees evaluate and respond to a specific event, such as confronting inadequate IS, they need to cope with it and the decision to create a workaround is very much part of that coping process. When individuals encounter a disruptive event, a two-stage cognitive appraisal process will be triggered. The first stage, primary appraisal, evaluates the potential impact or challenge of the event. At this stage, individuals would evaluate how the disruptive event will eventually bring negative consequences. In the second stage, secondary appraisal, the individuals assess their abilities and available resources to determine what they can do to cope with the event (Lazarus & Folkman, 1984). Creating a workaround is one possible action that individuals can take.

Although workarounds appear to be popular, engaging in these practices is not risk free. Employee behaviour in an organization is often regulated by policies that require the use of certain IS while proscribing others, often so as to meet security and audit requirements (Weill & Ross, 2005). The development and use of the workaround often requires employees' appraisal and evaluation, and hence the coping mind-set is embedded in the workaround process. Employee compliance with these

policies is expected (Avison & Fitzgerald, 1995), though employees' willingness to comply tends to fade if corporate headquarters is far away and the employees are not consulted about changes to the working environment (Xue, Ray, & Gu, 2011). While some managers are noted for their tolerance of workarounds, recognising the benefits that these can bring to the organization (Röder et al., 2014), others are less sanguine and may try to impose hefty penalties on the perpetrators (Griffin & Lopez, 2005). This research background and the sub-optimal synthesis of workaround and coping lead to the theoretical development below.

### 3. Theoretical development

In this development of a theoretical narrative (Davison, 2016; Schwabe, Richter, & Wende, 2019), we draw on the literature that relates to inadequate IS and the workarounds that employees may undertake and employ coping theory (Lazarus & Folkman, 1984) to guide our research model development. Coping theory is relevant because it refers to the "constantly changing cognitive and behavioural efforts to manage specific external and internal demands that are appraised as taxing or exceeding the resources of the person" (Lazarus & Folkman, 1984). In this study, we explore how an individual employee reacts to inadequate IS, i.e. a specific external demand that taxes the ability of the employee to complete their work. The enactment of workaround behaviour constitutes the act of coping.

We commence with the broadly-recognised notion that IS may not always be fit for purpose. Whether IS are simply badly designed or not enhanced so as to map onto new work processes, scholars have documented the existence of inadequate IS (Beerepoort et al., 2019; Davison et al., 2021). Further, these inadequate systems may cause taxing problems for employees who find it very hard to complete their work tasks. We consider the encounter with inadequate IS to be an instance of a disruptive event, which triggers the two-stage cognitive appraisal process (Lazarus & Folkman, 1984), and potentially induces employees to engage in workarounds to cope with the negative impact on their work.

Firstly, employees evaluate how inadequate IS will eventually bring negative consequences to them (Lazarus & Folkman, 1984). We suggest that two of the possible and immediate consequences of IS inadequacy for employees are the loss of control over how they work (Davison & Ou, 2017, 2018), and the development of anxiety about their performance and even their continued employment (Lee & Keil, 2018; Lytinen & Newman, 2015). These two consequences are linked to the possibility that some employees may be inclined to engage in workaround behaviour. We then identify two additional factors that may influence the engagement in workaround behaviour. The first relates to the IT policy restrictions enacted as part of corporate governance (Weill & Ross, 2005). The second involves the inclination of individual employees to engage in discretionary work activities that transcend normative job-role requirements (Organ, Podsakoff, & MacKenzie, 2006). The abilities of employees to engage in discretionary work activities will

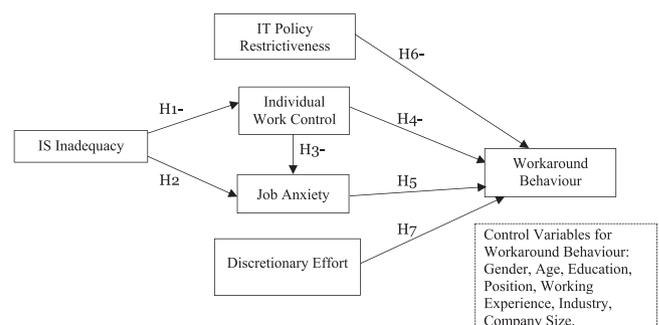


Fig. 1. Theoretical Model (developed by the authors).

<sup>2</sup> [https://ssrc.indiana.edu/doc/wimdocs/2011-11-04\\_dennis\\_theory\\_slides.pptx](https://ssrc.indiana.edu/doc/wimdocs/2011-11-04_dennis_theory_slides.pptx)

depend on the resources available to them (Lazarus & Folkman, 1984). We present the theoretical model in Fig. 1 and justify each hypothesis in the following paragraphs.

Employees today routinely employ various technologies in the course of their work. In ideal circumstances, the IS that are provided will match work requirements and will be explicitly designed to support work activities. Employees then have control over how they work. This work covers a very wide range of functions, including (but by no means limited to) communication with various parties inside and outside the organization, data analysis, decision making, knowledge exchange, and problem solving. In organizations where not all work processes are standardized, it is common for employees to retain some independent control over how they work.

However, employees do not always have access to the IS that are best suited to their work (Ferneley & Sobreperez, 2006). Instead, the IS may be inadequate in one or more aspects, such as their functionality, flexibility or simply their fit with work that needs to be done (Haag et al., 2019). It is also possible that the IS are provided because they are standardized components in an organization-wide systems arrangement (Davison et al., 2021), yet even in this case the IS may not meet all employees' needs. In situations like this, employees may find that they lose control over their work. As a result, everything that they do may be determined by the dictates of the IS and the policies that govern them, not the natural work process. Thus, employees need to cope with a disruptive situation.

For instance, Davison et al. (2021) document how employees in a major retailer arranged for goods to be delivered to customers through the services offered by a third party. Unfortunately, the ERP software that the employees were required to use did not allow for outsourcing to third party delivery agents. The assumption written into the software was that customers did not require delivery: they would collect their own goods. As a result of this discrepancy between the work that employees needed to do and the software support that was available, employees lost control over their work, at least until they created a workaround to solve the problem (Davison et al., 2021). Hence, we argue that:

**H1.** IS inadequacy is negatively associated with employees' individual work control.

When employees are required to use a system that inadequately supports their work requirements, they may find that it is not only more challenging to complete their assigned work tasks, but may also experience anxiety about their job performance and tenure. Job anxiety involves "a feeling of fear and/or an apprehensive mental state of an employee regarding certain components of work" (Bala & Bhagwatwar, 2018, p.654). This fear may also induce anxiety about one's continued employment in an organization (Lee & Keil, 2018). Job anxiety may be associated with recently implemented IS, because these can "introduce significant changes in how employees perform various tasks and how business processes operate" (Bala & Bhagwatwar, 2018, p. 654). For instance, Lytinen & Newman (2015) described how "users consistently affirmed ... that they were not properly consulted, and the system did not reflect their needs and interests", which led to "high levels of ... anxiety".

