

April 2023

Emergent Cultural Contradictions from Overlapping Cultural Levels in Information Systems Development

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Recommended Citation

Geeling, S., Brown, I., & Weimann, P. (in press). Emergent Cultural Contradictions from Overlapping Cultural Levels in Information Systems Development. *Communications of the Association for Information Systems*, 52, pp-pp. Retrieved from <https://aisel.aisnet.org/cais/vol52/iss1/36>

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Communications of the
Association for **I**nformation **S**ystems

Accepted Manuscript

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Abstract:

Research exploring cultural influence on information system development (ISD) projects tends to focus on a single level of influence (e.g., organizational culture) or cultural incompatibility between one or two cultural levels that are assumed to be discretely separate and static (e.g., national and organizational culture). In contrast, our research conceptualizes culture as dynamic and emergent, with varying levels of overlapping cultures that occur simultaneously in ISD projects (e.g., organizational and occupational culture overlaps). The case study method is used to examine two strategic projects in a single organization in South Africa. The findings describe how the overlap of different cultural levels gives rise to cultural contradictions in ISD projects. Understanding the relevance of the multiple cultures that exist in ISD projects offers further opportunity for refining explanations of cultural contradictions. Cultural contradictions that emerge from cultural overlaps during ISD are conceptualized as five distinct types: Vision Contradictions, Priority Contradictions, Process Contradictions, Role Contradictions, and Technology Contradictions. Despite variation in the context of each project, there is similarity in the nature and effect of emergent cultural contradictions. The paper concludes with suggestions for addressing cultural contradictions in, and influences on, ISD projects.

Keywords: Information Systems Development, Levels of Culture, Cultural Contradictions, ISD Projects.

1 Introduction

Information systems development (ISD) in organizations is typically carried out by multidisciplinary teams with members having varying work experience and different professional backgrounds. Furthermore, with increases in workforce diversity in many countries, as well as globalization, outsourcing, offshoring, virtual work and digital nomadism, a range of diverse cultures are brought to bear on ISD (e.g., Asatiani, Hämäläinen, Penttinen, & Rossi, 2021; Fazli & Bittner, 2017; Jacks, Palvia, Serenko, & Ghosh, 2022; Ravishankar, 2015; Rodríguez-Pérez, Nadri, & Nagappan, 2021; Su, 2015). Culture is defined in organizational studies as the shared values, assumptions, beliefs, and meanings considered important to members of groups like ISD teams (Alvesson, 2013; Martin, 2002; Schein, 1985). Cultural diversity can present in groups when their members values, beliefs, assumptions, and meanings are not uniformly shared. Thus, cultural diversity is likely if a group is composed of members from multiple nationalities, occupations, or organizations. This can be both beneficial and problematic for ISD team performance. For instance, ISD team members of different nationalities can have a positive influence on decision making (Shachaf, 2008). If these team members have previous working ties this leads to the development of better-quality software (Alfaro & Chandrasekaran, 2015). In contrast, studies show increased conflict amongst team members from different countries (Kankanhalli, Tan, & Wei, 2006). Such diversity may also negatively impact ISD project team efficiency (Alfaro & Chandrasekaran, 2015) and individual productivity (Garrison, Wakefield, Xu, & Kim, 2010). To better understand the nature and emergent consequences of cultural diversity, we conducted an interpretive case study using inductive reasoning. What emerged as a core theme was the issue of cultural contradictions¹. The study therefore aimed to make sense of cultural contradictions that may arise in ISD settings characterized by cultural diversity. Such knowledge can better equip organizations and project stakeholders to achieve successful ISD project outcomes (Könning, Strahringer, & Westner, 2021).

Culture has been conceptualized as occurring at multiple levels, e.g., national, organizational, occupational, group, etc. In this paper we posit that these levels of culture are not discrete and static (e.g., Cranfield, Gordon, Palvia, Serenko, & Jacks, 2021), as has been noted in studies that view culture from a “collective meaning” perspective (Giorgi, Lockwood, & Glynn, 2015; Grover, Tseng, & Pu, 2022). Rather, we view these levels as overlapping in dynamic ways (Patterson, 2014; Suri & Abbott, 2013). This creates a complex “milieu” of cultural values, assumptions, beliefs, and meanings with the potential to confound studies that focus on a single level of culture (Schein, 2015). Such a perspective on culture has been referred to as the “toolkit perspective” (Swidler, 1986), where individuals draw from multiple levels of culture as a resource, and as demanded by a situation (e.g., Grover et al., 2022; Richey & Ravishankar, 2019). Furthermore, the selection of cultural values as components of the cultural toolkit creates a relationship between the collective meaning and toolkit-based manifestations of culture (e.g., Asatiani et al., 2021; Giorgi et al., 2015). The assumptions here resonate with a structurational view of organizations and culture (Walsham, 2002). There is the potential for both cultural complementarities and contradictions arising because individuals draw from their cultural toolkits or the milieu. Our study focuses specifically on understanding contradictions as the emergent phenomenon.

Studies of culture and ISD reveal some of the cultural contradictions that lead to difficulties for ISD teams. These include contradictory views on authority or decision making (Berger, 2007; Iivari & Huisman, 2007; Shachaf, 2008), contradictions arising from differences in knowledge or experience (Guzman, Stam, & Stanton, 2008), contradictory perspectives on collaboration or information sharing (Koch, Leidner, & Gonzalez, 2013) and contradictions in the prioritization of ISD goals (Pscheidt, 2011; Ramesh, Cao, Kim, Mohan, & James, 2017). While each discrete study contributes important insight, our understanding of cultural contradictions in ISD could be further enriched by better conceptualizing these contradictions and arranging them into specific types. Specifying different types of phenomena offers an alternative perspective and serves as an additional contributor to identifying appropriate guidelines and interventions for effective treatment of the phenomena (Gregor, 2006).

¹ We use the term ‘contradiction’ rather than ‘paradox’ in this paper as it more accurately reflects the spirit of the situation in our conceptualization— a cultural belief or understanding that “denies the truth or correctness of another.” (Oxford University Press, n.d.). Paradox, in contrast, is more indicative of a self-contradictory statement that may nevertheless prove to be true (Oxford University Press, n.d.).

Exploring cultural contradictions of different types arising from multiple overlapping cultural levels can contribute an additional view on culture relevant for ISD project work. In this way we seek to contribute to prior work on interactions across diverse cultural scripts that have implications for software development (Ramesh et al., 2017). Additionally, as effective leadership requires cultural understanding (Schein, 2010), we argue that a deeper understanding of cultural contradictions can assist leaders of ISD projects to identify appropriate interventions and craft positive outcomes from the cultural diversity present in ISD project teams.

Our study therefore resulted in the pursuit of the following two objectives; (a) to develop a conceptual model for analyzing culturally induced contradictions experienced during an ISD project, and (b) to reveal the relationship between level-specific cultural influences and emergent cultural contradictions in ISD projects. The primary research question answered was:

RQ1: What types of cultural contradictions influencing social interaction in ISD teams emerge at overlapping levels of culture in ISD projects?

In the next section, we elaborate the conceptual background and key concepts in this study. Thereafter we discuss our research methodology. We then describe our findings and discuss our conceptual model in the context of existing theories. The paper concludes with a discussion of the key contributions.

2 Conceptual Background

The aim of this study is to develop a basis for analyzing cultural contradictions experienced during ISD. In this section we discuss theoretical aspects of ISD and culture that inform this research. We followed a common approach in inductive research and combined data collection, analysis, and review of the extant literature in an iterative process (Gioia, Corley, & Hamilton, 2013; Glaser & Strauss, 1967). Thus, literature pertaining to some parts of this conceptual background were reviewed ex-ante (e.g., information systems development and cultural levels), while other literature was reviewed ex-post (e.g., cultural contradictions) as new concepts emerged. The ex-ante review helped us understand our research topic in a broader context and provided theoretical sensitivity for data collection and analysis. The ex-post review allowed us to develop and refine our emergent concepts by locating our work within existing literature. In this section we summarize both the ex-ante and ex-post reviews to provide a holistic view of the literature relevant to this research.

2.1 Information Systems Development

The development of an IS is a complex undertaking, involving both a technical and a social dimension (Hassan & Mathiassen, 2018), and an understanding of the business for which the IS shall be developed (Roeder, 2013). Iivari, Hirschheim, and Klein (2004) posit five distinct knowledge areas relevant to IS developers:

- technical knowledge: understanding the suitability and availability of hardware and software.
- application domain knowledge: knowledge about concepts and principles relevant to the domain for which the IS is being built.
- organizational knowledge: knowledge about work and social processes within the intra- and interorganizational context.
- IS application knowledge: knowledge about the hardware and software typically used in a given application domain.
- ISD process knowledge: the principles, methods, tools, and techniques used to develop an IS.

IS developers need to draw from these multiple knowledge areas and apply their business acumen to make sense of situations and create meaning during development activities (Iivari et al., 2004; Roeder, 2013). Additionally, ISD occurs within a broader context that informs the action and behavior of individuals. Individuals draw on their assumptions, values, expectations, and knowledge to make sense of situations and choose courses of action (Goffman, 1974). Assumptions and values regarded as most important by individuals involved in the IS occupation differ from those considered important by non-IS individuals (Jacks, Palvia, Iyer, Sarala, & Daynes, 2018; Jacks et al., 2022). Thus, individuals involved in ISD may make sense of situations in ways that differ from non-IS individuals and prioritize different courses of action.

