Managing Organizational Development – The Interrelation of New Information Technology and Organizational Diagnosis

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List of Appended Studies

This dissertation is based on the work described in the following studies:

Study 1:

Wolf, T. R., Hattrup, K., & Mueller, K. (2011). A Cross-National Investigation of the Measurement Equivalence of Computerized Organizational Attitude Surveys: A Two-Study Design in Multiple Nations. *Journal of Organizational Computing and Electronic Commerce, 21*(3), 246-263. doi: 10.1080/10919392.2011.590112

Study 2:

Wolf, T. R., Schroeder, J., Weigelt, J. (under review). Creating Real-time Feedback for Organizational Development Initiatives - An Empirical Study on Prediction Markets. *European Journal of Work and Organizational Psychology.*

Study 3:

Kohnke, O., Wolf, T. R., Mueller, K. (2011). Managing user acceptance: an empirical investigation in the context of business intelligence standard software. *International Journal of Information Systems and Change Management, 5*(4), 269-290. doi: 10.1504/IJISCM.2011.045833

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Keywords

attitude measure, change management, company-wide standard software, cross-culture, feedback methods, IT implementation, management intervention, measurement equivalence, new organizational IT, organizational diagnosis, organizational development, prediction market, survey administration mode, TAM, technology acceptance

Thesis supervisor

Prof. Dr. Karsten Müller

Figures

Figure 1: Summary of dissertation studies

Abbreviations

AI	Artificial Intelligence
BI	Business Intelligence
CMV	Common Method Variance
CWSS	Company-wide Standard Software
ERP	Enterprise Resource Planning
ES	Employee Survey
HR	Human Resources
IT	Information Technology
MGCFA	Multiple Group Confirmatory Factor Analysis
OD	Organizational Development
ODI	Organizational Diagnosis
PM	Prediction Market
TAM	Technology Acceptance Model

Abstract

Globalization, rapidly changing financial markets, competitive environments, and differing consumer demands force today's organizations to anticipate and react quickly. Organizations are faced with challenges to stay continuously in contact with their workforce and drive organizational change initiatives, especially when distributed globally. New information technology promises a meaningful way to overcome challenges and support arising business needs, such as company-wide standard software packages implemented to manage work processes. Further, high expectations are ascribed to online administered feedback channels to stay in touch on employee experiences. On the one hand, online feedback channels enable organizational diagnosis. On the other hand, organizational diagnosis is needed to successfully support the implementation of new technologies. Based on this interaction between new information technology and organizational diagnosis, the present work examines owing questions on both: Study 1 provides a foundation by investigating, if organizational attitude surveys administered online within a cross-cultural setting represent psychometrical equivalence to their more traditional counterparts of paper-pencil surveys. Study 2 explores if recently introduced new online feedback methods, such as Prediction Markets, are comparable to traditional online attitude surveys and can provide valid information for organizational diagnosis to support management activities. Study 3 focuses on how organizational diagnosis supports the implementation of new information technologies, such as company-wide standard software by building on and extending the Technology Acceptance Model. An overarching framework organizes the rationale for the studies and helps to contextualize the present research project. In sum, each of the appended research papers contributes to the understanding on how information technology can enable organizational diagnosis and how organizational diagnosis supports the implementation of new technologies. The discussion of remaining questions as well as limitations of the present project highlight considerations for future studies and demonstrate the theoretical as well as practical relevance of the issue.

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Zusammenfassung

Globalisierung, sich schnell verändernde Finanzmärkte, Wettbewerbsumgebungen und unterschiedliche Verbraucheranforderungen zwingen Unternehmen schnell zu antizipieren und zu reagieren. Organisationen stehen vor der Herausforderung, kontinuierlich mit ihrer Belegschaft in Kontakt zu bleiben und organisatorische Veränderungsinitiativen voranzutreiben, insbesondere wenn sie global aufgestellt sind. Neue Informationstechnologien, wie z. B. unternehmensweite Standardsoftwarepakete, die zur Verwaltung von Arbeitsprozessen implementiert werden, versprechen neue Herausforderungen bewältigen und entstehende Geschäftsanforderungen unterstützen zu können. Weiterhin werden hohe Erwartungen an Online-Feedbackkanäle gestellt, um mit der Belegschaft im Austausch zu bleiben. Die Verwendung von Informationstechnologie in Unternehmen ist zweiseitig: Einerseits ermöglichen neue Technologien, wie z.B. Online-Feedbackkanäle eine Organisationsdiagnose. Andererseits bedarf es der Organisationsdiagnose, um die Einführung neuer Technologien, wie z. B. unternehmensweite Standardsoftwarepakete, erfolgreich zu unterstützen. Basierend auf dieser Wechselwirkung zwischen neuer Informationstechnologie und Organisationsdiagnose untersucht die vorliegende Arbeit folgende Fragen: Studie 1 untersucht, ob online durchgeführte Mitarbeiterumfragen in einem interkulturellen Umfeld eine psychometrische Messäquivalenz zu ihren eher traditionelleren Papier-Bleistift-Umfragen aufweisen. Studie 2 betrachtet, ob neue Online-Feedback-Methoden in Form von Prediction Markets mit traditionellen Online-Einstellungsumfragen vergleichbar sind und valide Informationen für Organisationsdiagnosen liefern können. Studie 3 basiert auf und erweitert Technologieakzeptanzmodel im Hinblick auf die Fragestellung, wie die Organisationsdiagnose die Implementierung neuer Informationstechnologien, wie beispielsweise unternehmensweiter Standardsoftware, unterstützen kann. Ein übergreifender Rahmen organisiert die Begründung für die Studien und hilft, das vorliegende Forschungsprojekt in Kontext zu setzen. Zusammenfassend trägt jede der beigefügten Forschungsarbeiten zum besseren Verständnis

bei, wie Informationstechnologie Organisationsdiagnosen ermöglichen und wie Organisationsdiagnosen die Implementierung neuer Technologien unterstützen kann. Die Diskussion verbleibender Fragen sowie Limitationen des vorliegenden Projekts zeigen Überlegungen für zukünftige Studien auf und fundieren die theoretische sowie praktische Relevanz der Fragestellung.