Coping theory argues that there is a need to evaluate the external and internal circumstances that tax or exceed the resources of the individual (Lazarus & Folkman, 1984), before deciding how to proceed. However, these circumstances can also be anxiety provoking. Thus, Davison et al. (2021) described how customers complained to employees because the delivery of goods was delayed, not realising that the delays happened because the corporate software failed to support the employees adequately. Following this critical feedback from dissatisfied customers, the employees experienced anxiety about how their work performance would be appraised by their managers, as well as their prospects for continued employment. Thus, we argue that:

**H2.** IS inadequacy is positively associated with job anxiety.

The satisfactory completion of work tasks is an essential component of employee appraisals. Managers draw on these appraisals to make decisions regarding the renewal or termination of work contracts (Tarafdar, Pullins, & Ragu-Nathan, 2015b). If employees lose control over their work practices and are unable to complete work tasks satisfactorily they are likely to feel anxious about how their work will be appraised (Tarafdar et al., 2015b). In contrast, when employees feel that they retain control over how they work, they are less likely to worry about their job security.

In similar vein, Benlian, Klumpe, & Hinz (2020) have suggested that individual employees live in a state of equilibrium with their environment, including work processes and technology. Maintaining this equilibrium will help to keep job anxiety at bay, but disruptions to the equilibrium, which can happen when employees lose control over how they perform their work, then anxiety may develop. Thus, we argue that:

**H3.** Individual work control is negatively associated with job anxiety.

If employees cannot control how they undertake their work, they may explore new ways of working to ensure they can fulfil their obligations (Kwahk, Ahn, & Ryu, 2018). In these circumstances, they may employ workarounds that facilitate the satisfactory completion of work tasks. These workarounds may require either the modification of current processes or the identification and creation of new processes that may involve new technology-based resources. These workarounds in effect constitute the outcome of the secondary phase of coping theory: appraisal, as employees consider what they can do in order to cope with the event. For instance, Spierings et al. (2017) documented how employees leveraged Microsoft Excel in order to validate forecasts and replenishment orders because they could not rely on data from the corporate enterprise system.

Unreliable data negatively affects employees' confidence in how they control their work. Meanwhile, Davison et al. (2021) observed how employees created workarounds in order to overcome a loss of control associated with an enterprise system that did not support a variety of essential functions, including: inventory management; internal and external communication; delivery coordination; order cancellation and rescheduling. All of these functions were essential and thus the workarounds benefited the organization and its clients. These workarounds were also directly related to employees regaining control over their working environment. Hence, we argue that:

**H4.** Individual work control is negatively associated with employees' engagement in workaround behaviour.

Employees are often concerned whether they can complete their work tasks and satisfy both their superiors and external parties such as customers, since failure in this respect can lead to punishment or even loss of employment (Tarafdar et al., 2015b). Employees who experience job anxiety will want to be sure that they can complete work tasks satisfactorily and meet the expectations of both internal colleagues and external stakeholders. If corporate IS inadequately support work then employees may investigate new ways of working (Davison & Ou, 2017), such as by developing workarounds (Alter, 2015), to minimise the likelihood of losing their jobs or damaging their career prospects. In other words, according to coping theory, the employees are at the stage of secondary appraisal (Lazarus & Folkman, 1984) and may determine that engaging in workarounds is a way to cope with job anxiety. Davison et al. (2021) documented employee frustration with a management cadre that did not listen to their pleas for modifications to the mandated enterprise system. Their decision to create and implement workarounds was directly related to this failure to acknowledge the legitimacy of the employees' needs and fears that without a better arrangement, they would not be able to perform their work satisfactorily. Hence, we argue that:

**H5.** Job anxiety is positively associated with employees' engagement

in workaround behaviour.

Organizations take IT and data security seriously because of a need to protect organizational interests (Weill & Ross, 2005). These interests include: compliance with legal obligations, e.g. data protection; protection of intellectual property and competitive secrets; and monitoring of employee behaviour in the office and on the Internet. In consequence, they create policies that regulate how employees should work, prescribing the adoption and application of specific IT applications and systems. They may also proscribe employee behaviour that is not consistent with these policies (Curreri & Lyytinen, 2017; Griffin & Lopez, 2005). Employees are expected to comply with these policies even though they may complicate the satisfactory performance of work.

A restrictive IT policy that is meticulously enforced may also limit the extent to which employees are able to access the alternative resources that they need to create and practice workarounds (Davison & Ou, 2017). For instance, even if employees can identify suitable alternative resources that will support their work, these resources may be inaccessible, or accessing them may attract penalties if discovered (Davison & Ou, 2018). The restrictive IT policy will thus also constrain the extent to which employees can cope with the situation. Hence, we propose that:

**H6.** IT policy restrictiveness is negatively associated with employees' engagement in workaround behaviour.

Discretionary behaviour, sometimes referred to as organizational citizenship behaviour or extra role behaviour (Organ et al., 2006), involves employees doing more work than is contractually required and undertaking additional tasks in a discretionary manner. Discretionary behaviour, which includes such varied activities as taking work home, proposing innovative solutions, demonstrating loyalty to the organization, and volunteering for unpaid overtime work (Zigarmi, Nimon, Houson, Witt, & Diehl, 2012), is recognised as an essential contributor to organizational success because employees are helping the organization in times of difficulty (Chou, Cho, Jiang, & Klein, 2013).

Employees who are loyal to their organization are likely to want to ensure its success, as well as customers' satisfaction. As a result, they may be more inclined to practice workarounds if these novel work processes benefit the organization and its customers. These workarounds constitute a form of coping behaviour and reflect employees' allocation of additional personal resources to solve workplace problems. In contrast, employees who have a weak sense of ethical responsibility or loyalty towards the organization may be disinclined to take individual initiatives on a discretionary basis and so are unlikely to practice workarounds that benefit the organisation (Davison, Ou, & Ng, 2020). Thus, we argue:

**H7.** Employees' inclination to perform discretionary behaviour is positively associated with their engagement in workaround behaviour.

## 4. Methods

We used the survey method to test the research model. In this section, we explain the development and validation of measures, and our data collection procedure.

### 4.1. Measurement development

All instrument items are adapted from previous research and a complete set of questions can be found in Appendix 1.<sup>3</sup> We located scales in the literature and adapted items to fit our own context. The construct of IS inadequacy is adapted from Davison et al. (2019, 2021) and the survey questions are operationalized as reflective measures. We designed the survey such that prior to answering the two questions

about IS adequacy, the respondents needed to identify the corporate IS in use and evaluate the extent to which the corporate IS are adequate for a list of common work tasks that employees may perform such as 1) Data analysis, 2) Decision making, 3) Planning of resources, 4) Generating reports, 5) Undertaking routine daily work, 6) Sharing information with colleagues, 7) Communication with colleagues inside the organisation, and 8) Communication with people outside the organisation (e.g. partners, customers), and others.