Software development is described as a shared social practice that unfolds its object (the IS artifact) as development proceeds (Dittrich, 2016). Development practice uses methods that include shared understanding and explicit rules and structures, all of which need to be integrated into existing practice (Dittrich, 2016). Contingencies in the development context and the unfolding of the IS artifact as development proceeds introduces diversity into development practices. Individuals therefore engage in constant sensemaking to assess the relevance of ISD methods in the particular development context. Different approaches to ISD, like waterfall or agile methods, provide IS developers with alternatives on how to conduct ISD by guiding and governing the methods necessary to produce the IS (Hassan & Mathiassen, 2018; Iivari et al., 2004).

An IS is often instrumental for attaining multiple organizational goals at different levels within an organization (Watson, 2014). Consequently, developing an IS requires the cooperation and collaboration of multiple stakeholders (Watson, 2014) across specialist and leadership roles in the organization. Additionally, an IS has the capability to transform intra- and extra-organizational relationships, as well as the relationship between organizational members and technology (Watson, 2014). The complex, dynamic relationships between social actors and technology, and the social implications underpinning the development of an IS introduce complexity into the development process. The effects these create threaten successful project outcomes (Baghizadeh, Cecez-Kecmanovic, & Schlagwein, 2020; Watson, 2014).

Most IS research has focused on the technical dimension of ISD (Hassan & Mathiassen, 2018). With this research we seek to address calls to contribute to a better understanding of social phenomena implicated in ISD (Baghizadeh et al., 2020; Hassan & Mathiassen, 2018).

2.2 Culture's Influence on ISD

Culture is conceptualized in organization studies as the assumptions, beliefs, values, and meanings that determine how individuals make sense of their environment and select appropriate courses of action (Alvesson, 2013; Martin, 2002; Schein, 1985). In IS research the concept of culture is usually defined as a set of value patterns that are shared by members of a group (Geeling, Brown, & Weimann, 2016; Leidner & Kayworth, 2006). This collective meaning perspective (Grover et al., 2022) or symbolic component of culture (Giorgi et al., 2015) positions culture as moderating societal behavior and practices (Patterson, 2014). Individuals tend to align their behavior with values deemed important in their social groups. This stream of research fails to acknowledge that individuals may be simultaneously influenced by values from a variety of social groups (Cranefield et al., 2021). Rather, different value systems (cultures) are depicted as existing in discrete, static levels, creating different levels of culture (Karahanna, Evaristo, & Srite, 2005). Karahanna et al. (2005) suggest a hierarchy of cultural levels (see Figure 1), extending from a supranational level accounting for differences that span national boundaries like language or religion, to a group level that accounts for culture confined to organizational groups such as project teams. Level in this conceptualization of culture indicates the level of abstraction of the culture concept, its scope, and its boundaries. While the relationship between the cultural levels may be hierarchical, it is not necessarily so (Karahanna et al., 2005). For instance, group cultures (at the lower end of the hierarchy) may include members with multiple occupational cultures (at the higher end of the hierarchy). Similarly, multinational organizations may have an organizational culture that spans and incorporates supranational, national, and occupational cultures. Culture is also conceptualized at national (Hofstede, 1980a), occupational (Cranefield et al., 2021; Jacks et al., 2022), and organizational (Hofstede, 1980b; Schein, 1985) levels. Additionally, the values embedded in the capability and functionality of the technology artifact suggests the IS has a culture of its own (Berger, 2007; Leidner & Kayworth, 2006; Waring & Skoumpopoulou, 2012). For instance, in exploring the use of a human resource management system in a management consultancy firm, Alvesson and Kärreman (2007) suggest the system serves as a set of meanings for organizational members.

Critics of values-based culture research (i.e., the "collective meaning" perspective) argue that individuals are influenced by multiple, overlapping cultural levels (Cranefield et al., 2021; Schneider, Ehrhart, & Macey, 2013) that create a complex and dynamic cultural milieu (Leonardi, 2011; Suri & Abbott, 2013). In such an environment culture serves as a "toolkit" of assumptions, beliefs, and values emanating from a multitude of cultural levels (Swidler, 1986) that individuals pragmatically adapt to suit a context by incorporating their knowledge of the situation (Patterson, 2014). Individuals thus selectively draw from their cultural toolkits to make sense of situations and choose paths of action (e.g., Su, 2015). The toolkit conceptualization of culture offers a close connection between culture and action (Giorgi et al., 2015). ISD

projects are typified by this ongoing sensemaking, both internally amongst project team members and with external parties like governing authorities (Baghizadeh et al., 2020). Intra-project sensemaking occurs amongst project team members in efforts to achieve project objectives within time and budget constraints. Extra-project sensemaking with external governance entities seeks to achieve successful outcomes within established policies and rules, and organizational values and norms (Baghizadeh et al., 2020). Repeated social interaction and the selective inclusion or removal of cultural elements reveals the dynamic, nuanced, and situated nature of cultural sensemaking (e.g., Su, 2015). At the same time, the enactment of selected cultural elements gives credence to these elements and a degree of persistence in a particular setting, creating a relationship between cultures value-based (symbolic) and toolkit-based (pragmatic) manifestations (Giorgi et al., 2015). In this study we follow others (Asatiani et al., 2021) in adopting a view of culture that recognizes the fluid relationship between these two cultural manifestations and align our stance for studying cultural practice with the perspective that individuals and groups continuously move between multiple, overlapping configurations of cultural manifestations to achieve their goals (Patterson, 2014).

Cultural influences from diverse cultural levels have the potential to create problems for ISD teams that can be challenging to address (Dennehy & Conboy, 2019). For instance, the way in which a business problem is perceived by different groups shapes potentially diverse responses from ISD members (Bunduchi, Tursunbayeva, & Pagliari, 2020), a misalignment of existing work practices with new technology can disrupt the flow of work in project teams (Dennehy & Conboy, 2019), and authoritarian management practices can cause problems for agile teams (Jovanović, Mas, Mesquida, & Lalić, 2017). Furthermore, interventions to resolve these differences can have unintended consequences. For instance, removing visual aids like Kanban boards from some agile teams to present a pleasing workplace image to corporate executives created tension with other teams who continued to use these aids (Dennehy & Conboy, 2019). In efforts to deepen understanding of culturally induced conflict, Lawrence (2013) identified three cultural “conflict zones” that emerge during ISD (see Figure 1) at overlapping cultural levels:

- the temporal innovation culture (e.g., group/project culture) ↔ culture of the IS,
- the organizational culture ↔ culture of the IS, and
- the organizational culture ↔ temporal innovation culture.

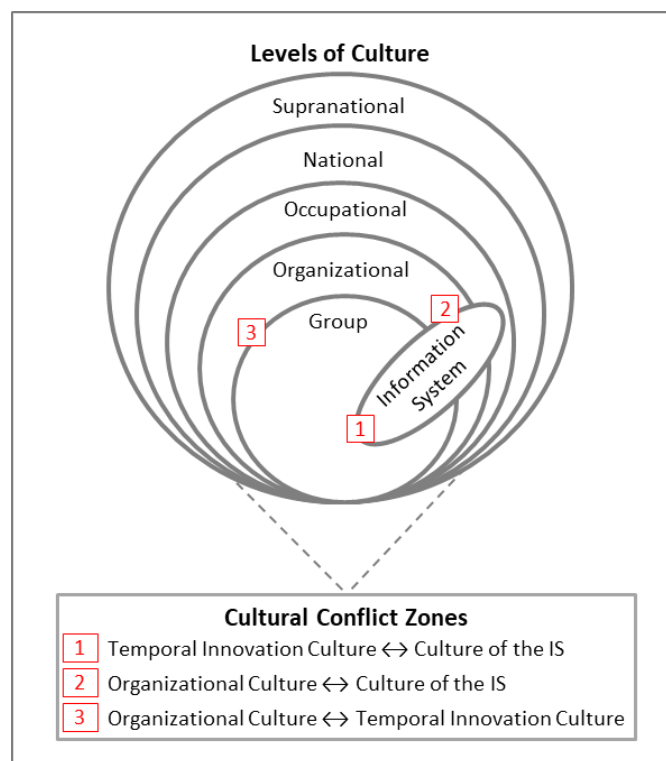


Figure 1. Levels of Culture and Cultural Conflict Zones (Karahanna et al., 2005; Lawrence, 2013; Trice, 1993; Waring & Skoumpopoulou, 2012)

The cultural conflict zones indicate the significant points of interaction of cultural groups during ISD (Lawrence, 2013). Each interaction point presents an opportunity for culturally mediated and diverse responses from the individuals involved (Lawrence, 2013). In this study we are not using the term conflict zones or conflict, but instead refer to cultural level overlaps and contradictions. Differences appearing at these overlapping cultural levels could manifest as conflict or as synergies/strengths (complementarities). IS research has tended to focus on two themes related to cultural differences, the first positioning diversity as a challenge for business and the second exploring cultural commonalities as business enablers (Kummer & Schmiedel, 2016). Both themes put an emphasis on cultural differences as contributing a negative influence on phenomenon. More recently, researchers are exploring cultural differences as more of a mixed blessing, where diversity can give rise to conflict and hence a negative effect, but also contribute a positive influence by serving as a source of creativity (Stahl & Maznevski, 2021).

Different types of contradictions can arise from cultural differences. Individuals or groups may have different perspectives on what the IS solution should be (Bunduchi et al., 2020; Leidner & Kayworth, 2006) or prioritize project activities differently (Rai, Maruping, & Venkatesh, 2009; Suri & Abbott, 2013). There may be alternate views amongst project team members on the ISD development processes that should be followed (Dennehy & Conboy, 2019; Kankanhalli et al., 2006) or the role and responsibilities of project team members (Berger, 2007; Jovanović et al., 2017). Individuals and groups may also have contradictory views about the embedded capability in the technology artifact and how it should be used (Kaplan, 2011; Koch et al., 2013).