1. General Introduction

Organizations are faced with high complexity and rapid change. In this context, new information technology (IT) plays a crucial role to stay competitive as well as to ensure sustainable performance. On the one hand, these complexities establish new ways of business and offer new opportunities (Lai, 2017). On the other hand, they force organizations to explore the uncertainty of these dynamics and the possible need for agility to adapt as well as transform (Teece, Peteraf, & Leih, 2016). Organizational Development (OD) activities and transformation are essential to influence organizational culture traits, ways of accomplishing tasks and, successful change to compete and pursue sustainable performance (Denison & Spreitzer, 1991). To foster OD and accelerate future decision-making by organizations, data need to be collected and transformed into actionable insights. Organizational diagnoses (ODI) determine, assist and enable OD by collecting relevant data points on the experiences within a system in scope, and reporting insights back to the system to ensure performance sustainability (Alderfer, 1980; Alderfer, 2011; Zarei, Chaghouee, & Ghapanchi, 2014).

Emerging technologies promise a way to enable ODI and have been in focus of research since the 1950's (Zammuto, Griffith, Majchrzak, Dougherty, & Faraj, 2007). In general, a technology is the "capability, that is, physical structure or knowledge embodied in an artefact (software, hardware, or methodology), that aids in accomplishing some task" (Leonard-Barton, 1990, p. 45). A universal classification distinguishes four types of technologies: data acquisition technologies, warehousing technologies, transportation technologies and IT (Lin & Ho, 2007; Rampersad, Plewa, & Troshani, 2012). Although all four types of support organizations, most of ODI activities are tied to IT, defined as systems to store, retrieve, study, transmit and manipulate data or information (Daintith, 2009).

Nowadays, hardly any business abstains from incorporating IT to function, regardless of organizational size or scope (Zarei, Chaghouee, & Ghapanchi, 2014). This is also confirmed

by an investigation from 2018 revealing that "84 percent of 6,381 business and IT executives surveyed agree that through technology, companies are weaving themselves seamlessly into the fabric of how people live today" (Accenture Technology Vision 2018, p. 5). With the rise of the internet, new IT has been introduced to enable ODI, e.g., online survey feedback methods have shown a promising way to enable ODI and organizations tend to survey their workforce periodically (Borg & Mastrangelo, 2008). They allow large and globally distributed companies to stay in touch with every individual employee to voice their attitudes and desires (Johnson, 1996). However, not much evidence is given if they are comparable and can be used in co-existence with their more traditional counterparts of paper-and-pencil surveys. Further research is needed, especially within the single organizations stratified across multiple nations (De Beuckelaer & Lievens 2009; Mueller, Liebig, & Hattrup, 2007). The present endeavor sheds some new light onto these ongoing discussions (cf., De Beuckelaer & Lievens 2009; Mueller, Liebig, & Hattrup, 2007). In addition, during the last decades new IT and data collection methods have infused organizations and enriched ways to stay in touch with the workforce, such as email, mobile surveys, online messengers, social media platforms, interactive voice response, or artificial intelligence chat bots. Despite their rich history in trying to predict election outcomes (e.g., Rhode & Strumpf, 2004), prediction markets (PM) were also recently introduced within organizations to act as a feedback channel for employees to forecast e.g., business performance or sales figures (e.g., Cowgill, Wolfers, & Zitzewitz, 2009). Following the wisdom of the crowd methodology, PMs act as a forum of experts to predict future events (Berg & Rietz, 2003, Wolfers & Zitzewitz, 2004). PMs have been also suggested to enable ODI by forecasting employee attitudes and the efficiency of human resource development activities (Passmore, Cebeci, & Baker, 2005). The present research attempts to empirically support the appropriateness of PMs to forecast employees' attitudes and their ability to enable ODI. In sum, IT offers meaningful ways to derive insights on employee opinions. However, some questions in research and practice need to be explored in detail. Chapter 1.1. discusses the relevance,

advantages as well as challenges of online attitude measures within organizations and provides a rationale for the first part of this research on how IT enables ODI with a focus on online employee feedback methods. Further, it presents an overview of the usage of PMs and introduces the attempt to use these markets to enable ODI.

One the one hand, these research topics and corresponding studies examine on how IT enables ODI. One the other hand, ODI obviously holds the great potential to support the implementation of new IT within organizations.

With the incorporation of new technologies in organizations, there is also a growing interest to apprehend the user acceptance of IT by ODI and, thus, to successfully manage organizational change and IT implementation based on empirical information about user acceptance (e.g., Drzensky, Egold, & van Dick, 2012). The aspect of the human side of change is considered fundamental (Bakari, Hunjra, & Niazi, 2017), especially, in the context of more complex IT such as company-wide standard software systems (CWSS; Aladwani, 2001). Many change projects fail because the psychological components of the implementation process are over-looked (Dillon & Morris, 1996; Gould, Boies, & Lewis, 1991; Nickerson, 1981). Several models to assist change management activities and investigation of user acceptance of new IT have been discussed in the relevant literature (Lai, 2017; Sun & Zhang, 2006), such as the Technology Adoption Model (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989), the Theory of Reasoned Action (Fishbein & Ajzen, 1975), the Theory of Planned Behavior (Ajzen, 1991), the Social-Cognitive Theory (Bandura, 1986), the Diffusion of Innovation Theory (Rogers, 1962), or the Theory of Task-Technology Fit (Goodhue & Thompson, 1995).