The measures for individual work control, job anxiety and IT policy restrictiveness are adapted from Elie-Dit-Cosaque, Pallud, & Kalika (2011), Lee & Keil (2018) and Curreri & Lyytinen (2017) respectively. Workarounds are measured by compiling and modifying a list of items from Alter (2014), Klaus, Wingreen, & Blanton (2010) and Rivard & Lapointe (2012). We measure discretionary effort by adapting the scales of Zigarmi et al. (2012). All measurements involve 7-point Likert scales anchored on the agree-disagree continuum. We also collected demographic data such as industry type and company size, as well as gender, age and experience in the company for individual respondents.

All measurement items were adopted or adapted from papers published in English. Two of the authors examined scales in a number of different source papers and compared their suitability for measuring the constructs in this study. Since we collected data in Romania, we followed the translation committee approach (Van de Vijver, 1997) to convert the original English instrument items into Romanian: one translator translated the survey instrument into Romanian and a second translator back translated it into English to ensure equivalence of meaning across all question items in the two language versions. The instrument was first tested for content and face validity: three qualified individuals were invited to provide feedback on the instrument items with respect to the clarity of items and their intelligibility. Based on feedback received, we revised some of the items.

### 4.2. Sample and data collection

The population of this study is working professionals in Romania who use corporate information systems on a regular basis. We used an online survey instrument, the web-based Qualtrics software, to collect data. A link to the survey instrument was distributed online (via email, Facebook and LinkedIn) through the alumni network of the Bachelor and Master programmes in Business Information Systems of the West University of Timișoara, Romania. Recipients of the link were invited both to complete the survey and to forward the link to their colleagues. A qualifying question was included at the beginning of the survey to ask the participants to identify the corporate information system that they are required to use at work. We considered only responses with answers to the qualifying question as valid. Over a six-month period in 2020 and an additional period in 2021, we received 384 valid responses. 74 respondents did not complete the entire survey, giving us a total of 310 usable responses. A series of t-tests were conducted to test for any significant differences between the usable responses in the first period and the second period. No significant differences were found.

Since all the data were collected from a single source, we also tested for common method bias and found it not to be a concern. Firstly, we conducted Harman's one factor test by performing an unrotated principal components factor analysis on all the measurement items in our model (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). The analysis revealed more than one factor and the largest factor did not account for a majority of the variance (only 23.2%). Secondly, we conducted the full collinearity assessment as suggested by Kock (2015). All the variance inflation factors (VIFs) resulting from the full collinearity assessment did not exceed the suggested threshold of 3.33 (Hair, Black, Babin, Anderson, & Tatham, 2006). Based on the results of the two assessments we conclude that common method bias is not an issue in our study. Thus, we use the 310 responses to test the research model.

<sup>3</sup> The Romanian version of the questions is available from the authors.

## 5. Data analysis and results

The demographic characteristics of the respondents are summarized in Table 1. These include gender, age, education, the industry sector of the firm where they work, their duration of work experience, size of company and the specific corporate IS that they work around.

### 5.1. Measurement model

We used Partial Least Squares Structural Equation Modeling (PLS-SEM) to conduct the data analysis. The analytical software is SmartPLS (version 2.0. M3). We also used SPSS v.25 to conduct additional statistical tests. Firstly, we evaluated the measurement model by examining the construct reliability, unidimensionality, convergent and discriminant validity (Benitez, Henseler, Castillo, & Schubert, 2020; Gefen & Straub, 2005). Specifically, we examined the construct reliability for all constructs with reflective measures by identifying the composite reliability scores and the square roots of the average variance extracted (AVE), all of which are summarized in Table 2.

As shown in Table 2, the composite reliability for all constructs exceeded the recommended 0.7 threshold (Hair, Sarstedt, Ringle, & Mena, 2012), indicating good internal consistency. Moreover, the AVE of each construct was greater than the acceptable threshold of 0.5 (Hair et al., 2012), hence convergent validity is confirmed. We further examined the discriminant validity using Fornell & Larcker (1981) criterion analysis. The square roots of the AVEs for each construct were larger than the correlation value on other constructs, hence discriminant validity is also confirmed. The loadings and cross-loadings are included in Appendix 2.

### 5.2. Structural model

After verifying the measurement model, we then examined the whole structural model in SmartPLS. Specifically, we created the structural model in SmartPLS and implemented the PLS-SEM algorithm for model estimation to obtain explained variance measures and path coefficients.

**Table 1**  
Demographic characteristics of the respondents (n = 310).

Gender	#	%	Duration of Work Experience	#	%
Female	187	60.3	6 months or less	27	8.7
Male	123	29.7	More than 6 months to 1 year	44	14.2
<b>Age</b>			More than 1 year to 2 years	69	22.3
18 – 25	133	42.9	More than 2 years to 5 years	91	29.4
26 – 35	107	34.5	More than 5 years to 10 years	44	14.2
36 – 45	54	17.4	More than 10 years	35	11.3
46 – 55	10	3.2			
56 – 65	6	1.9			
<b>Education</b>			<b>Size of Company (number of employees)</b>		
High school	13	4.2	50 or below	49	15.8
Bachelor's degree	131	42.3	51–300	47	15.2
Master's degree	159	51.3	301–800	35	11.3
Doctoral degree	7	2.3	801–2000	61	19.7
			2001–10,000	65	21.0
			10,001 or above	53	17.1
<b>Industry Sector</b>			<b>Corporate Information System Implemented</b>		
Automotive industry	101	32.6	SAP (e.g. SAP Enterprise, SAP S/4 HANA, etc.)	185	59.7
IT (software)	64	20.6	Romanian ERP (e.g. Charisma, SeniorERP, Socrates, etc.)	31	10.0
IT (services)	42	13.5	Oracle (e.g. Oracle, JD Edwards)	23	7.4
Services	61	19.7	Microsoft (e.g. Navision, MS Dynamics)	23	7.4
Manufacturing	15	4.8	Others (e.g. ASIS, Infor, Nexus, Vantive, etc., where count of each system < 4)	48	15.5
Others	27	8.7			

We also conducted a bootstrapping procedure with 5000 samples of 310 cases to determine the statistical significance of the path coefficients (Hair et al., 2012). Fig. 2 shows the SmartPLS results of the structural model. In addition, we examined the multi-collinearity of the constructs in the structural model by performing collinearity diagnostic. Using VIFs to measure multi-collinearity among the constructs enabled us to capture both vertical and lateral collinearity (Kock & Lynn, 2012). All VIFs resulting from the collinearity diagnostic test were below the suggested threshold of 3.33 (Hair et al., 2006), indicating multi-collinearity was not a concern.

Workaround behaviour was predicted by individual work control (H4:  $\beta = -0.15$ ,  $p < 0.001$ ), job anxiety (H5:  $\beta = 0.13$ ,  $p < 0.01$ ), IT policy restrictiveness (H6:  $\beta = -0.34$ ,  $p < 0.001$ ), and discretionary effort (H7:  $\beta = 0.12$ ,  $p < 0.05$ ), explaining 18% of the variance in the dependent variable. As expected in our proposed model, inadequate IS significantly and negatively affected individual work control (H1:  $\beta = -0.60$ ,  $p < 0.001$ ), with an explained variance of 36%. However, the proposed effect of IS inadequacy on job anxiety was not supported. On the other hand, job anxiety was affected by individual work control (H3:  $\beta = -0.19$ ,  $p < 0.01$ ), though only 3% of its variance was explained. Table 3 summarizes the results of the hypothesis testing.