Most of the empirical ISD and culture research focuses on the overlap of only two cultural levels (see Appendix A). This body of research examines:

- the overlap between the culture of the IS and the national (Ramesh et al., 2017) or organizational culture (Berger, 2007; livari & Huisman, 2007; Koch et al., 2013) and,
- the overlap of diverse national (Alfaro & Chandrasekaran, 2015; Garrison et al., 2010; Gavidia, 2016; Kankanhalli et al., 2006; Pscheidt, 2011; Shachaf, 2008; von Stetten, Beimborn, & Weitzel, 2012), organizational (Bunduchi et al., 2020) or occupational cultures (Guzman et al., 2008).

Importantly, most ISD research focuses on interactions between diverse national cultures (Leidner & Kayworth, 2006), contrary to the conflict zones suggested as most significant during ISD (Lawrence, 2013). The studies also reveal a variety of cultural contradictions, including contradictory perspectives on authority or decision making (Berger, 2007; livari & Huisman, 2007; Shachaf, 2008), contradictions in knowledge or experience (Guzman et al., 2008), contradictory views on collaboration or information sharing (Koch et al., 2013) and contradictions in the prioritization of development goals (Pscheidt, 2011; Ramesh et al., 2017).

Multiple levels of culture have an influential effect on ISD teams (Baghizadeh et al., 2020). The first step in addressing cultural contradictions is to recognize the type of contradictions that individuals experience (Koch et al., 2013). In this study we seek to elaborate on the types of cultural contradictions experienced by ISD teams at overlapping cultural levels. This understanding can provide a more nuanced account of the cultural triggers implicated in contradictions that threaten successful ISD outcomes.

3 Methodology

This research seeks to understand the nature of cultural contradictions and the relationship between these contradictions and levels of culture in ISD projects. We acknowledge the dynamic, contextual, and emergent nature of culture (Ravishankar, 2015; Suri & Abbott, 2013) and accommodate this perspective by conducting an interpretive study. We elected the case study method as appropriate for the research (Walsham, 2006) and used inductive reasoning to elicit answers to our research question.

3.1 Background to the Study

This research focused on ISD projects that were still in progress, rather than projects that had already been completed. This approach is contrary to the norm in ISD research (Baghizadeh et al., 2020) but important for an in-depth examination of culture. As culture includes implicit elements like assumptions and beliefs (Hofstede, 1980a; Schein, 1985), the prevailing context in which ISD activities occur contributes to the salience, and hence the importance of cultural influences (Hsu, 2009; Su, 2015). Particulars of the context and their relevance may be forgotten over time and compromise descriptions of

events that occurred in the past. Furthermore, when professional workers like those involved in ISD reflect on past events, they tend to overlook differences in values (culture) as a potential contributor to issues (Argyris, 1991, 2002).

The Johannesburg Stock Exchange (JSE) was used as a source for identifying well-established organizations in South Africa to participate in our research. Organizations listed on the JSE seemed likely to have been in existence for some time and have the resources to sustain engagement in ISD. Both criteria were important for the research, as culture needs time to develop (Bass & Avolio, 1993; Schein, 2010) and projects can be cancelled if organizational resources become constrained. Several organizations on the JSE were approached; one organization agreed to participate in our study.

FinSect (a pseudonym), was the largest organization in their industry sector in the South African market. The project portfolio manager in FinSect selected two ISD projects to participate in the research. Each project was in the project execution stage, delivering results from project activities. Selection followed theoretical replication logic allowing comparison of cases in similar circumstances with the expectation of contrasting results (Keutel, Michalik, & Richter, 2014). Project selection was based on each project's performance against time, cost, and quality measures. The portfolio manager was asked to select one project that was maintaining / improving performance against the three measures and another that showed a deteriorating performance trend. Blend (a pseudonym) was assessed as maintaining / improving performance, while Kindle (a pseudonym) showed a deteriorating performance trend.

3.1.1 Blend

Blend was a strategic initiative to implement a software package to manage external organizational suppliers. The organization had relied on a variety of Excel spreadsheets to perform these tasks, creating a large administrative overhead for staff. The new technology solution was intended to remove the need for Excel, create a robust administrative platform and be a viable option for other companies within the larger organizational group. The organization selected to implement a solution from a local vendor, with an agreement that the package would be customized by the vendor to create a better alignment with FinSect requirements. The Blend team followed a waterfall software development approach. This approach had been used historically in the organization and was well understood by FinSect employees. The project team consisted of business stakeholders from FinSect and technical specialists from the technology company. The project manager, product owners, business analysts, and testers of the new IS were FinSect employees. All customization of the packaged solution was done off-site by the technology company at their premises. Acceptance of the new solution, implementation, roll-out, and management of organizational change impacts was the responsibility of FinSect employees.

3.1.2 Kindle

Kindle was a strategic program to replace the organization's custom-developed product administration system with a software package developed in the United States of America. The program had a history of false starts, dating back to about 2005. The scale of the change and associated risk were significant contributing factors to initial hesitancy to proceed with the initiative. However, it was eventually launched in 2012 when new executive leaders decided the change was imperative for future business growth. Kindle represented the largest and most business-critical initiative in FinSect, with a budget that exceeded USD 34 million and an impact on most business units in the organization. Furthermore, the combined scale, complexity, and risk associated with the initiative were unprecedented in FinSect. These factors contributed to the decision to adopt agile software development methods, rather than the waterfall approach which had been used historically for software development in the organization. The program consisted of many integrated projects. A single governing body provided overarching governance for all the projects. Participants for this research study came from an ISD team from one project in the program. The profile of this team included FinSect employees seconded into the initiative and temporary employees who were contracted from local and international (mainly India) sources.

3.2 Data Collection

Project team members holding managerial and specialist roles on each project were invited to participate in the research. For this research, the two roles were defined as follows:

- managerial role: individual is involved in governing, managing, or facilitating project activities. This includes the allocation and control of project activities (waterfall approach), as well as the

facilitation and coaching of project teams (agile approach). Examples include the program manager, project manager, steering committee members, scrum master, and project team facilitator.

- specialist role: individual is involved in applying their own expertise and knowledge to the production of products or services. Examples include product owners, business analysts, architects, software engineers, testers.

Thus, individuals who held organizational management roles but provided product or service expertise and knowledge to the project, were classified as specialists rather than managers.

Data collection occurred over a seven-month period. The timeframe allowed data to be gathered from multiple instances of events that occurred periodically, like monthly portfolio meetings, monthly steering committee meetings or agile retrospectives. All the data gathered were qualitative in nature. Semi-structured interviews lasting an average of 45 minutes were held with 22 participants and addressed the following themes: the organization, the project, project leadership and project performance. Guidelines used for the interviews are presented in Appendix B. Project and portfolio meetings were observed and audio recorded. Documentation, including project management documents, historical documentation with an organizational focus, and photographs were also collected. This data provided a basis for validating the researchers' interpretations of interviews and meetings. Further descriptions of the empirical material are provided in Table 1.

Table 1. Description of Empirical Materials

Empirical materials	Explanation	FinSect	Kindle	Blend
Interviews	Audio recorded, face-to-face interviews, average duration of 46 minutes	22	7 ^M 7 ^S	3 ^M 5 ^S
Meetings	Audio recorded, face-to-face meetings	5	17	2
Documents	Organizational documents (e.g., whistle blowing policy, conflict of interest policy), project documents (e.g., status reports, presentations, risk logs)	7	4	3
Posters & signage	Photographs of organizational and project posters and signage	18	12	
Websites	Web pages from the organizational website (e.g., organizational vision, organizational structure)	8		
Notes: Each interview included an organizational theme, hence the number of people interviewed is 22 rather than 44. Empty cells indicate the data does not exist. M = Manager. S = Specialist.				

3.3 Data Analysis

We chose thematic analysis (TA) as an appropriate method to analyze our data and build a conceptual model of cultural influences on ISD. The method is a good fit with inductive research as TA does not prescribe a theoretically informed analytical framework (Braun, Clarke, & Rance, 2015). This allows flexibility in data collection methods, the choice of theory as a sensitizing lens and the form of TA used for data analysis (Braun et al., 2015). Furthermore, the approach emphasizes the identification and interpretation of recurring patterns or features in empirical data.

We began our analysis with a within-case analysis of each project. We started the analyses by reading the project and organizational documentation we had gathered, to familiarize ourselves with some of the main features relevant to the research question. For instance, the organization and the Kindle project made use of posters and signage to signal their key values and expectations to organizational and project members (see Figure 2, Figure 5, and Figure 7).