Although all these models have shown good ability to explain technology acceptance, the Technology Acceptance Model (TAM; Davis 1989; Davis, et al., 1989) is the most prominent, investigated and empirically validated model (Lee, Kozar, & Larson, 2003; Legris, Ingham, & Collerette, 2003; Ma & Liu, 2004; King & He, 2006; Schepers & Wetzels, 2007;

Yousafzai, Foxall, & Pallister, 2007a, 2007b). Based on the Theory of Reasoned Action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), the TAM explains and predicts user acceptance of information technology systems in relation to both the intention to use the system and actual system usage itself. Although the TAM has been studied extensively, there are still some questions remaining in research and practice, e.g., the influence of national culture, the applicability of the model to measure the acceptance of complex IT systems (e.g., CWSS systems), and extension of the overall model to better assist ODI. This research project investigates the generalizability of the TAM with regards to the application to more complex IT system, namely Business Intelligence (BI) system. In addition, factors essential for change management activities as well as preconditions for acceptance are reviewed and examined on their influence of the TAM parameters.

In sum, IT has an important effect within organizations. IT plays a pivot role enabling ODI (Burton & Obel, 1998) to result in sustainable performance. In turn, ODI has the potential to support the implementation of new IT in organizations. This project attempts to answer open questions with regards to the incorporation of IT within organizations to enable ODI as well as on how ODI can support the implementation of new IT. The following chapters provide rationale for this endeavor by outlining lacking fragments in empirical research as well as providing new insights on the interplay of ODI and IT in practice. Chapter 1.1. focuses on IT based data collection and aggregation methods for employee attitude measures within organizations and how they can be used in various setups to enable ODI. Precisely, the question on psychometrical equivalence of different administration modes is investigated and new methods (e.g., PMs) are explored. Chapter 1.2. addresses the support of ODI to implement new IT by focusing on and expending established models of IT acceptance with focus on CWSS as a basis for ODI.

1.1. Organizational Diagnostic Enabled by New Information Technologies – Online Employee Feedback Methods

Organizational diagnosis focuses on organizational systems by collecting data and providing feedback (Alderfer, 1980). Since the 1930's, structured surveys became a standard tool for empirical research in social sciences, marketing, and official statistics (Vehovar & Manfreda, 2008). Several methods of feedback collection and aggregation have been introduced to access, scale, structure, and assure comparability of retrieved results (e.g., Borg & Mastrangelo, 2008; Mellenbergh, 2008). Traditionally, face-to-face interviews and paper-and-pencil interviewing were applied most frequently. With the pervasive impact and availability of computers as well as IT, new ways have evolved like computer-assisted interviewing, computer-assisted personal interviewing, computer-assisted telephone surveys, computer-assisted self-interviewing, or computerized self-completed questionnaires. With the fast rise of the internet, most of these techniques are nowadays replaced or adapted by online surveys (Bethlehem & Biffignandi, 2012).

Organizations have used survey feedback methods for decades, for example, to measure the loyalty, satisfaction, commitment, engagement or other attitudes of their workforce (e.g., Allen & Meyer, 1990; Borg & Mastrangelo, 2008; Sanford, 1988; Schneider, Asworth, Higgs, & Carr, 1996). Generally, organizational feedback is collected by structured questionnaires rather than unstructured personal interviews and best accomplished by an employee survey (ES; Borg & Mastrangelo, 2008; Kraut, 1996; Church & Waclawski, 1998; Schneider, et al., 1996; Rogelberg, 2002).

ES as an instrument is directed at the employees by using empirical methods to systematically collect attitudes, which are important to the organization, to achieve its business targets by analyzing the results in an aggregated way and follow-up on the insights derived (Borg & Mastrangelo, 2008). Thus, ES offers the foundation for organizational diagnosis, as

results provide a structured foundation for decision making or organizational development as well as future management decisions, although the directions and follow-ups of the gained insights might not be well-defined at the moment of assessment (Harrison & Shirom, 1998). ES have established a meaningful way to gain insights on aspects of matter within an organization and have become a strategic business management instrument as well as a major tool for organizational development.

Similar to how the concept of measuring employee attitudes with ES (e.g., focus on job satisfaction, commitment, engagement or employee experience) has evolved (e.g., Allen & Meyer, 1990; Sanford, 1988; Schneider, Asworth, Higgs, & Carr, 1996), the way of data collection and processing of quantitative employee attitude measures has also developed from paper-pencil to online surveys and even newer formats like always-on feedback methods to access the attitudes of a workforce. If conducted properly, online surveys are attributed with a lot of advantages to enable ODI due to the ease of administration, reduction of error, scalability and increased accuracy, survey flow logics, cost savings, and higher flexibility compared to other formats (e.g., Evans & Mathur, 2005; Mueller, Liebig, & Hattrup, 2007; Rosenfeld, Doherty, & Carroll 1987; Rosenfeld, Doherty, Vicino, Kantor, & Greaves, 1989). The change in administration modes of ES raises new questions relevant for research. For example, there is still an ongoing discussion on the psychometric equivalence of measures administered via different modalities (De Beuckelaer & Lievens, 2009). Especially, in cross-cultural settings, considering differing cultural traits, there are only a few studies available attempting to better understand the comparison of employee attitudes measures administered online compared to collection by paper-pencil (e.g., De Beuckelaer & Lievens, 2009; Mueller, Liebig, & Hattrup, 2007). Described in more detail in section 2, this research aims to contribute to the understanding of different administration modes of attitude surveys within an organizational setting organized over a wide range of national cultures.

Given the tremendous advantages of new survey technologies, large organizations tend to survey the whole workforce periodically. Surveying has become very easy and as such organizations are faced with the challenge of having to ensure not to "over-survey" their employees. Indeed, survey fatigue associated with an increase in the number of surveys sent to participants poses a threat to the reliability of survey results (Porter, Whitcomb, & Weitzer, 2004).