## 6. Discussion

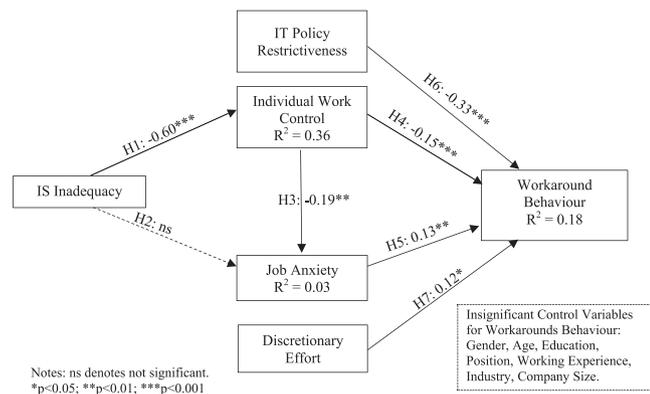
Our empirical data and analyses largely support the conceptual model proposed in this research. IS inadequacy is not uncommon in practice, but it is under-investigated and lacks theorization (Davison et al., 2021). In the contemporary workplace, employees are increasingly assertive with respect to what they see as their right to the autonomy of how they work. Employees are unlikely to be satisfied with IS that inadequately support their work needs (Ali, Zhou, Miller, & Ieromonachou, 2016; Choudrie & Zamani, 2016). Poorly performing technology, or ineffective work-focused system, can hamper employee autonomy and hurt their productivity (c.f., Davison et al., 2020). These days most enterprise systems involve significant levels of standardization across the organisation. Tensions between managerially imposed requirements and employee autonomy are perhaps inevitable. As a result, solving the misfit between process, structures and software has become the most important topic when dealing with enterprise-wide system implementation and usage (van Beijsterveldt & Van Groenendaal, 2016). When resources are available, employees are likely to persist in their engagement with workarounds, which may even become synonymous with standard organisational routines in the long run (Davison et al., 2019, 2021; Pentland & Feldman, 2008).

In this research, we have undertaken a cross-sectional survey to examine how Romanian employees view inadequate IS and the associated impact on individual work control, job anxiety and the inclination to engage in workaround behaviour, building upon the theoretical lens of coping theory (Lazarus & Folkman, 1984). Of the seven hypotheses we proposed, six are supported, confirming the cognitive appraisal on how individuals evaluate and respond to the specific events of inadequate IS in the workplace. We find that inadequate IS are associated with employees' loss of work autonomy (Davison et al., 2019) because the IS that best fit their work are not always accessible (Ferneley & Sobreperez, 2006). This loss of autonomy contributes significantly to anxiety about employment prospects (Lee & Keil, 2018), even if this is not the only source of job anxiety. Loss of work autonomy ( $\beta = -0.15$ ,  $p < 0.01$ ) and anxiety ( $\beta = 0.13$ ,  $p < 0.05$ ) together contribute to the engagement in workaround behaviour, consistent with the speculations of Tarafdar et al. (2015b). Taking these findings together, our empirical data suggests inadequate IS can reduce 36% of the work control ( $\beta = -0.6$ ,  $p < 0.01$ ), with this loss of work control a key driver of workaround behaviour. This suggests that if inadequate IS are part of the employees' daily work environment, it subsequently contributes to employees' higher tendency to engage in workarounds. On the other hand, this also implies that if the system is not essential to the employee's daily tasks,

**Table 2**  
Construct reliabilities, convergent and discriminant validity.

Constructs	Mean	S.D.	Composite Reliability	Cronbach's Alpha	AVE	ISI	IWC	JA	ITR	DE	WB
ISI	2.01	1.30	0.95	0.90	0.91	<b>0.95</b>					
IWC	5.97	1.35	0.90	0.83	0.75	-0.60	<b>0.86</b>				
JA	3.84	1.82	0.85	0.72	0.74	0.06	-0.16	<b>0.86</b>			
ITR	4.65	2.09	0.90	0.79	0.82	-0.12	0.04	0.06	<b>0.91</b>		
DE	4.68	1.86	0.81	0.77	0.53	0.04	0.07	0.07	-0.20	<b>0.73</b>	
WB	2.72	1.68	0.89	0.83	0.66	0.23	-0.23	0.18	-0.35	0.18	<b>0.81</b>

Note: ISI=IS Inadequacy, IWC=Individual Work Control, JA=Job Anxiety, ITR=IT Policy Restrictiveness, DE=Discretionary Effort, WB=Workaround Behaviour. Diagonal values are the square root of the AVE.



**Fig. 2.** SmartPLS results of the structural model.

**Table 3**  
Summary of hypothesis testing.

Construct	Hypothesis	Results
H1	ISI → IWC IS inadequacy is negatively associated with employees' individual work control.	Supported
H2	ISI → JA IS inadequacy is positively associated with job anxiety.	Rejected
H3	IWC → JA Individual work control is negatively associated with job anxiety.	Supported
H4	IWC → WB Individual work control is negatively associated with employees' engagement in workaround behaviour.	Supported
H5	JA → WB Job anxiety is positively associated with employees' engagement in workaround behaviour.	Supported
H6	ITR → WB IT policy restrictiveness is negatively associated with employees' engagement in workaround behaviour.	Supported
H7	DE → WB Employees' inclination to perform discretionary behaviour is positively associated with their engagement in workaround behaviour.	Supported

the chance that the individual performs workarounds will be low.

The process of engagement with workarounds is situated within coping theory for the first stage of the appraisal of a negative event in terms of its impacts or challenges. In the second stage, individuals evaluate how this negative event will eventually lead to consequences and decide how to proceed based on their ability and available resources (Lazarus & Folkman, 1984). Specific to our research context and findings, restrictive IT policies have a dampening effect ( $\beta = -0.33$ ,  $p < 0.01$ ) on the engagement in workaround behaviour. This finding is consistent with the notion that a strict IT policy limits the extent to which employees can access available resources and deal with the situation (Davison & Ou, 2017). The employee's inclination to undertake discretionary work ( $\beta = 0.12$ ,  $p < 0.10$ ) influences engagement in workaround behaviour (Zigarmi et al., 2012), which we take as the behavioural outcome of coping with the inadequate IS. To summarize, our findings demonstrate that although engaging in workaround

behaviour requires some discretionary efforts from individual employees, it also addresses the sense of job anxiety and restores the sense of autonomy and work control. As a result, workarounds make a positive contribution in the workplace.