Figure 2. Signage Reflecting Organizational Cultural Values

We used this information in two ways; initially it served to sensitize our data collection efforts and later in our analysis we used it to validate and support our findings. At this stage relevant information and interesting features from these sources were annotated and documented in memos. For example, we noted from Figure 2 the importance of people to the organization, the metaphor “The FinSect Way”, the organizational emphasis on “Excellence” and the organization's expectation of outstanding work from its members. We then moved on to read the transcript of our first interview. The inductive analytical cycle involves the recognition of concepts and themes in the data and the coding of these with succinct labels that reflect the underlying data (Strauss & Corbin, 1998). The intention was to capture the meaning of experiences in terms relevant to organizational members but also adequate for theorizing their experiences (Gioia et al., 2013). In some instances, we used labels already defined in the literature like “Organizational Culture” or “Occupational Culture”; otherwise, we created new labels, like “Empowering Individuals”. We used a form of TA that looks for latent meaning in the data (Braun et al., 2015), and coded paragraphs, sentences, or phrases in the transcripts and documents. Once we had completed coding the first interview transcript, we moved on to the next interview. A large number of concepts emerged. As analysis proceeded, we noticed similarities between different concepts in our coding. Similar concepts were then merged into the more relevant concept, or a new concept that better reflected the essence of both. This iterative process continued throughout the coding of the data. We managed the coding and merging of concepts, and later analytical activities, using the NVivo 11 Pro edition software. The first author did the analysis and coding of the transcripts and presented the outcomes at monthly meetings with all three authors, to discuss the coding and to address inter researcher reliability (IRR). Although an IRR was not calculated the analytical results were discussed until consensus about the coding and later the themes was reached. If we failed to reach consensus, we postponed our decision until further coding results on the various data resources helped us to find a common ground. We also introduced a step involving mutual peer audits of the data versus the findings. This step ensured trustworthiness of our qualitative research and addressed the confirmability and dependability of our work (Graneheim & Lundman, 2004; Lincoln & Guba, 1986; Shenton, 2004; Venkatesh, Brown, & Bala, 2013).

As the research progressed, we searched for themes in the data by looking for significant, broader patterns of meaning. Themes emerge from a central organizing concept and illustrate how this concept plays out in the data (Glaser & Strauss, 1967). Themes also serve to organize the data into a more structured form and have the effect of reducing the number of concepts to a more manageable number (Gioia et al., 2013). An example is provided in Figure 3 to illustrate our organization of themes, concepts, and data during the analytical process.

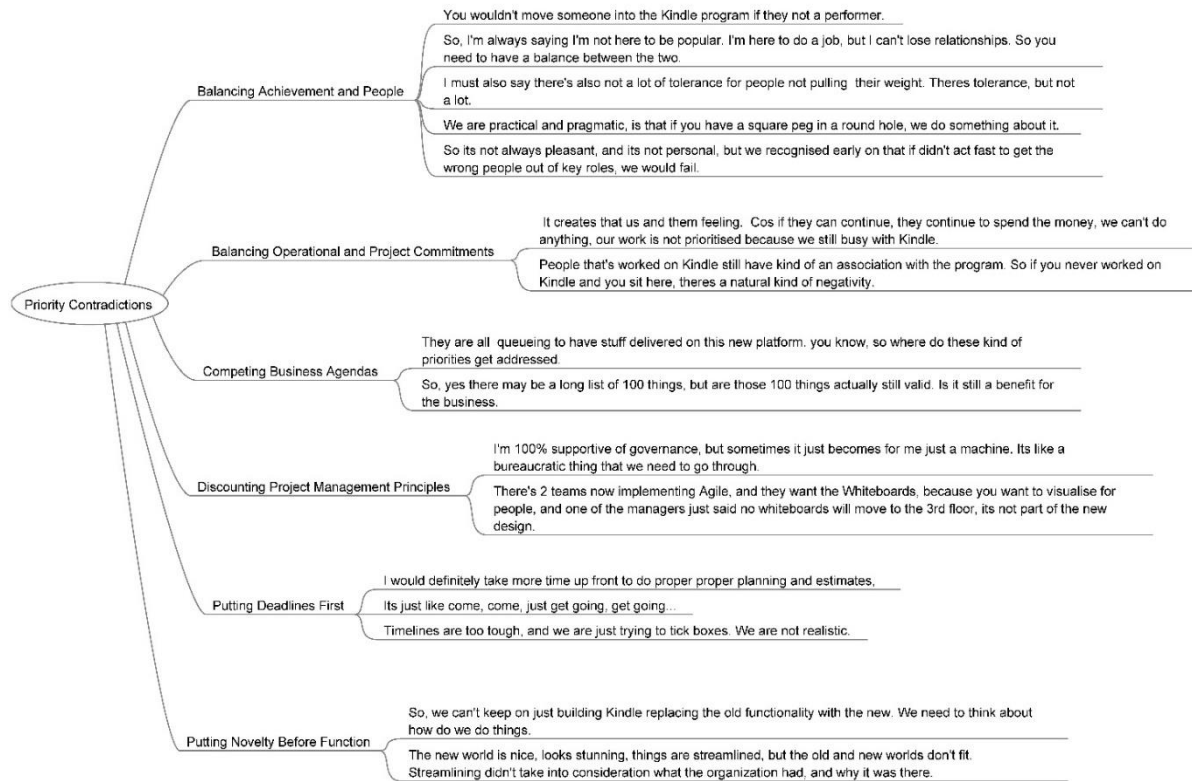


Figure 3. The Priority Contradictions Subtheme with Concepts and Examples of Associated Data Excerpts

Reflection on the emerging themes and attempting to answer the question “What’s going on here?” led to some adjustments to questions in subsequent interviews, to allow more focus on these themes. We concluded we had reached “theoretical saturation” (Gioia et al., 2013; Glaser & Strauss, 1967) of the themes in our data when we found that later interviews were not providing further elaboration of the themes, but rather different examples of incidents already identified.

After the initial stages in our analysis, and concurrent with ongoing data collection, we engaged in a process of constant comparison (Strauss & Corbin, 1998), to check for the distinctiveness of our themes or their similarity with other themes in the data or in related theory. The theories used in this process are identified based on their relevance to the research topic and data, and the researchers’ subjective view of the insightfulness of a theory (Walsham, 2006). The cycling between our analytical outcomes and the relevant literature allows consideration of our data in tandem with existing theory. This process of constant comparison and the iterative analysis of data produces emergent theory (Gioia et al., 2013; Glaser & Strauss, 1967) and in our case the conceptual model. It was at this stage of our analysis that the relevance of intersecting overlapping cultural levels emerged. At the end of this process, nine subthemes and two themes represented the conceptualization of cultural influences on ISD in our empirical situation (see Figure 4).

We finalized analysis of the data with a cross-case analysis of the two cases. This step did not reveal any differences between the two in respect to emergent themes and subthemes.

3.4 Ethics, Confidentiality and Privacy

We approached ethical considerations for this project from the premise positioned by Miles, Huberman, and Saldaña (2014) that as researchers we had responsibility to protect the situation of our research participants, and not privilege our research objectives above these considerations. We paid attention to the potential harm the research could cause, particularly as organizations can be made vulnerable through revealing their culture (Schein, 2010). Consequently, steps were taken to maintain the anonymity of the organization and the individual participants by using alpha-numeric codes or pseudonyms as identifiers. All interview recordings, transcripts, and analytical work were kept in an encrypted, local storage location. Ethics clearance in the form of an official consent letter was obtained from the relevant

body in our affiliated institution before any data collection commenced. The ethics process included scrutiny of several documents:

- A confidentiality and consent form for the organization and for each participant, describing the research, ensuring anonymity of participants, and advising that participation was voluntary with the option to withdraw at any stage. Signed forms from the organizations and each participant were required before data collection commenced.
- Interview guidelines for the semi-structured interviews.
- A description of how confidentiality of the research participants would be maintained through data collection, storage, analysis, and communication of findings.

Additionally, specific permission was sought from the organization for the use of organizational posters and signage in our publications.

4 Findings

The two themes and nine subthemes that emerged from the iterative analysis of data and the process of constant comparison are depicted in Figure 4 and described in this section, where the *themes* and the *subthemes* are in italic font.

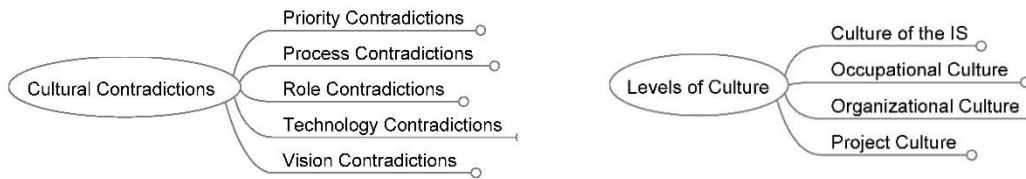


Figure 4. Themes and Subthemes in the Data

4.1 Levels of Culture

Levels of Culture aggregates four subthemes that emerged in the data: the *Occupational Culture*, *Organizational Culture*, *Project Culture*, and the *Culture of the IS*. The theme and subthemes do not purport to reflect every element of cultural influence from each cultural level. Instead, *Levels of Culture* encapsulates influential cultural elements from each level in this empirical situation.

The theme *Levels of Culture* and its subthemes is defined in Table 2. In the definitions we referred to the existing literature to ensure a common understanding of the terms. Table C1 illustrates the subthemes and concepts related to the theme.