However, agile and data-driven management decisions demand accurate data to increase productivity (e.g., Brynjolfsson, Hitt, & Kim, 2011) and real-time feedback to validate a chosen way of action. Hence, to monitor management decisions, drive sustainable change as well as retrieving the latest attitudes by the workforce, new IT is considered to serve here, for example, gathering always on and real-time feedback with a PM. PMs are future markets in which prices and estimates are used to predict future incidents (Berg & Rietz, 2003, Wolfers & Zitzewitz, 2004). They offer a promising way to provide predictions of an uncertain future, are assumed to overcome some of the obstacles of traditional online ES (e.g., survey fatigue) and have, e.g., been proposed to forecast the efficiency as well as employees' acceptance of HR development activities (Passmore, Cebeci, & Baker, 2005). Implying the wisdom of the crowd, they consider the forecasts of a few individuals to predict the assumptions of a larger audience. PMs have demonstrated good accuracy within various settings (Graefe & Armstrong, 2011), such as election outcomes, development of consumer demands, as well as economic, political or disease risks (Arrow, et al., 2008; Graefe & Armstrong, 2011; Rhode & Strumpf, 2004; Passmore, Cebeci, & Baker, 2005). However, it remains unclear whether these findings are transferable to the gathering of employee attitudes like engagement, satisfaction with work, commitment, organizational well-being, or development. Thus, it is unclear if PMs can really contribute to enable ODI. Further described in chapter 2, this research contributes to the knowledge on how PMs can be implemented and used within organizations. Especially, it provides one of the first

attempts to gain insights on how PMs can be utilized to predict and real-time monitor organizational attitudes like engagement drawing from a snapshot of the workforce to the entire organization by assisting the annual ES.

This research delineates how ODI can be enabled by the assistance and usage of IT. Further, it reveals how the rapid evolution of IT leads to new questions in research as well as practice. The research questions preliminary refer to extended forms of the use of existing methods (e.g., online surveys across different cultures) or the use of new forms of data collection (e.g., PMs).

Going further, the relation between the enablement of ODI by IT is not a one-way direction. Implementation of new IT within an organization needs to be systematically observed first by ODI to ensure the fit, which might in turn enable sustainable performance and further OD. Chapter 1.2. depicts models for ODI and outlines frameworks to best access the implementation and acceptance of IT. Application of these models to support the implementation of new IT in organizations (e.g., CWSS) are discussed.

1.2. Implementation of New Information Technology Supported by Organizational Diagnosis – Assuring Factors of the Acceptance of Information Technology within the Workplace

New technologies, such as CWSS packages (e.g., Enterprise Resource Planning [ERP], Customer Relationship Management, Supply Chain Management, or BI systems), promise to deal with permanently shifting environments in a simple and fast manner (Davenport, 1998, 2000; Ward, Hemingway, & Daniel, 2005). If implemented successfully they are associated with benefits such as cost reduction, improvement of quality and productivity, meeting precise customer expectations, empowerment of planning and organizational processes, and an improvement of decision-making (e.g., Laukkanen, Sarpola, & Hallikainen, 2007).

However, the successful implementation of new technology in organizations and final adoption by the user is often challenging. First, the fitting technology must be discovered for the appropriate business need. Not every solution for a specific business need fits every organization. Second, technical implementation is needed. Third, it must be accepted by the users. This psychological component is often overlooked; however, user acceptance is elemental for the success of the implementation (Dillon & Morris, 1996; Gould, Boies, & Lewis, 1991; Nickerson, 1981). Fourthly, "using [HR] technology does not lead to positive results unless it is used correctly" (Hunt, 2014, p. 11) and thus actual and appropriate usage must be guaranteed. Some research suggests that up to 90% of ERP systems implementations do not meet either the expected time or cost estimations of implementation (Laukkanen, Sarpola, & Hallikainen, 2007), whereas 40% of CWSS systems only achieve partial implementation, and 20% are considered as total failures (Trunick, 1999). The introduction of new IT to the workplace also requires a cultural shift and change in attitudes by the workforce, which needs to be managed properly (Bakari, Hunjra, & Niazi, 2017). Thus, successful change management is a prerequisite and indispensable for organizations to implement new habits and IT (e.g., Armenakis & Harris, 2009; Drzensky, Egold, & van Dick, 2012). It allows handling technical, structural, and attitudinal aspects and variables able to influence the acceptance of IT, e.g. system characteristics (e.g., Davis, 1993; Igbaria, Guimaraes, & Davis, 1995; Wixom & Todd, 2005), organizational and leadership support (e.g., Igbaria, Zinatelli, Cragg, & Cavaye, 1997; Karahanna & Straub, 1999), user training and information (e.g., Bueno & Salmeron, 2008; Amoako-Gyampah & Salam, 2004), or user participation (e.g., Barki & Hartwick, 1994; Jackson, Chow, & Leitch, 1997).

As new IT in organizations is beneficial to enable ODI, the assessment of the organization in scope is needed to successfully adopt new IT supported by ODI, which again requires purposeful change management. These ODI, however, should be based on sound

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theoretical models. Several models and theories in behavioral science have been recognized, tested, replicated, refined, extended, and unified to explain user willingness to accept and use new technologies (e.g., Compeau, Higgins, & Huff, 1999; Kukafka, Johnson, Linfante, & Allegrante, 2003; Lai, 2017; Sun & Zhang, 2006; Yi, Jackson, Park, & Probst, 2006). The TAM is the most widely used and empirically validated model available to conceptualize and explain user technology acceptance (King & He, 2006; Lee, Kozar, & Larson, 2003; Legris, Ingham, & Collerette, 2003; Ma & Liu, 2004; Schepers & Wetzels, 2007; Yousafzai, Foxall, & Pallister, 2007a, 2007b), initially proposed by Davis (1986, 1989; Davis, Bagozzi, & Warshaw, 1989) and extended by Venkatesh and Davis (2000) as well as Venkatesh and Bala (2008). The TAM offers a promising way to frame ODI in the context of new IT implementation by modeling and supporting the factors of adoption. Yet, only limited research has investigated the application of the TAM on more complex IT, such as BI systems. Further, less is known on supporting antecedents of the model and its components (e.g., perceived usefulness or perceived ease of use) to support sustainable change management and successful implementation of BI systems. Chapter 2 describes on how the TAM can be used to explain user acceptance on BI systems and how it is linked to change management factors relevant for the implementation.