The only rejected hypothesis involves the lack of support for inadequate IS enhancing job-related anxiety ( $\beta = -0.05$ ,  $p > 0.10$ ). We suspect that employees do not feel anxious for their jobs in this situation for several reasons. Firstly, inadequate IS do not seem to be the main reason for job anxiety; instead, the loss of work control is a more significant factor. This means that the negative effect of IS inadequacy on job anxiety is indirectly reflected by its harmful impacts on work control. Secondly, the majority of our respondents are young and would have joined the organization after the implementation of the inadequate IS. Therefore, from the respondents' perspective, the inadequate IS are not innovations that damage an existing working environment nor were they imposed without consultation: instead, they are part of an existing set of work arrangements. Thirdly, younger employees are more likely to be innovative in the devising of creative work practices that can obviate the problems caused by the inadequate IS (cf. Davison et al., 2021). In contrast, older employees who had been directly affected when the IS were first introduced could be expected to be more anxious with respect to the impact of the inadequate IS on their career prospects in the organisation. However, these explanations require further investigation in future work. Indeed, a longitudinal study of how workarounds are developed and maintained over time would be invaluable.

### 6.1. Theoretical contributions and implications

Our research contributes to theory in several ways. In investigating the phenomenon of how employees engage in workaround behaviour in response to inadequate IS, we draw on our earlier qualitative studies that examined the phenomenon in depth (references withheld for review). Given the dearth of prior work in the area, our study constitutes an important first step and contributes to a more rigorous understanding of the phenomenon of workarounds, as well as their determinants and implications. Building upon the current rich research, in particular the extant process models, of workarounds (e.g., Alter, 2014; Davison et al., 2021), in this research we build and test a variance model that explains the relationships among inadequate IS, workarounds, and their mediators in the workplace. The conceptualization of workarounds into a variance theory in this study contributes to the calibration with the predominantly process models of prior workaround research, and hence enriches the theoretical explanation and prediction via an alternative logical theoretical structure (Fang, Lim, Qian, & Feng, 2018).

Specifically, we employ coping theory (Lazarus & Folkman, 1984) as an overarching theoretical framework to guide our research, given the importance of coping behaviour for employees faced with inadequate IS. The classical process model of workarounds from Alter (2014) has outlined the holistic perspective of workaround practice. In this research, we focus on individual employees' appraisal of and method of handling inadequate IS in workplace from a coping perspective. In order to enrich coping theory and contextualize workaround behaviour with coping, we introduced constructs that describe the inadequacy of IS, job anxiety and employee control over work, IT policy restrictiveness, and

the inclination to undertake discretionary effort. The development and deployment of workarounds as a coping strategy to handle inadequate IS rely significantly on both the available resources and the extent to which employee creativity can match requirements. It is also subject to how threatening is the situation in terms of daily work requirements. The interplay and equilibrium of IT policy restrictiveness and individual work control are thus demonstrated. In this research, we advance the debate surrounding workarounds and establish new directions for scholarship. We establish a conceptual model to theorize antecedents of workarounds and examine this important phenomenon from a variance-theory perspective.

Our new conceptual model also opens up the possibility of broadening the theoretical landscape surrounding workarounds. Each of the above-mentioned sources, viz., human computer interaction, IT governance, human resources, and organisational behaviour, can serve as a foundation to further scrutinize and theorize components for a larger logical structure of the workaround phenomenon.

## 6.2. Implications for practice

Our practice-oriented implications are relevant for employees and managers alike. We find that the inclination of employees to engage in workaround behaviour is at least in part associated with their interest in undertaking discretionary behaviour (Davison et al., 2019, 2020; Organ et al. 2006). These employees are very often loyal to the organization and as a result take actions to ensure that they can complete their work satisfactorily (Beerepoort et al., 2019) instead of taking otherwise adverse actions (Ali et al., 2016), even if the IT-based resources that they are expected to use do not meet their needs. Indeed, these actions, which we refer to as workarounds (Alter, 2014), may both complement and enhance the official IT-based resources, contributing to organizational productivity (Beane, 2017). However, we caution employees to exercise great care when they create workarounds. It will be valuable if they can document how they have developed and applied workarounds, because this information will make it easier to improve them as feedback is received on their efficacy (Davison et al., 2021). We recognise that workarounds are sometimes developed by lone employees in the shadows (Haag & Eckhardt, 2017), but we suggest that a more public approach to workaround development will help to ensure that the workarounds are both safe and sustainable.

Given the tendency of employees to create workarounds when they face inadequate IS, we suggest that managers in organizations need to be more sensitive to the legitimate needs of employees with respect to the IS that they are required to use. This advice extends to managers responsible for the IT function, as well as security. Such managers may view any workaround as a threat to corporate security with the potential to damage the organisation, even if this damage is inadvertent (Ali et al., 2016; Ferneley & Sobrepez, 2006). Nevertheless, we urge managers to consider very carefully how they can ensure that employees are adequately supported by IS, ideally involving employees in discussions about the design of IS pre-implementation, and responding to employee feedback post-implementation.

Workarounds may be seen as temporary solutions to inadequate IS. Our empirical data suggests that individual employees determine the extent to which they engage in workaround behavior based on their appraisal of the situation that they face and the resources available. Overall, workarounds seem to provide a good solution when the needed functionality is not available in official software because customization may be too expensive or simply not feasible (Davison et al., 2021). We have demonstrated that although engaging in workaround behaviour requires certain discretionary efforts by employees, workarounds can allay employees' job anxiety and restore part of the lost work control. As a result, workarounds are beneficial in the workplace. From a long-term perspective, whether workarounds should be incorporated into organizational routines depends on the IT governance policy (is it open to such an arrangement?) and an assessment of whether the benefits of

workarounds outweigh the efforts needed to fulfil job requirements (van Beijsterveld & Van Groenendaal, 2016). Considering the constantly changing market conditions and environmental requirements, corporate managers responsible for IS, such as the Chief Information Officer (CIO),<sup>4</sup> may need to consider whether inadequate IS constitute a local and temporary problem that can be ignored (because the workarounds are effective and do not damage the organization) or a central problem that requires a more systematic solution. The ingenuity of employees that has led to the development and application of workarounds can be leveraged by a CIO keen to trial new ideas or refine the IT environment, but formal incorporation of the workarounds within an IT governance policy is essential in the long run because only in this way can the workarounds be controlled in a manner that ensures their positive impact in the organization.

We have validated our research model in a hitherto under-researched context, the Romanian organizational sector, where recent studies have shown that younger employees "have little respect for old ways of problem solving and want to make their way" (Pinzaru & Mitan, 2016, p.156). Furthermore, the demographics of the Romanian workforce are changing with increasing numbers of digital native employees, as reflected in the characteristics of the population in this study: 93.6% have a Bachelor or Master degree, and 77.4% are aged 35 or younger. This new generation is less concerned with job security than was formerly the case. Instead, these younger employees appreciate work-style autonomy, being able to control and take responsibility for how they perform work tasks. As enterprise systems are being increasingly adopted in Romania (59.6% of our sample indicate that they use an SAP system), workarounds may be inevitable and we expect that these younger but digitally-literate employees will have a significant role to play, if senior management is open to their involvement. However, if they are excluded from the process, then it is likely that the resulting enterprise systems will inadequately support their needs. This may then induce the creation and deployment of workarounds.