Table 2. Theme and Subtheme Definitions for Levels of Culture

Theme / subtheme	Definitions
Levels of culture	The salient cultural elements (beliefs, values, norms, and practices) emerging from the occupational, organizational, or group affiliations of individuals, the IS itself or any combination of these, that inform and shape the perceptions and subsequent action of project stakeholders. The salience of cultural elements is dynamic and unpredictable, shaped by the individuals involved, the IS, and the context in which interaction occurs. The influential power of culture arises from the degree of affiliation felt by an individual to the beliefs, values, norms, and practices of the cultural level. The aggregation of four subthemes; i) Occupational Culture, ii) Organizational Culture, iii) Project Culture, and iv) the Culture of the IS.
Occupational culture	The beliefs and values related to the principles and competencies relevant to an occupation (Karahanna et al., 2005; Trice, 1993) that inform the behavior of individuals.
Organizational culture	The values, beliefs, norms, and practices relevant to an organization and referred to by organizational members when performing their duties (Hofstede, 1980b; Schein, 1985).
Project culture	The Project Culture is defined as the beliefs, values, norms, and practices accepted by the ISD stakeholders as relevant in their particular context (Karahanna et al., 2005; Shore, 2008). This is akin to what Lawrence (2013) defines as a temporal innovation culture. The context in which the ISD project is performed affects which cultural elements emerge as

Table 2. Theme and Subtheme Definitions for Levels of Culture

Theme / subtheme	Definitions
	most salient to project stakeholders. Thus, the Project Culture may not persist beyond the lifespan of the project.
Culture of the IS	The Culture of the IS draws on the conceptualization of the IS as a system constituted by three sub-systems: the information artifact, the social artifact, and the technology artifact (Lee, Thomas, & Baskerville, 2015). As these subsystems are "...enabling, interacting with and even transforming one another..." (Lee et al., 2015, p. 6), the resultant IS is greater than the sum of its constituent parts. Thus, the Culture of the IS is defined as the beliefs, values, norms, and practices of ISD stakeholders that become embedded in the technology artifact during ISD (Waring & Skoumpopoulou, 2012). The definition is extended to include the shared values of the IS community in the organization concerning the IS itself and the software development process (the social artifact), and have a bearing on how these stakeholders perceive and interact with the IS. In this respect the Culture of the IS is akin to the notion of "IT culture" (Lawrence, 2013; Leidner & Kayworth, 2006). The context in which ISD occurs, the nature of the IS, and the individuals involved has a bearing on which cultural elements are influential on the actions of ISD stakeholders. Thus, the Culture of the IS is dynamic and indeterminate and may not persist beyond the lifespan of the ISD effort.

4.1.1 Occupational Culture

Occupational principles, values and accepted practice exert influence over the behavior of ISD project team members. Influences from the software development and project management occupations are the most salient in the ISD context. Thus, both Kindle and Blend team members expect to be empowered to perform their duties and to be able to collaborate with others to achieve project objectives. Managers of the Kindle team agree these values are important and the program manager affirms they values are influential in the project context, saying "we've figured it out ourselves. No one tells us how to do it." Blend team members also acknowledge that the project supports principles of empowerment and collaboration. A product owner asserts that "[the steering committee] are defining what targets need to be met, and what needs to be done. You must decide how to do it and get it done."

Blend team members draw on historical software development and project management principles to frame an expectation that they should only perform duties on the project for which they are trained and qualified. A business analyst complains "I'm not a formal tester. I've just been told to go test, train, business analysis, project administrator, everything on this project." While the agile methodology supports a breadth of experience rather than a focus specialty from team members, there is nevertheless an expectation that a required level of knowledge and experience is met. Thus, a systems analyst from Kindle complains that resource constraints are addressed by a manager "just saying 'Oh, we need a resource here.' Taking somebody, slotting him in that spot, and saying, 'Oh, I've given you a resource, you must be happy by now.'"

4.1.2 Organizational Culture

FinSect's long history includes many prestigious industry awards and accolades achieved in a challenging commercial environment. Awards are a source of pride to organizational members and maintaining the position of industry leader is a prominent factor in everyday business. Organizational websites, slogans like "The FinSect Way", posters and signage attest to feelings of superiority amongst organizational members. The expertise of organizational members to competitively price FinSect's products has become entrenched as a significant contributor to organizational success and indicative of the superiority of organizational members in the industry. This 'ability to price' is espoused as a key organizational value, illustrated by the proportionalities of the text in Figure 5.



Figure 5: Organizational and Project Values Espoused in Wall Signage

Many meeting rooms in the organization are decorated solely with award memorabilia. The organization also has a reputation for looking after its members. Organizational members from all levels use the metaphor “It’s a family” to describe the working climate, and relationships are an important aspect of the workplace. A manager declares “it’s a very relationship orientated culture. So that impacts how FinSect works, it impacts how it thinks, it impacts how it hires its people, it impacts how it approaches things.” Long service records for many staff members are further testament to the organization’s reputation. A product manager explains that “people on average stay here 20, 22, 25 years. That speaks about the company itself.” However, these long service records contribute to an organizational legacy of entrenched processes and authoritative leadership. A specialist describes the organization as having “a 100-year history that’s always been dominated by middle aged men, white men, who always made the decisions. ... that legacy still lives through this organization.”

The success of FinSect leads organizational members to believe they represent the best talent in the industry, and the organization also emphasizes an expectation of excellence. Importantly, this context leads to unintended consequences. A manager describes how “there’s an occasional reluctance to be honest about failings, because you want to have your best foot forward, and have everybody think that you are a great performer.” Additionally, this context leads to a low tolerance for mistakes. Consequently, organizational members delay the communication of bad news, present information in a positive light and engage in collective decision-making to mitigate any reputational damage from mistakes. A product owner feels that “the message is not coming down to say ‘it’s fine, you can make mistakes. ... as long as it’s not repetitive.’” This leads to collective decision making which a manager describes as a need “to be very careful. We want to consult a bit more with other people ... So, people are not willing to put their head on a block.”

4.1.3 Project Culture

Both projects in the research study have a strong focus on doing whatever is necessary to ensure project success. At times, this requires deviation from accepted values and established practices in the organization. A senior manager from the Kindle project describes how organizational values were reconciled with project requirements, in that “we were not ruthless and contrary to our culture of respecting people, but we wasted no time in removing people that we did not feel had it in them.” The Blend team pay less attention to established organizational values in their efforts to get things done. For instance, despite the organizational preference for collective decision making, a product owner describes how “the project team sat there and decided, guys we have to sort of make this thing work. Come hell or high water, irrespective of what the business people say.”

Both projects put effort into building trust and gaining commitment from project stakeholders but do so in slightly different ways. The Blend team rely on the value placed on relationships by organizational members. A manager explains that “I build good rapport with my development managers, ... the project sponsor, ... and the project managers. To me, it’s a game about relationships.” The Kindle team use signage and select key team members based on personal characteristics that resonate with organizational and project values. Thus, the entrance to the Kindle project team space has a sign that reinforces the

notion of “family” (see Figure 6), a metaphor widely used amongst organizational members to describe the organizational culture.



Figure 6. Signage at the Entrance to the Kindle Team Space

Kindle team members also leverage relationships to realize agile principles like collaboration. A manager describes the program manager as “a facilitative kind of leader, that doesn’t hold content knowledge himself, but knows enough ... and he kind of brings it together in the solution. That has worked well.” The team also emphasizes the creation and maintenance of a shared and compelling vision amongst their stakeholders and introduces a set of project values to keep team members focused. A senior manager explains:

We realized that if we were to come in on the budget that we had ultimately been given, we had to have absolutely no waste in the system at all. So, we built these mantras, 15 different statements ... which were pinned up over every wall.

4.1.4 Culture of the IS

Both the Kindle and Blend project teams are customizing a packaged solution. Team members from both projects perceive the new solution as an opportunity to change and improve existing business processes. Thus, the introduction of new technology presents possibilities to change existing organizational culture. The Blend team strongly support the principle of changing the way they do business to suit the new technology. A senior manager explains that “one of our key points in the sand ... is we will stick to vanilla [off-the-shelf technology] as far as possible, and everybody will have to fit in.” The introduction of agile methods for the Kindle team provides an opportunity to change the existing leadership style in the organization and also address the problematic hesitancy to disclose bad news. A senior manager asserts that:

The agile methodology has helped us quite a lot ... there are certain expectations of leaders that are built into the methodology. ... you force that level of accountability ... you force the level of honesty to say well this went right, this went wrong, this is what we are doing to mitigate it.

The new Kindle solution introduces changes to existing business processes and ways of doing business. According to a product owner, “just that shift from implementing a new system into the new technology space, brought a big shift on the organization itself.” Additionally, those filling managerial roles are required to develop expertise in agile development methods while specialists are also required to gain expertise in new technologies. In contrast to the Blend team, Kindle team members expect the new solution to fit seamlessly into the existing technical architecture. Interestingly, this perspective is shared by both managers and specialists. In referring to the structural architecture of his product, a product owner declares that “if this is the product we have, the product should be on the new platform, and it should be the same.” An initial misunderstanding of features and capability in the new Kindle solution led to a design of the system that compromises flexibility and eventually must be redone. A specialist explained that “because we didn’t know, we said we must do it the way we do [it] right now.” In these respects, the organizational culture is influential in changing the technology.

4.2 Overlapping Cultural Levels

Overlapping cultural levels can be observed when different perspectives of the same situation are expressed by members of the project teams. Their perspectives are informed by the beliefs and values incumbent in the level of culture most salient to them in a particular situation. In most instances, differences are expressed when *Organizational Cultural* influences contradict influences from each of the other cultural levels in this study, i.e., the *Project Culture*, the *Culture of the IS*, and the *Occupational Culture*. The long service records of organizational members and a belief in the superiority of their processes (*Organizational Culture*) create difficulties in the project context (*Project Culture*). A software engineer from the Blend team asserts that “first, we are going to do what needs to be done according to the rule book, and then if some impossible thing comes up, we may have a quiet meeting without the rule book, and make it happen.” Kindle team members experience difficulties in introducing agile methods (*Culture of the IS*) to organizational members accustomed to the waterfall methodology (*Organizational Culture*). A senior manager attributes difficulties in gaining acceptance of project deliverables to “there's not yet an understanding of agile, and how difficult it is to measure those things in an agile context.” For both project teams, the organizational preference for collective decision making undermines the knowledge, skills, and experience of project team members. A product owner describes how “a person may be given a particular role and it's their area of expertise, let them make the decision. We don't do that.”