1.3. Preliminary Conclusion

IT plays a predominant role in today's organization to drive business performance, to assist management decisions (Zarei, Chaghouee, & Ghapanchi, 2014) and promises meaningful ways to foster change, manage a wide-spread workforce as well as support OD. Online employee feedback methods especially seem to be effective to stay in touch with employees and enable ODI. In turn, more complex IT benefits through ODI as a core element of evidence-based change management. This ODI should be assisted by sound theoretical models to ensure the best fit and user acceptance of the system. The present research adds to ongoing discussions in

literature and practice on the interaction of IT and ODI. Chapter 2 provides a classification of the appended studies before characterizing them in detail.

2. The Present Research

2.1. Overview

Technology plays a pivot role within the environment of an organization and has an interaction to ODI. As stated before, ODI is enabled by IT, while, ODI has a high potential to support the implementation of IT itself.

This dissertation, composed of three studies, contributes to a better understanding of the interplay between ODI and IT. It adds on various fields to recent research as well as practice and reveals new insights on questions discussed, however in this context, yet not empirical investigated. Figure 1 summarizes these relationships and integrates the conducted studies.

Figure 1. Summary of Dissertation Studies
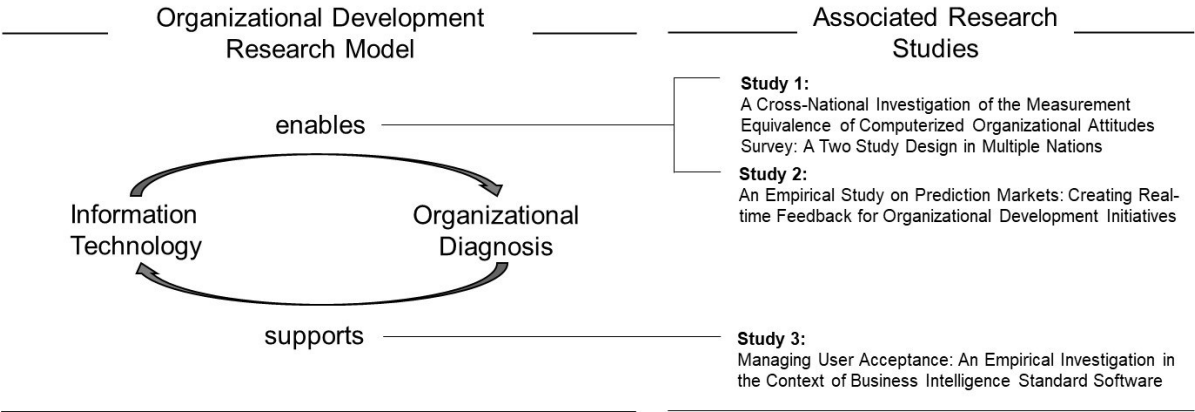
Studies 1 and 2 contribute on the understanding on how ODI can be enabled by IT, whereas study 3 focusses on the implementation of IT supported by ODI.

Study 1 empirically explores how online surveys are interpreted and thus answered within a cross-cultural setting of an organization, by comparing response patterns between an online survey and a paper-and-pencil version within the same organization. Conclusions on the psychological measurement equivalence are drawn across multiple nations. Following a two-

study approach based on a large-scale sample (N=57,861 in Study 1a), the findings are replicated within another empirical investigation (N=105,734 in Study 1b). The results are discussed in the light of how mixed mode, organizational survey designs can be considered for ODI in a cross-cultural setting. Thus, this study aims to contribute to the question on the comparability of employee attitude surveys which are administered online in a cross-cultural setup with their more traditional paper-and-pencil counterparts (e.g., Booth-Kewley, Edwards, & Rosenfeld, 1992; Donovan, Drasgow, & Probst 2000; Mueller, Liebig, & Hattrup, 2007).

Given tremendous enhancements of online data collection methods, study 2 examines the evolving ways of data collection as well as aggregation and validates the insights in the context of the assessment of organizational attitudes (e.g., employee engagement). In detail, PMs are considered to monitor management decisions and the evaluation of organizational attitudes, also accessed by traditional online ES. Obtained results from a PM (N = 6,329) are compared to the outcomes of a yearly employee attitude survey (N = 69,461) within one global organization. Finally, the application of this new data collection method for ODI activities is discussed.

Study 3 applies ODI by an online survey technology to access the attitudes and acceptance factors of a workforce towards a newly introduced CWSS system. It builds on the established TAM to access the attitudes towards and actual usage of the IT system in scope. The influence of recent discussed change management factors as antecedents on the model parameters are empirically explored. The study is based on 1,683 employees of active users of a BI system within one organization. Findings contribute to the generalizability of the TAM within the assessment of complex CWSS systems and investigates important factors of technology acceptance relevant for change management.

The appended studies are already published or submitted for review for publication. Therefore, the reference and citation formatting changes within chapter 2.2 to 2.4.

2.2. Study 1

A Cross-National Investigation of the Measurement Equivalence of Computerized Organizational Attitudes Survey: A Two Study Design in Multiple Nations

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Abstract

Multinational organizations frequently administer employee surveys online. This process is accompanied, however, by concerns about the psychometric equivalence of measures administered by different modalities. Using data from a large multinational organization ($N =$ 57,861 in Study 1; $N =$ 105,734 in Study 2), the present research examined cross-national generalizability of the measurement equivalence of an organizational attitude survey administered by computer and paper-and-pencil. Results of multiple group confirmatory factor analysis indicated psychometric equivalence of the test modalities in disparate national samples. Implications for the cross-national use of computerized organizational attitude surveys are discussed.