## 6.3. Limitations and future research directions

The current study is part of a larger global investigation into the way employees react to inadequate IS. Although in this study we report on data collected in Romania, we do not see this focus on a single country as a limitation, because we are also collecting data in many other countries. Nevertheless, our work is exploratory: we have more work to do on the construct identification and development, as well as the instrumentation. Further, how long an inadequate IS has been in place will be an important factor to be considered in workaround research. If the duration is too short at the time when the research is undertaken, employees may not have had sufficient time to develop workarounds. This also suggests that it will be valuable to measure how employee behaviours change over time, and so a longitudinal assessment, which we have not been able to undertake, would be invaluable.

We hope that other researchers will consider how they can build on our work with other constructs and in other cultural contexts (Davison and Martinsons, 2016), such as those where there is a longer history of corporate IS implementation. Indeed, we advocate for more attention to research into inadequate IS, since there is considerable potential for this research to contribute both to organizations and to the scholarly literature. We also suggest that the linkage between coping theory (Lazarus & Folkman, 1984) and workaround theory (Alter, 2014) be explored in more detail: there is considerable potential for new theoretical advances to be made here and workaround theory can be strengthened in consequence.

<sup>4</sup> See <https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/the-cio-agenda> for a review of the evolving nature of the CIO role.

## 7. Conclusions

In this study, we explored some critical determinants of the work-around behaviours in which employees engage when they are required to use an information system that inadequately supports their needs. We focused on IT policies that may restrict how employees undertake their tasks, the loss of control over working style as experienced by employees, the anxiety that employees experience in connection with the requirement that they use inadequate IS, and the discretionary effort that employees may engage in over their formally contracted job requirements. Given that employees need to cope with the inadequate IS, we employed coping theory as the overarching theoretical lens. We found that employees experience difficulties controlling their work if the IS are inadequate, which leads to the enacting of work-around behaviours. The creation of workarounds is also associated with employee concern for their future employment and when their tendency to engage in discretionary effort, i.e. work that goes beyond their formal job requirements. Finally, a restrictive corporate policy has a dampening effect on the creation of workarounds. We encourage researchers to engage more deeply into the phenomenon of inadequate IS since it is likely to be common. We suggest that researchers should be particularly

sensitive to the juxtaposed interests of employees, who want to complete their work, and senior managers who have the prerogative both to establish work norms and to protect the organisation from actions that may damage it.

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### CRediT authorship contribution statement

Conception and design of study: RM Davison, LHM Wong, CXJ Ou, L Hurbean. Acquisition of data: L Hurbean, M Muntean. Analysis and/or interpretation of data: RM Davison, LHM Wong, CXJ Ou, L Hurbean. Drafting the manuscript: RM Davison, LHM Wong, CXJ Ou, L Hurbean. Revising the manuscript critically for important intellectual content: RM Davison, LHM Wong, CXJ Ou, L Hurbean. Approval of the version of the manuscript to be published: RM Davison, LHM Wong, CXJ Ou, L Hurbean, M Muntean.

## Appendix 1. Constructs and measurement items

Construct	Items: Please indicate the extent to which you agree with the following statements (1 = extremely disagree) to (7 = extremely agree)	References
<b>IS inadequacy</b>	<ol style="list-style-type: none"> <li>In general, the corporate IS (i.e. "name of the system") is adequate for my work needs. (R)</li> <li>Considering the work that I need to undertake, the corporate IS (i.e. "name of the system") that the company provides is sufficient. (R)</li> </ol>	<a href="#">Davison et al. (2019)</a>
<b>Individual work control</b>	<ol style="list-style-type: none"> <li>I have control over the way I use the corporate IS (i.e. "name of the system") when performing my work tasks.</li> <li>I have the resources necessary to use the corporate IS (i.e. "name of the system") available to me at work.</li> <li>I have the knowledge necessary to use the corporate IS (i.e. "name of the system") available to me at work.</li> </ol>	<a href="#">Elie-Dit-Cosaque et al. (2011)</a>
<b>IT Policy restrictiveness</b>	<ol style="list-style-type: none"> <li>The corporate IS (i.e. "name of the system") restricts my choice of ways to work.*</li> <li>The procedures that I use at work are required by the corporate IS (i.e. "name of the system").*</li> <li>My choice of work approach is determined by me, not by the corporate IS (i.e. "name of the system").*</li> <li>I am not allowed to use any other information systems or technology to perform my work tasks except the corporate provided ones.</li> <li>I can freely choose any of my preferred information systems or technology to complete my work. (R)</li> </ol>	<a href="#">Curreri and Lyytinen (2017)</a>
<b>Job anxiety</b>	<ol style="list-style-type: none"> <li>I am concerned that my future career opportunities with this company will depend on how well I perform. *</li> <li>I am concerned that my performance at work could negatively affect my ability to be employed by this company in the future.</li> <li>I am worried that my work performance could have negative implications for my future career with this company.</li> </ol>	<a href="#">Lee &amp; Keil (2018)</a>
<b>Use of discretionary efforts</b>	<ol style="list-style-type: none"> <li>I propose innovative solutions at work.*</li> <li>I volunteer for things that may not be a part of my job.</li> <li>I undertake overtime work without being paid or asked to do so.</li> <li>I take home work when I know it will make me more effective the next day.</li> <li>I spend my discretionary time finding information that will help my company.</li> </ol>	<a href="#">Zigarmi et al. (2012)</a>
<b>Workaround behaviour</b>	<ol style="list-style-type: none"> <li>When I do my work, I ignore standard corporate processes and activities if they are too troublesome to follow.</li> <li>When I do my work, I create ways of working around inadequate features of the corporate IS (i.e. "name of the system") that the company provides.</li> <li>When I do my work, I skip certain required standard procedures if they obstruct my work.</li> <li>When I do my work, I do not follow standard procedures that my company requires.</li> </ol>	Items compiled/modified from <a href="#">Alter (2014)</a> , <a href="#">Klaus et al. (2010)</a> and <a href="#">Rivard &amp; Lapointe (2012)</a>

Note: (R: reverse scale; \* indicates items that were removed due to weak loadings (< 0.4)