To a lesser extent, *Occupational Culture* influences are at odds with influences from the *Project Culture*. Project team members are expected to put project expectations and requirements above occupational standards and guidelines. A Blend business analyst complains “I'm not a formal tester. I've just been told to go test, train, business analyst, personal assistant, everything on this project, systems architect as well.”

4.3 Cultural Contradictions

In this section we elaborate the types of contradictions that emerge at the overlap between different *Levels of Culture*. *Cultural Contradictions* aggregates five subthemes: *Vision Contradictions*, *Priority Contradictions*, *Process Contradictions*, *Role Contradictions*, and *Technology Contradictions*. The theme *Cultural Contradictions* and its subthemes is defined in Table 3. In the definitions we refer to the existing literature to ensure a common understanding of the terms. Table 4 illustrates the relationship between the theme, its subthemes, and concepts.

Table 3. Theme and Subtheme Definitions for Cultural Contradictions

Theme / subtheme	Definitions
Cultural contradictions	Cultural differences arising during ISD as the consequence of a mismatch of values, beliefs, norms, or practices (Leidner & Kayworth, 2006), emanating from different cultural levels. Cultural Contradictions could emerge through interaction between individuals or groups and between individuals / groups and the IS. The emergent cultural differences are dynamic and unpredictable, shaped by the individuals involved, the IS, and the context in which the activity occurs. The aggregation of five subthemes; i) Vision Contradictions, ii) Priority Contradictions, iii) Process Contradictions, iv) Role Contradictions, and v) Technology Contradictions.
Vision contradictions	A misalignment of the goals of different stakeholders involved in ISD activities (Bunduchi et al., 2020; Leidner & Kayworth, 2006). Vision Contradictions could emerge through interaction between individuals or groups and between individuals / groups and the IS. Vision Contradictions can arise during ISD through a misalignment of organizational strategy with project goals or through difficulties in expressing an unambiguous articulation of the future IS.
Priority contradictions	The misalignment of different values, beliefs, norms, or practices held by individuals and groups that creates different perspectives on the prioritization of the ISD procedures and activities (Rai et al., 2009; Suri & Abbott, 2013).
Process contradictions	Differences in work practices that arise from different beliefs, values, norms, and practices held by individuals and groups (Dennehy & Conboy, 2019; Kankanhalli et al., 2006). These differences can arise through the need to adjust existing practices to accommodate unique project, process, and / or IS requirements, or through different perspectives on the efficacy of established procedures. Adjustments to work practices

Table 3. Theme and Subtheme Definitions for Cultural Contradictions

Theme / subtheme	Definitions
	may not persist beyond the ISD effort.
Role contradictions	Different beliefs of individuals and groups regarding the merit of using individuals with specialist skills during ISD, and different expectations regarding the responsibilities and accountability associated with specialist roles (Berger, 2007; Jovanović et al., 2017). These beliefs and expectations are shaped by the individuals involved, the IS, and the context of the ISD effort
Technology contradictions	Differences concerning the beliefs about the IS and embedded capability in the technology artifact that have a bearing on how it is accepted, developed, and implemented (Kaplan, 2011; Koch et al., 2013). Differences can arise from the degree of fit between the nature, functionality, and processes of the IS solution and the experience or expectations of organizational stakeholders. Differences can also arise from a gap between the new IS and the architecture of existing systems and between the knowledge and experience of existing IS professionals. Technology Contradictions are dynamic and unpredictable, shaped by the individuals involved, the IS, and the context of the ISD project.

The theme and subthemes do not purport to reflect every element of cultural influence that may give rise to contradictions. Instead, *Cultural Contradictions* encapsulates the influential cultural elements in this empirical situation.

Table 4. The Cultural Contradictions, Subthemes, and Concepts

Themes	Subthemes	Concepts
Cultural contradictions	Vision contradictions	Aligning organizational and project objectives
		Competing business strategies
		Visualizing the new solution
	Priority contradictions	Balancing achievement and people
		Balancing operational and project commitments
		Competing business agendas
		Discounting project management principles
		Putting deadlines first
	Process contradictions	Putting novelty before function (K)
		Circumventing processes (B)
		Decentralizing decision making
	Role contradictions	Employing process autonomy (K)
		Altering responsibilities (B)
	Technology contradictions	Discounting specialist skills
		Expecting an unaltered experience
		Putting new technology first
Note: Most concepts were represented in both datasets. Concepts unique to either Kindle or Blend are indicated by a (K) or (B) respectively.		

4.3.1 Vision Contradictions

The espoused organizational and Kindle project values shown in Figure 7 illustrates how *Vision Contradictions* might emerge at the overlap between the *Organizational* and *Project Cultures*. The importance placed by the organization in “Excellence” is difficult to reconcile with project values like “Keep it Simple” and “Apply 80/20 Principle”. Different perspectives on what Excellence means in the context of the Kindle project has an impact on a variety of project activities (e.g., the allocation of tasks, the sign-off of project deliverables etc.).



Figure 7. Espoused Organizational and Kindle Project Values

The Blend team experience *Vision Contradictions* in the context of strategic misalignment between management and operational levels in FinSect. The project sponsor complains that “it feels like the whole world is working not with you, to put this thing in. You need to bat the whole time just to justify what you are doing.”

In both cases the ISD teams have trouble describing the new IS in an unambiguous manner. A manager from the Kindle project puts the experienced difficulties into context by explaining that “so much of what we do is not visible, you know. We are not building houses here. I think for some executives that complexity is understandable, and for others it’s just very hard to get to grips with.” These difficulties create problems in aligning organizational and project objectives. A product owner complains:

The one thing that we were told up front is that we just building like for like. What you had in the old system, you'll have in the new system ... but that we never got. ... we got less.

4.3.2 Priority Contradictions

FinSect’s position as an industry leader requires organizational members to prioritize productivity and efficiency in their business activities. This requirement is sometimes difficult to reconcile with the organizations reputation of looking after their members. This dilemma emerges in the project context when project team members are not performing as expected. A senior manager on the Kindle team explains that “we recognized early on that if didn’t act fast to get the wrong people out of key roles, we would fail.”

Strategy misalignment in the organization puts pressure on organizational resources and complicates efforts to secure sufficient team members to complete the project work. A project manager complains that “we are trying to do too many things with the same resources in a short space of time and then we keep on having to report that we are slipping ... or we are overspending on it.” The situation is further complicated by different perspectives on organizational priorities and competing business agendas amongst organizational members. A senior manager in the Kindle team asserts that “we’ve got a slight disconnect with strategy, and our vision and where we want to be, and what is in the portfolio, and what we are delivering ... and what’s actually happening on the floor.” This organizational pressure creates an urgency on the Blend project to begin work on project deliverables, causing the project to compromise occupational values. A team member complains “it’s just like come, come, just get going, get going ... I would definitely take more time up front to do proper project planning and estimates.” The Kindle project is impacted by interior design principles in the organization when these are prioritized over agile development methods. A project manager explains in disbelief that “two teams now implementing agile. They want the whiteboards because you want to visualize for people. One of the managers just said ‘No whiteboards will move to the 3rd floor. It’s not part of the new design.’”

As the project progresses the Blend team puts a focus on meeting their schedule commitments, which sometimes compromises the organizational concern for excellence. A business analyst reports that during testing of the new solution the users “did say that the timelines are too stressed, and we are just trying to tick boxes.” Similarly, despite agile tenets of flexibility, the Kindle team becomes increasingly focused on meeting initial commitments and less inclined to accommodate changing business needs. A product

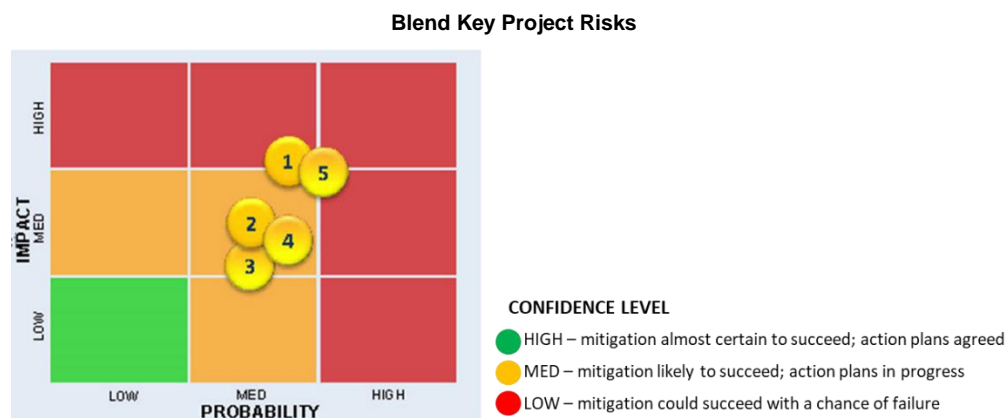
owner complains that “the Kindle team was so focused on delivering ... that they at times lost track with reality. So, sort of find ways to just get this thing through, instead of understanding what the impact will be on the business.”

Features and benefits of the new Kindle IS are prioritized above some organizational values embedded in the old solution, and some features in the existing IS are not carried forward. A technical specialist explains that “the new world is nice, looks stunning, things are streamlined, but ... streamlining didn't take into consideration what the organization had and why it was there.”

4.3.3 Process Contradictions

A long history of organizational success entrenches a view in FinSect of the efficacy of existing organizational processes, causing reluctance to adjust these to suit project requirements. Additionally, an authoritative leadership style enables senior team members to override some project management processes. A manager in the Blend team explains that “my feeling is always, if I've got accountability and I've got structure, I don't need all of the regular processes to make it work.”