Keywords: measurement equivalence, survey, administration mode, attitude measure, cross-culture

2.3. Study 2

Creating Real-time Feedback for Organizational Development Initiatives - An Empirical Study on Prediction Markets

Wolf, T. R.[1], Schroeder, J.[2], Weigelt, J.[3] (under review). Creating Real-time Feedback for Organizational Development Initiatives - An Empirical Study on Prediction Markets. *European Journal of Work and Organizational Psychology.*

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Abstract

Measuring employees' attitude to evaluate organizational development is primarily executed by traditional employee attitude surveys. However, this method of measurement is considered with high costs, tremendous efforts, and sometimes a large time offset. This study introduces the prediction market as a complementary instrument to gather real-time feedback on future ideas and incidents within organizations. Incorporating 6,329 employees within a global company, eleven key performance indicators, normally measured by the annual employee survey, were predicted. After the closure of the market the accuracy of the forecasts were evaluated by comparing the obtained predictions with the outcomes of the annual employee survey including a sample nine times the size of the sample of the prediction market. Results show an accurate forecast of the scores given a moderate activity within the markets. Several aspects should be considered and are discussed for future research and practice.

Keywords: Prediction Market, Survey Feedback, Employee Attitude Survey, Organizational Development, Continuous Listening

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2.4. Study 3

Managing user acceptance: an empirical investigation in the context of business intelligence standard software.

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Abstract

This study suggests and tests a model for the systematic evaluation of management activities in company-wide standard software implementations using the example of a business intelligence (BI) software package. The proposed model builds on an extended technology acceptance model (TAM), previous research on IT implementation success factors and reviews of relevant change management variables. Using Structural Equation Modelling, several hypotheses are tested. The investigated management variables demonstrate significant influences on the psychological acceptance factors included in the model. Seven out of ten hypotheses are confirmed. In addition, the model explains a substantial amount of variance in actual user behavior measured with a system-based indicator. Practical implications for the implementation of company-wide standard software in organizations are discussed.

Keywords: technology acceptance, TAM, standard software, IT implementation, change management, management intervention attitudes in organizations.

3. General Discussion

Organizations become more and more complex and are forced to adapt quickly to their changing environment. ODI assists to understand the requirements of flexibility and contributes to manage whether change is desirable (Alderfer, 1980). IT has and will continue to impact the way businesses run as well as influence employees' life (e.g., Markus & Robey, 1988), improves business performance and sustains competitiveness in the market. As such, the implementation and usage of new IT (e.g., online feedback channels or CWSS) has grown rapidly to compete with challenges of the complex business environment and to assist customers' and employees' needs.

The present research contributes to a comprehensive understanding on how IT can enable ODI and in turn on how ODI can support the implementation of new and complex IT in organizations. Survey feedback methods are critical to organizational diagnosis (e.g., Alderfer, 2011; Pond, Armenakis, & Green, 2009) and act as a parsimonious way to collect organizational sentiments, assist management decisions, support change management activities, and to guide into the future (Borg & Mastrangelo, 2008). The appended three studies reveal new insight on how online surveys and new feedback methods can be considered to enable ODI. Further, they shed new light onto the research and generalizability of the well-established TAM to assist ODI by supporting the implementation of complex IT systems. In sum, this research project reveals new insights on the interaction of IT and ODI. The general results as well as implications for research and practice will be discussed in the following.

3.1. Summary of Study-specific Results and General Implications for Research and Practice

Survey feedback methods play a predominate role to enable ODI and assess organizational attitudes (Church & Waclawski, 1998; Kraut, 1996; Rogelberg, 2002; Schneider, et al., 1996).

Over the decades, new methods of data collection and aggregation have evolved. Online employee attitude surveys especially have been adapted by many organizations to stay in touch with a globally spread workforce (Thompson, Surface, Martin, & Sanders, 2003; Thompson & Surface, 2007). Study 1 contributes to existing research on the psychometric equivalence of paper-and-pencil and computerized job attitude measures administered within a cross-cultural setting (e.g., De Beuckelaer & Lievens, 2009; Mueller, Liebig, & Hattrup, 2007) and follows the request of De Beuckelaer and Lievens (2009) "… to confirm our results in other organizations, in other countries, and with other measures." (p. 357). Most of the previous research on the psychometric equivalence of computerized and traditional organizational surveys has confirmed measurement equivalence across survey administration modalities (e.g., Booth-Kewley, et al., 1992; De Beuckelaer & Lievens, 2009; Donovan, Drasgow, & Probst, 2000; Mueller, Liebig, & Hattrup, 2007). The results of the present comprehensive cross-national investigation of the equivalence of computerized and paper-and-pencil job attitude measures largely support the comparability of scores obtained from the different survey administration methods. Multiple Group Confirmatory Factors Analysis (MGCFA) showed a general comparability of the administration of online versus paper-and-pencil measures over different geographies with no effect on the factor structure of the administered questionnaire in both modes. The repeated assessment in a two-study design revealed a very good equivalence across modes of administration in the same geographies supporting previous findings (De Beuckelaer & Lievens, 2009), as well as proving measurement equivalence for both modes in previously mixed findings (e.g., equivalence for the Czech Republic, cf., De Beuckelaer & Lievens, 2009). These insights are highly relevant for research and practice, as conclusions from both modes of administration can be drawn, even though an organization is spread across several nations and applies different modes due to the organizational setup (e.g., blue-collar workers vs. white-collar workers) in parallel. This understanding of the simultaneous usage of different survey administration modes enables practitioners to trust in the feedback retrieved by

their workforce and use both modes with confidence to enable ODI. Further, the present endeavor is highly relevant for researchers as it provides guidelines on conducting assessments to assure psychological equivalence between mixed mode retrieved data. The usage of MGCFA to test for psychometrical equivalence is discussed, compared to other methods and interpretation guideline for respective outcomes are provided. Overall, MGCFA shows a good applicability to examine psychological measurement equivalence. In addition, the study contributes to the existing literature of measurement equivalence of mixed-mode survey administration across several nations.