## Appendix 2. Loadings and cross loadings

	IIS	IWC	JA	ITR	DE	WB
ISI_1	<b>0.95</b>	-0.53	0.04	-0.14	0.02	0.2
ISI_2	<b>0.96</b>	-0.6	0.07	-0.1	0.06	0.27
IWC_1	-0.46	<b>0.79</b>	-0.16	-0.06	0	-0.15
IWC_2	-0.54	<b>0.9</b>	-0.12	0.09	0.08	-0.17
IWC_3	-0.54	<b>0.89</b>	-0.12	0.06	0.08	-0.13
JA_2	-0.01	-0.07	<b>0.73</b>	0.07	0.08	0.02
JA_3	0.07	-0.16	<b>0.98</b>	0.05	0.06	0.16
ITR_4	-0.18	0.08	0.09	<b>0.91</b>	-0.14	-0.31
ITR_5	-0.04	-0.01	0.02	<b>0.91</b>	-0.22	-0.32
DE_2	-0.02	0.1	-0.04	-0.01	<b>0.46</b>	0.02
DE_3	-0.02	0.15	0.03	-0.09	<b>0.67</b>	0.04
DE_4	-0.03	0.09	0.03	-0.18	<b>0.76</b>	0.08
DE_5	0.08	0.02	0.08	-0.2	<b>0.95</b>	0.21
WAB_1	0.22	-0.16	0.13	-0.2	0.15	<b>0.84</b>
WAB_2	0.26	-0.15	0.16	-0.39	0.23	<b>0.86</b>
WAB_3	0.1	-0.1	0.12	-0.24	0.07	<b>0.81</b>
WAB_4	0.2	-0.16	0.03	-0.24	0.09	<b>0.74</b>

ISI= IS Inadequacy, IWC=Individual Work Control, JA=Job Anxiety, ITR=IT Policy Restrictiveness, DE=Discretionary Effort, WB=Workarounds Behaviour.

## References

- Albu, C. N., Albu, N., Dumitru, M., & Dumitru, V. F. (2015). The impact of the interaction between context variables and enterprise resource planning systems on organizational performance: A case study from a transition economy. *Information Systems Management*, 32(3), 252–264.
- Ali, M., Zhou, L., Miller, L., & Ieromonachou, P. (2016). User resistance in IT: A literature review. *International Journal of Information Management*, 36(1), 35–43.
- Almasan, A., Circa, C., Zarzycka, E., & Dobroszek, J. (2016). Management accounting information from the perspective of managers: The case of Poland and Romania, *Zeszyty Teoretyczne Rachunkowości*, 90, 41–64.
- Alter, S. (2014). Theory of workarounds. *Communications of the Association for Information Systems*, 34(55), 1041–1066.
- Alter, S. (2015). Beneficial noncompliance and detrimental compliance: Expected paths to unintended consequences, in: Proceedings of the 21st Americas Conference on Information Systems, Fajardo, Puerto Rico, August 13–15.
- Avison, D. E., & Fitzgerald, G. (1995). *Information systems development: Methodologies, techniques and tools*. London: McGraw-Hill.
- Azad, B., & King, N. (2012). Institutionalized computer workaround practices in a Mediterranean country: An examination of two organizations. *European Journal of Information Systems*, 21(4), 358–372.
- Bala, H., & Bhagwatwar, A. (2018). Employee dispositions to job and organization as antecedents and consequences of information systems use. *Information Systems Journal*, 28(4), 650–683.
- Beane, M. I. (2017). *Operating in the shadows: The productive deviance needed to make robotic surgery work (Doctoral dissertation)*. Massachusetts Institute of Technology. (<https://dspace.mit.edu/handle/1721.1/113956>).
- Beerepoort, I., van de Weerd, I., Reijers, H.A. (2019). The potential of workarounds for improving processes, in: Proceedings of the International Conference on Business Process Improvement, Sept 1–6, Vienna, 338–350.
- Benitez, J., Henseler, J., Castillo, A., & Schubert, F. (2020). How to perform and report an impactful analysis using partial least squares: Guidelines for confirmatory and explanatory IS research. *Information and Management*, 57(2), Article 103168, 1-16.
- Benlian, A., Klumpe, J., & Hinz, O. (2020). Mitigating the intrusive effects of smart home assistants by using anthropomorphic design features: A multimethod investigation. *Information Systems Journal*, 30(6), 1010–1042.
- Chen, X. Y., Wei, S. B., Davison, R. M., & Rice, R. E. (2020). How do enterprise social media affordances affect social network ties and job performance? *Information Technology & People*, 33(1), 361–388.
- Chou, T. Y., Cho, S. C. T., Jiang, J. J., & Klein, G. (2013). The organizational citizenship behavior of IS personnel: Does organizational justice matter? *Information & Management*, 50(2–3), 105–111.
- Choudrie, J., & Zamani, E. (2016). Understanding individual user resistance and workarounds of enterprise social networks: The case of Service Ltd. *Journal of Information Technology*, 31(2), 130–151.
- Curreri, A., & Lyytinen, K. (2017). Mindfulness, information technology use, and physicians' performance in emergency rooms. *Academy of Management Proceedings*. (<https://journals.aom.org/doi/10.5465/AMBPP.2017.13828abstract>).
- Davison, R. M. (2002). Cultural complications of ERP. *Communications of the ACM*, 45(7), 109–111.
- Davison, R. M. (2016). The art of storytelling. *Information Systems Journal*, 26(3), 191–194.
- Davison, R. M., & Martinsons, M. G. (2016). Context is King! Considering particularism in research design and reporting. *Journal of Information Technology*, 31(3), 241–249.
- Davison, R. M., & Ou, C. X. J. (2017). Digital work in a digitally challenged organization. *Information & Management*, 54(1), 129–137.
- Davison, R. M., & Ou, C. X. J. (2018). Subverting organisational IS policy with feral systems: A case in China. *Industrial Management and Data Systems*, 118(3), 570–588.
- Davison, R. M., Ou, C. X. J., & Ng, E. (2020). Inadequate information systems and organizational citizenship behavior. *Information & Management*, 57(6), Article 103240, 1-10.
- Davison, R.M., Wong, L.H.M., Alter, S., Ou, C.X.J. (2019). Adopted globally but unusable locally: What workarounds reveal about adoption, resistance, compliance and non-compliance, in: Proceedings of the 27th European Conference on Information Systems, Stockholm, Sweden, June 12–14.
- Davison, R. M., Wong, L. H. M., Ou, C. X. J., & Alter, S. (2021). The coordination of workarounds: Insights from responses to misfits between local realities and a mandated enterprise system. *Information & Management*, 58(8), Article 103530, 1-12.
- Elie-Dit-Cosaque, C., Pallud, J., & Kalika, M. (2011). The influence of individual, contextual, and social factors on perceived behavioral control of information technology: A field theory approach. *Journal of Management Information Systems*, 28(3), 201–234.
- Fang, Y. L., Lim, K. H., Qian, Y., & Feng, B. (2018). System dynamics modeling for information systems research: Theory development and practical applications. *MIS Quarterly*, 42(4), 1303–1329.
- Ferneley, E., & Sobreper, P. (2006). Resist, comply or workaround: An examination of different facets of user engagement with information systems. *European Journal of Information Systems*, 15(4), 345–356.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50.
- Gefen, D., & Straub, D. W. (2005). A practical guide to factorial validity using PLS-Graph: Tutorial and annotated example. *Communications of the AIS*, 16(5), 91–109.
- Griffin, R., & Lopez, Y. (2005). Bad behavior in organizations: A review and typology for future research. *Journal of Management*, 31(6), 988–1005.
- Haag, S., & Eckhardt, A. (2017). Shadow IT. *Business & Information Systems Engineering*, 59(6), 469–473.
- Haag, S., Eckhardt, A., & Schwarz, A. (2019). The acceptance of justifications among shadow IT users and nonusers: An empirical analysis. *Information & Management*, 56(5), 731–741.
- Hair, J., Black, W., Babin, B., Anderson, R., & Tatham, R. (2006). *Multivariate data analysis* (6th ed.). Upper Saddle River, NJ: Pearson Prentice Hall.
- Hair, J. F., Sarstedt, M., Ringle, C. M., & Mena, J. A. (2012). An assessment of the use of partial least squares structural equation modeling in marketing research. *Journal of the Academy of Marketing Science*, 40(3), 414–433.
- Klaus, T., Wingreen, S. C., & Blanton, J. E. (2010). Resistant groups in enterprise system implementations: A q-methodology examination. *Journal of Information Technology*, 25(1), 91–106.
- Kobayashi, I.M., Fussell, S.R., Xiao, Y. & Seagull, F.J. (2005). Work coordination, workflow and workarounds in a medical context, in: Proceedings of the Conference on Computer-Human Interaction. Portland, OR, April 2–7.
- Kock, N. (2015). Common method bias in PLS-SEM: A full collinearity assessment approach. *International Journal of e-Collaboration*, 11(4), 1–10.
- Kock, N., & Lynn, G. S. (2012). Lateral collinearity and misleading results in variance-based SEM: An illustration and recommendations. *Journal of the Association for Information Systems*, 13(7), 546–580.
- Kwahk, K.-Y., Ahn, H., & Ryu, Y. U. (2018). Understanding mandatory IS use behavior: How outcome expectations affect conative IS use. *International Journal of Information Management*, 38(1), 64–76.
- Kwayu, S., Abubakre, M., & Lal, B. (2021). The influence of informal social media practices on knowledge sharing and work processes within organizations. *International Journal of Information Management*, 58(102280), 1–9.
- Laumer, S., & Eckhardt, A. (2012). Why do people reject technologies? A review of user resistance theories. In Y. K. Dwivedi, M. Wade, & S. Schneberger (Eds.), *Information Systems Theory. Integrated Series in Information Systems* (pp. 63–86). New York, NY: 28. Springer.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer.