A positive outlook from organizational members is highly valued in FinSect. The need to present situations in a positive light makes it difficult for project teams to follow accepted risk management processes. This causes the management of project risk to be neglected or managed in surreptitious ways. For instance, both project teams attempt to minimize perceptions of project uncertainty through selective publishing of project risks. While the project risk reports illustrate general compliance with risk management processes by both projects, the small number of listed project risks is disproportionate to the size and nature of the projects (see Figure 8).



Kindle Release 2 Risk Report All Risks

Generated Date: 2017-05-16

Risk No	Title	Type	Status	Follow Up Date	Impact	Probability	RAG	Last Updated
003008	Capacity constraints to attend to BAU, Growth initiatives, and Kindle work	Resources	Open	2017/06/02	Moderate Plus (4)	Possible Plus (4)	⚠️	2017/05/03 15:44
003127	Contact Centre readiness for Kindle rollout	Resources	Open	2017/06/02	Moderate Plus (4)	Possible Plus (4)	⚠️	2017/05/03 15:36
003128	Release 2 dependency on Platform level changes	Interdependencies	Open	2017/06/02	Moderate Plus (4)	Possible Minus (3)	⚠️	2017/05/03 15:32
003130	Complexity of migration leads to timeline uncertainty	Progress	Open	2017/06/02	Moderate Plus (4)	Possible Minus (3)	⚠️	2017/05/03 15:25
003134	Change Readiness - Brokers	Other	Open	2017/06/02	Moderate Plus (4)	Possible Minus (3)	⚠️	2017/05/03 13:27
003125	Overlapping deployments create capacity contention	Resources	Open	2017/06/02	Moderate Minus (3)	Possible Minus (3)	⚠️	2017/05/03 15:41

Figure 8. Risk Reports from the Blend and Kindle Projects

Changes to established processes are handled formally by the Kindle project. A decision is made early in the project lifecycle to decentralize project decision making, in contrast to the organizational norm where decision making is centralized. A senior manager explains that “we had to make a very specific decision

and say you know we cannot have consensus driven decision making. It touches the entire organization ... and we said it's just not going to work. It's too time consuming."

The introduction of agile methods for Kindle set the project apart with respect to entrenched software development processes in the organization. While other software development teams are required to follow standard organizational processes, the Kindle project experiences a high degree of process autonomy. The Kindle project manager explains that "Kindle has always been exempted in terms of the way we work, with the Agile manifesto and the story cards, and even the tool and where we store our documentation. It's very much disconnected from the Head office."

4.3.4 Role Contradictions

Role Contradictions emerge when an organizational focus on cost efficiency and a belief in the abilities of existing staff cause some managers in the Blend project to question the need for specialists. A manager questions why "a business manager is there, a project manager is there, we've got a business analyst there as well. So, who is doing what? ... these resources cost us money." Failure to allocate specialist resources to project activities results in the subsequent inappropriate allocation of project tasks amongst Blend team members.

The new Kindle IS requires technical skills that existing technical specialists do not possess. A technical specialist explains how a lack of requisite new skills led to questions regarding her role and to "the feeling ... you're on the mainframe, you know nothing ... This is the new world, and you can't do SQL." Additionally, the new solution shifts decision making responsibilities between organizational units. A manager describes the difficulty amongst organizational members to accept changes to their responsibilities; "every time we said, [business unit A] and [business unit B], you don't own the user interface. The contact center owns the user interface."

4.3.5 Technology Contradictions

The use of agile software development methods creates issues for the Kindle team. Organizational members expect consensus-based decision making aligned with their experience of software development practice in the organization, rather than self-organizing teams. Collaboration also proves difficult with organizational members accustomed to an authoritative leadership style. Team members also experience difficulties aligning technology features developed for a North American context to business practices applicable in South Africa. A business analyst suggests that "maybe the system, the technology, coming from America, we work differently." Additionally, while features like flexibility in the new solution are highly valued, what this flexibility means in business terms is not always clear. A manager explains that "we've implemented technology that would allow for flexibility ... we still need to define to what extent we want it, what that flexibility would mean."

Technology Contradictions emerge for the Blend project team from the intention to adjust existing organizational practices to align with the new technology. The project sponsor explains the challenges "with the new technologies coming along ... how to reposition this whole business for that. That for me is going to be tricky."

4.4 Summary of the Findings

Findings from this research show cultural influences on ISD teams from four different *Levels of Culture*: *Occupational Culture*, *Organizational Culture*, *Project Culture*, and the *Culture of the IS*. The overlap of these cultural levels raises different types of *Cultural Contradictions*, *Vision Contradictions*, *Priority Contradictions*, *Process Contradictions*, *Role Contradictions*, and *Technology Contradictions*. The prevalence of *Cultural Contradictions* at the overlap between different *Levels of Culture* is revealed in our data through the co-occurrence of the subthemes. These findings are illustrated in Table 5.

Table 5. Contradictions Emerging from Overlapping Cultural Levels

Overlapping cultural levels	Emergent contradictions									
	Vision		Priority		Process		Role		Technology	
	B	K	B	K	B	K	B	K	B	K
Organizational culture vs project culture		■	■	■	■	■				
Organizational culture vs culture of the IS	■	■		■		■		■	■	■
Organizational culture vs occupational culture			■	■	■	■	■	■		
Occupational culture vs project culture					■		■			
Occupational culture vs culture of the IS										
Project culture vs culture of the IS										
Notes: B = Blend. K = Kindle. Shaded cells indicate the presence of contradictions.										

The overlap between the *Culture of the IS* and the *Organizational Culture* represents the only overlap between cultural levels that raises contradictions across the *Cultural Contradictions* spectrum, as defined in this study. In contrast, the overlap between the *Culture of the IS* with the remaining levels of culture (*Occupational Culture* and *Project Culture*) reveals the absence in our data of any type of *Cultural Contradiction*, and potential for complementarities.

5 Discussion

We undertook this research in pursuit of the following two objectives; (a) to develop a conceptual model for analyzing culturally induced contradictions experienced during an ISD project, and (b) to reveal the relationship between level-specific cultural influences and emergent cultural contradictions in ISD projects. The primary research question we addressed was: What types of cultural contradictions influencing social interaction in ISD teams emerge at overlapping levels of culture in ISD projects? In this section we discuss our findings in relation to these research objectives and research questions.

We integrated the emergent concepts from our research and their relationships into an adaptation of existing conceptual models (Karahanna et al., 2005; Lawrence, 2013; Trice, 1993; Waring & Skoumpopoulou, 2012). The result is presented in Figure 9. This model illustrates our theorization of how the *Cultural Contradictions* we observe in the empirical data can be accounted for by overlapping *Levels of Culture*.

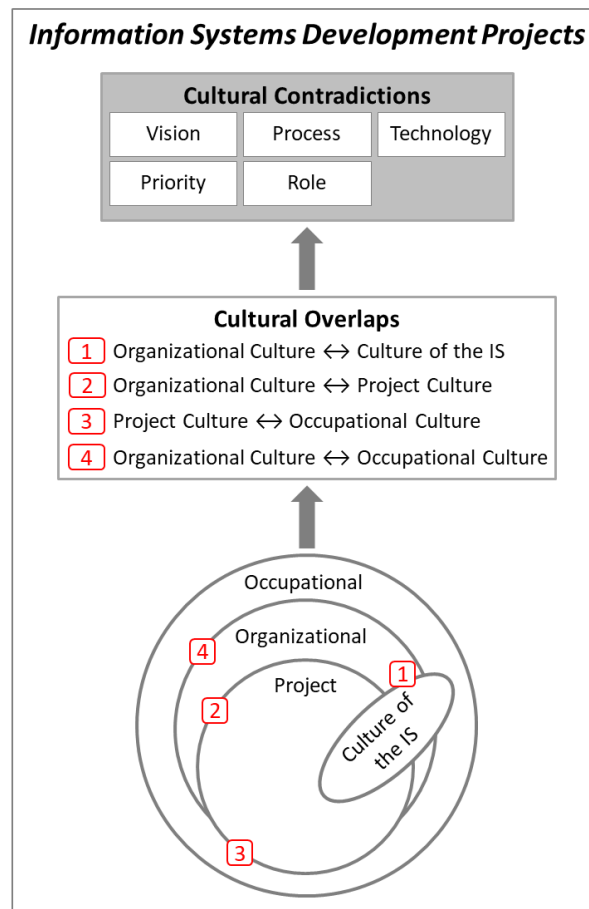


Figure 9. Cultural Contradictions, Cultural Overlaps, and Levels of Culture

The two key themes emerging from our data, *Levels of Culture* and *Cultural Contradictions* are discussed further in the sections that follow.

5.1 Levels of Culture

Our research reveals *Occupational Culture*, *Organizational Culture*, *Project Culture*, and *Culture of the IS* as influential cultural levels during ISD. The data does not explicitly support the relevance of cultural influences emanating from either the supranational or national cultural levels. Instead, we observed that values emanating from national cultural influences played out in the organizational context as organizational values. For instance, the value the organization placed in authoritative leadership is suggestive of the hierarchical bureaucracies that historically characterized some elements of the national culture (Thomas & Bendixen, 2000), prevalent for most of the organization's history. This observation supports the notion that culture does not occur in discrete levels, but rather as a complex mix of intertwined cultural levels (Ravishankar, 2015; Suri & Abbott, 2013). Furthermore, the absence of national or supranational cultural influences in our research model is aligned with the proposition that behaviors associated with the application of competencies to accomplish tasks will be influenced primarily by occupational, organizational, and group cultures (Bunduchi et al., 2020; Karahanna et al., 2005). Additionally, when considering the influence of national culture on IT occupational culture in countries across the world, Jacks et al. (2022) found more similarities than differences within the IT occupational culture, suggesting the influence from the national culture is not as significant, but nevertheless, from the toolkit perspective of culture, is still a resource drawn on and often woven and embedded into other layers.