As online surveys are likely to maintain their dominant role in assessments for employee attitudes and are comparable to their more traditional counterparts (e.g., paper-and-pencil surveys), the rapid enhancements of IT and feedback methods promise a meaningful new way to stay in touch with the workforce and to enable a meaningful dialogue for ODI. Consequently, new research questions arise. PMs have been suggested to foster HR organizational development activities to shed light onto the efficiency and acceptance of these activities (Passmore, Cebeci, & Baker, 2005). Yet, this new data collection method has been absent within the scope for ODI, and thus could not assist organizational development. Study 2 reveals a systematic application of PMs to provide insights on the forecast of employees' organizational attitudes and might be considered to monitor management decisions as well as to drive OD. Focusing on a two-study design, the first study provides insights on the application of PMs within an organizational setting to access employee attitudes. PMs are considered as a promising way to assists these efforts by being a reliable counterpart for decadence employee surveys to drive ODI. Considered with high activities in this feedback collection method due to its unique format, PMs provide an experience of excitement and engagement due to the fun-factor and the game character. The derived results of the first part of the study show the potential of the PM within the area of organizational development and research if enough activity in the

markets is ensured. In the second part of the study, comparisons of the results retrieved from the PM and the annual employee survey within the same organization support the strong possibility to forecast organizational key performance indicators and employee attitudes. 17.5% of the tested cases result in an absolute error below 1 scale points (out of possible 100). Drawing on dependencies for accuracy of predictions, activities within the markets and low uncertainty are identified as key determines. As such, low uncertainty and high activity in the markets are required to ensure a high accuracy of the results and thus to precisely forecast the success of organizational development activities. Consequently, PMs achieve their full predictive power for organizational development activities if they are strongly promoted within an organization and users are familiar with the constructs to forecast. In turn, this assures a high usage of the PM and lowers the uncertainty within the markets. In addition, real payouts for the best predictions as well as non-HR related market additions (e.g., sales forecasts or end results of sport matches) might enable the interest in and usage of PMs.

Considering the insights of study 1 and 2, new IT and data collection methods are efficient, effective and results to enable ODI are comparable to their traditional counterparts (e.g., paper-and-pencil mode in study 1 or online surveys in study 2). Additionally, ODI also promises a way to support the implementation and acceptance of new and more complex IT. Building on the user acceptance for newly introduced IT, the TAM is a verified model to access factors of perceived usefulness, support on usage and actual usage of new IT (Davis, et al., 1989). Study 3 demonstrates the applicability of the TAM to assist the implementation of a BI systems, as such systems constitute a major organizational change process (Venkatesh, Davis, & Morris, 2007). External variables considered to support change management (Armenakis & Bedeian, 1999) showed a significant influence on the model parameters of subjective norm, as well as perceived usefulness and ease of use of the BI system in scope. Especially, top management support seems to be essential for the implementation of company-wide standard

software, showing a high influence on subjective norm. Within an implementation phase of CWSS, support as well as commitment by the top management to the system in scope contributes to a successful implementation. Further, the quality of information, referring to the completeness of provided information, accuracy of system data, preparation, and display of the information (cf., Wixom & Todd, 2005), shows a strong influence on the perceived usefulness of the system. In addition, user training is required to ensure perceived ease of use. By extending the TAM with constructs from change management literature, this study accounts for calls to combine investigations on technology acceptance with other established areas of research (Rampersad, et al., 2012; Venkatesh, Morris, Davis, & Davis, 2003). Repeated application of the model across time and organizations would suggest a strong and stable relationship between the external variables and particular components of the TAM. Further, it would help to identify important moderators of the relationship between management variables and technology acceptance factors.

IT systems help organizations to understand their needs, the experience of the employees and thus provide a way to enable ODI. Being implemented the right way and to ensure user acceptance, ODI is needed to support the implementation of new IT in organizations. The three appended studies contribute to the understanding of the interrelationship of IT and ODI and provide new insights for research and practice. Study 1 and 2 provide evidence for the comparability and support of mixed mode administration channels to gather employees' feedback. In addition, PMs have been evaluated as a counterpart to online census surveys to steadily monitor management activities within organizations. Study 3 revealed the importance to monitor newly introduced IT (e.g., complex CWSS) and outlined important change management factors to ensure user acceptance.

Nevertheless, the present research is a first attempt to provide insights on the interrelationship of IT and ODI. Further new IT systems need to be examined and additional

research models need to be applied to completely understand this interaction. This research addresses only a few questions on the interdependencies and interplay between IT and ODI. Many more open questions remain. Hence, the research limitations and future directions are discussed in the next section.

3.2. General Limitations and Future Directions

As has often been the case in research, the review of the results of this project needs to consider some limitations which should be addressed in future research. Forthcoming studies might particularly investigate sampling methods, replication of the present findings, longitudinal designs, moderating effects and expand the suggested research designs to other new IT not in focus yet.

The selection of only one company for each study, restrict the generalizability of the results across very disparate organizations and conditions. While study 1 does build on large samples, participants were not randomly assigned to the conditions of online and paper-and-pencil. Instead, the computerized version was administered in organizational units where computers and intranet connections were widely available and email databases were complete and up to date. Future studies might replicate the findings by applying a random sampling or pseudo-experimental setting by providing the treatment groups contradictory to their daily used setting (e.g., by surveying blue collar workers with computers and white collar with paper-and-pencil). Moderating effects (e.g., perceived anonymity or questionnaire purpose) might also contribute to a better understanding on the psychometric equivalence of computerized organizational attitude measures with their paper-and-pencil counterparts.