- Lee, J. S., & Keil, M. (2018). The effects of relative and criticism-based performance appraisals on task-level escalation in an IT project: A laboratory experiment. *European Journal of Information Systems*, 27(5), 551–569.
- Levi-Strauss, C. (1966). *The savage mind*. Chicago, IL: University of Chicago Press.
- Lyytinen, K., & Newman, M. (2015). A tale of two coalitions: Marginalising the users while successfully implementing an enterprise resource planning system. *Information Systems Journal*, 25(2), 71–101.
- Madapusi, A., & D'Souza, D. (2012). The influence of ERP system implementation on the operational performance of an organization. *International Journal of Information Management*, 32(1), 24–34.
- Malaurent, J., & Avison, D. (2015). From an apparent failure to a success story: ERP in China—Post implementation. *International Journal of Information Management*, 35(5), 643–646.
- Malaurent, J., & Karanasios, S. (2020). Learning from workaround practices: The challenge of enterprise system implementations in multinational corporations. *Information Systems Journal*, 30(4), 639–663.
- Muntean, M., Brândas, C., & Cirstea, T. (2019). Framework for a symmetric integration approach. *Symmetry*, 11(2), 1–10.
- Nölke, A., & Vliegthart, A. (2009). Enlarging the varieties of capitalism: The emergence of dependent market economies in East Central Europe. *World Politics*, 61(4), 670–702.
- Organ, D. W., Podsakoff, P., & MacKenzie, S. (2006). *Organizational citizenship behavior: Its nature, antecedents and consequences*. Thousand Oaks, CA: Sage.
- Päivälä, V. D., Hurbean, L., & Fotache, D. (2019). *Modern Business Information Systems Extended ERP Components and their Integration* (vol. 2). Lambert Academic Publishing.
- Pentland, B. T., & Feldman, M. S. (2008). Designing routines: On the folly of designing artifacts, while hoping for patterns of action. *Information and Organization*, 18(4), 235–250.
- Pinzaru, F., & Mitan, A. (2016). Managers versus digital native employees. A study regarding the perceptions of the Romanian managers working with youngsters. *Management Dynamics in the Knowledge Economy*, 4(1), 153–166.
- Podsakoff, P., MacKenzie, S., Lee, J., & Podsakoff, N. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879–903.
- Rivard, S., & Lapointe, L. (2012). Information technology implementers' responses to user resistance: Nature and effects. *MIS Quarterly*, 36(3), 897–920.
- Röder, N., Wiesche, M., Schermann, M., Krcmar, H. (2014). Why managers tolerate workarounds: The role of information systems, in: Proceedings of the 20th Americas Conference on Information Systems, Savanna, GA, August 7–10.
- Safadi, H., Faraj, S. (2010). The role of workarounds during an open source electronic medical record system implementation, in: Proceedings of the 31st International Conference on Information Systems, St Louis, MO, December 12–15.
- Schwabe, G., Richter, A., & Wende, E. (2019). Special issue on storytelling and information systems. *Information Systems Journal*, 29(6), 1122–1125.
- Soh, C., Sia, S. K., & Tay-Yap, J. (2000). Cultural fits and misfits: Is ERP a universal solution? *Communications of the ACM*, 43(4), 47–51.
- Spierings, A., Kerr, D., & Houghton, L. (2017). Issues that support the creation of ICT workarounds: Towards a theoretical understanding of feral information systems. *Information Systems Journal*, 27(6), 775–794.
- Tarafdar, M., D'Arcy, J., Turel, O., & Gupta, A. (2015a). The dark side of information technology. *MIT Sloan Management Review*, 56(2), 61–70.
- Tarafdar, M., Pullins, E. B., & Ragu-Nathan, T. S. (2015b). Technostress: Negative effect on performance and possible mitigations. *Information Systems Journal*, 25(2), 103–132.
- Van de Vijver, F. J. (1997). *Methods and data analysis for cross-cultural research*. Thousand Oaks, CA: Sage.
- van Beijsterveld, J. A., & Van Groenendaal, W. J. (2016). Solving misfits in ERP implementations by SMEs. *Information Systems Journal*, 26(4), 369–393.
- Weill, P., & Ross, J. W. (2005). A matrixed approach to designing IT governance. *Sloan Management Review*, 46(2), 26–34.
- Worthen, B. (2002). Nestlé's enterprise resource planning (ERP) odyssey, *CIO Magazine*: (<http://www.cio.com/article/2440821/enterprise-resource-planning/nestl-s-ent-prise-resource-planning-erp-odyssey.html>).
- Xue, L., Ray, G., & Gu, B. (2011). Environmental uncertainty and IT infrastructure governance: A curvilinear relationship. *Information Systems Research*, 22(2), 389–399.
- Zigarmi, D., Nimon, K., Houson, D., Witt, D., & Diehl, J. (2012). The work intention inventory: Initial evidence of construct validity. *Journal of Business Administration Research*, 1(1), 24–42.