Participants in study 2 were randomly assigned to the market segments of the PMs, based on their affiliation of a geographical region and line of business. Further stratification within these segments might be considered and explored. For example, Goswami and Dutta (2016) have explored the significant role of gender on technology adaption. Further, the sample

in scope was based on an IT company. Additional research needs to account for even more parameters for randomized sampling, e.g., companies with various fields of business. Moreover, moderating effects, e.g., the setup of the markets using real-payoffs or mixed topic markets, might be of interest for prospective investigations.

ODI also support the usage and change efforts for implementation of IT in organizations. As study 3 reveals new insights on the usage of the TAM to predict actual usage of CWSS, by considering supporting change management factors, the generalizability of the results needs to be accounted for with regards to sampling methods. The present study was conducted within one organization as well as focusing on one nation. Future research needs to investigate the role of wider cultural contexts on the acceptance of new technology in organizations, especially in the context of CWSS, as there is some evidence that the failure to adapt standard software packages is associated with poor fit to national culture (e.g., Krumbholz & Maiden, 2001; Sheu, Chae, & Yang, 2004). The general research on national culture's influence on the TAM has often been examined by a small number of nations, sometimes using as few as three nations (e.g., Srite, 2006; Straub, Keil, & Brenner, 1997). Although there is a growing interested of applying the TAM to examine CWSS usage in different contexts (e.g., Amoako-Gyampah & Salam, 2004; Hwang, 2005; Mouakket, 2010; Shih & Huang, 2009), it seems there is a lack of studies exploring moderating effects across a broad range of national cultures on the adoption of CWSS applying the TAM.

In addition, longitudinal designs might increase the validity of the causal assumptions of the TAM and further explore the frequently mentioned problem of common method variance (CMV) in TAM research (Lee, et al., 2003; Straub & Burton-Jones, 2007). Especially the relationship between perceived usefulness and actual usage seems to be threatened by CMV (cf., Sharma, Yetton, & Crawford, 2009). Although, study 3 measured actual usage behavior

with an objective indicator to reduce CMV, future research needs to account for potential biases caused by the measurement of the usage itself.

In general, future research may focus on other IT to collect employee attitudes and on how IT systems in the workplace are perceived by the end users. As study 1 and 2 already contribute to a better understanding of how new IT enables ODI, new data processing methods need to be incorporated in future research. Open text feedback analysis seems to be especially promising to enable ODI by resulting in a higher response rate compared to mixed mode questionnaires (e.g., Vitale, Armenakis, & Feild, 2008). As such, future research should investigate new IT for capturing sentiments by the workforce (e.g., artificial intelligence chatbots or social media) and how emerging analytical methods (e.g., natural language processing) can represent the employee opinions even better. On the one hand, future research streams may concentrate on how these methods result in equivalent insights compared to more traditional feedback collection methods to enable ODI. On the other hand, user acceptance of e.g., chatbots needs to be assured and investigated. Recent research already indicates moderating factors on user acceptance and perceived usefulness of chatbots with regards to their form and function. For example, Rietz, Benke and Maedche (2019) demonstrated a significant, four times higher effect of anthropomorphic chatbot design features on the TAM component perceived usefulness compared to functional features. Future research needs to explore if the findings can be transferred to an organizational setting incorporating chatbots to access organizational key metrics like engagement of the workforce or trust in leadership trust.

Again, establish models like the TAM likely help to explain user behavior and the intention of usage. However, further model parameters or moderating effects on existing model components needs to be considered. Two classes of moderators are suggested by Sun and Zhang (2006) who classify the most common moderators in technology acceptance literature: individual factors (e.g., age, gender, user experience) and organizational factors (e.g., job

function). These moderators need to be explored in simpler IT systems (e.g., PMs, chatbots), as well as more complex IT, as little is known about the effect individual and organizational context variables on the relevance of technology acceptance factors. Further, perceived anonymity or perceived voluntariness of the usage of new IT to collect feedback may serve as important determines to be considered within models to predict user behavior. Also, with regards to the usage of CWSS the voluntariness of usage is an important variable. Mostly, CWSS is applied to resolve business demands and tasks without any alternatives or the possibility to refuse to work with.

3.3. General Conclusion

If IT in the workplace is accepted and generates the desired outcomes, it helps organizations to foster innovation, communicate as well as collaborate in an efficient way, decrease human errors, increase security, and boost productivity by maintaining an organization in an accurate way. The findings of the three research studies within this project reveal new insights on the interrelation of IT and ODI, demonstrating how IT enables ODI and ODI supports the incorporation of new IT. As such, it adds to theory and organizational practice in three ways.

First, the results add to the understanding of the comparability and application of new online data collection methods for employee attitudes (e.g., online surveys) to enable ODI. This strengthens previous research findings (e.g., De Beuckelaer & Lievens, 2009; Mueller, Liebig, & Hattrup, 2007) of the equivalence of these cognitive measures. The results provide practitioners with a guide on collecting and interpreting feedback with different administration modes from a geographically wide-spread workforce.

Second, a novel concept to collect employee attitudes with IT was examined and might serve as an opening for further discussions on the suitability of prediction markets to access the opinion of a workforce. The results help as a first anchor point to draw on and apply this new method within organizations to enable ODI.

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Third, drawing and expanding on well-established theoretical models, the present research contributes to knowledge on the suitability of the TAM to explain user behavior of new and complex IT. Drawing on change management research, the examined extensions of the TAM provide a comprehensive understanding on the appropriate management of change attempts and implementation of new and complex IT within organizations for research and practice.

In conclusion, the present findings largely support the extant literature, yet add to the understanding and broaden established research areas and highlight new opportunities for further studies. As some of the research questions and IT in scope are investigated for the first time within an organizational setting focusing on employees' attitudes, future replication of results and extension of the present research is needed. From a practical perspective, the results provide guidance which IT might serve best to arising demands and how IT is managed the best way to deliver return on investments.

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