The data also uncovers multiple *Occupational Cultures* amongst ISD team members, reflecting the variety of specialists that perform ISD activities (Project Management Institute, 2017). The salient values distinguishing different occupational groups in the project teams are related to ISD methodologies and project management practice. This finding supports research that extends the range of the *Occupational Culture* during ISD beyond just the IS industry (Karahanna et al., 2005; Rao & Ramachandran, 2011), in

our case to include project managers. Additionally, the *Project Culture* shows the prioritization of particular values by the project team related to the project context. The *Project Culture* is aligned to the notion of a group culture (Karahanna et al., 2005) or a temporal innovation culture (Lawrence, 2013). Our findings support the notion that projects can develop cultures of their own that are socially relevant in the project context (Karahanna et al., 2005; Shore, 2008) and counters the argument that relatively short project time frames preclude the emergence of a *Project Culture* (Fellows & Liu, 2013).

Our research corroborates the view that cultural levels overlap creating a dynamic and complex cultural environment (Karahanna et al., 2005; Ravishankar, 2015; Suri & Abbott, 2013). The values incumbent in *Levels of Culture* provide the elements individuals consider appropriate to interpret and respond to social situations consistent with their membership and degree of affiliation to the cultural levels (Lawrence, 2013; Su, 2015). The findings indicate that the *Occupational Culture* raises *Cultural Contradictions* at the overlap with the *Project Culture* and the *Organizational Culture* respectively. This supports prior research showing behavior involving the completion of tasks is primarily influenced by *Occupational*, *Organizational*, and *Project Culture* (Bunduchi et al., 2020; Karahanna et al., 2005).

The findings also align with prior research indicating that the overlap of cultural levels occurs between the *Organizational Culture / Project Culture* (Lawrence, 2013) and *Organizational Culture / Culture of the IS* (Dennehy & Conboy, 2019; Gupta, George, & Xia, 2019; Lee & Chen, 2019) and extends findings from earlier studies that primarily observe these cultural overlaps during technology adoption (Koch et al., 2013; Lawrence, 2013). The overlap between the *Organizational Culture* and the *Culture of the IS* represents the only overlap of cultural levels that raises contradictions across the *Cultural Contradictions* spectrum, as defined in this study. This range of contradictions supports the view that understanding the potential for overlap between the organizational culture and the IS is important for successful IS implementation post-ISD (Leidner & Kayworth, 2006). Our findings suggest this understanding is equally important for ISD.

An explicit distinction between the *Occupational Culture* and the *Project Culture* in this research accounts for the contradictions that emerge from interactions involving these levels. Furthermore, our research reveals that the multiple *Occupational Cultures* engaged in ISD raises *Cultural Contradictions* within this cultural level. Overlaps within the *Occupational Culture* and between the *Occupational Culture* and the *Project Culture* extend the focus on overlapping cultural levels beyond those involving technology. In this respect we contribute to the call to pay more than just nominal attention to social aspects in IS research (Sarker, Chatterjee, Xiao, & Elbanna, 2019).

The absence of *Cultural Contradictions* at the overlap between the *Occupational Culture* with the *Culture of the IS* suggests cultural commonality between these levels in ISD projects. This finding is supported by prior work where values like autonomy in decision-making, structure/precision, reverence for technical knowledge (Jacks et al., 2018; Jacks et al., 2022) and technical jargon (Guzman et al., 2008) are attributed to the information technology occupation and are closely akin to values associated with the *Culture of the IS* (Lawrence, 2013; Leidner & Kayworth, 2006).

The absence of *Cultural Contradictions* at the overlap between the *Project Culture* and the *Culture of the IS* supports the suggestion by Lawrence (2013) that significant cultural overlap does not generally occur at these levels. Instead, both cultural levels predispose individuals to adopt a more cooperative attitude (Lawrence, 2013), precluding demonstrations of *Cultural Contradictions*, and suggesting the potential for complementarities.

5.2 Cultural Contradictions

We expand on the notion of cultural conflict zones (Lawrence, 2013) by referring to them as cultural overlaps between different levels of culture, in recognition that both contradictions and complementarities might emerge at each cultural overlap. What emerged through the inductive data analysis were *Cultural Contradictions* at overlapping *Levels of Culture*, which refines the notions of “culture conflict” (Koch et al., 2013; Leidner & Kayworth, 2006) and cultural conflict zones (Lawrence, 2013, p. 43). Importantly, the same type of *Cultural Contradiction* may emerge from interactions implicating a variety of cultural levels. Thus, *Process Contradictions* may emerge from the overlap between the *Organizational Culture* and the *Occupational Culture* but also from the overlap between the *Occupational Culture* and the *Project Culture*. The *Cultural Contradictions* that emerge vary in their impact dependent on the contextual environment and the individuals involved. This is consistent with the view that the effects of cultural influences may range from resistance, inertia, or pliability (Lawrence, 2013) and lends support to the possibility in ISD of

negative (Alfaro & Chandrasekaran, 2015; Ramesh et al., 2017) or positive (Shachaf, 2008) consequences from cultural diversity. In this research we further elaborate on the potential contradictions emerging from overlapping cultural levels and conceptualize five different *Cultural Contradictions*; i) *Vision Contradictions*, ii) *Priority Contradictions*, iii) *Process Contradictions*, iv) *Role Contradictions*, and v) *Technology Contradictions*.

Vision Contradictions emerge from misalignment between organizational strategy and project objectives, and from complexities inherent in ISD that create difficulty in clearly articulating the IS solution. This finding supports research that reveals how the envisioning of the IS solution by the actors involved plays an important role in shaping the project outcomes (Bunduchi et al., 2020). *Vision Contradictions* is aligned with the notion of “vision conflict” that accounts for differences in the values ascribed to an IS by different groups (Leidner & Kayworth, 2006). Our findings support the view that achieving a shared vision amongst a diversity of project stakeholders is highly unlikely (Adolph, Kruchten, & Hall, 2012), discrediting the promise of potential benefit for project teams who invest in efforts to align stakeholder goals and objectives (Project Management Institute, 2017).

Manifestations of *Priority Contradictions* in the IS literature include varying perspectives on status and authority (Levina & Vaast, 2008; Pscheidt, 2011) or disagreements over the prioritization and organization of work (Rai et al., 2009; Suri & Abbott, 2013). In our research, the ISD teams prioritize the *Organizational Culture* in the early project stages with resistance to project requirements that challenge organizational norms. The priority changes in favor of the *Project Culture* as the projects proceed. These findings support the view that groups will adopt new values and beliefs if the resulting group actions are seen to be successful (Schein, 2010).

Process Contradictions emerge from challenges to the values, processes, and procedures contained in the *Occupational Culture*, *Project Culture*, and in the *Culture of the IS*. Contradictory organizational and professional values can account for the reluctance from both Kindle and Blend team members to fully disclose the risks on their projects. Instead, risks are managed using tacit methods rather than accepted risk management procedures, an approach commonly adopted by IS projects (Kutsch, Denyer, Hall, & Lee-Kelley, 2013). The success of FinSect confirms the efficacy of existing processes for organizational members causing resistance to change. Prior research shows leaders of successful organizations can resist suggestions that existing processes may be ineffective in alternative contexts (Weick & Sutcliffe, 2001). *Process Contradictions* could similarly be attributed to the issues arising from the misalignment of new development tools with existing practices (Dennehy & Conboy, 2019) and task conflict experienced in global virtual teams (Kankanhalli et al., 2006).

Existing organizational processes raise *Role Contradictions* when managers discount the value of specialist skills. Project tasks are allocated to unskilled individuals and decision-making is consensus-based. Other studies show how extra-project management approaches can create difficulties in ISD projects (Baghizadeh et al., 2020). The introduction of new technology also introduces the requirement for new technical skills causing differences between the *Organizational Culture* and the *Culture of the IS*. Prior studies similarly reveal the impact of new technology on the relevance of existing organizational skills (Waring & Skoumpopoulou, 2012). For instance, failure by organizations to relinquish management control of tasks in favor of self-organizing teams has been shown to be a common problem for ISD teams using agile methods (Berger, 2007; Jovanović et al., 2017).

Difficulty in translating the complexity incumbent in an IS into an unambiguous future vision causes a misalignment of values in the *Organizational Culture* with the *Culture of the IS*. The gaps between the requirements and expectations of organizational members and capability in the new IS reflect the *Technology Contradictions* that emerge. This finding is aligned to research that shows issues emerge during ISD from a mismatch between organizational values and the values embedded in a technology (Kaplan, 2011; Koch et al., 2013) or through poor technological support of existing organizational practices (Clemmensen, 2012). Additionally, efforts to integrate agile principles with areas of the organization unfamiliar with an agile approach created problems. This finding aligns with previous studies that reveal the need for organizational culture change when adopting agile methods (Kalenda, Hyna, & Rossi, 2018) and that non-agile organizational units can raise challenges for the introduction of agile software development (Abdalhamid & Mishra, 2017; Dennehy & Conboy, 2019).

6 Conclusions

This research has developed a conceptual model for analyzing culturally induced problems experienced during ISD that can serve to inform future theoretical and practical interventions concerned with improving ISD project outcomes.

6.1 Theoretical Contribution

Our research contributes to IS culture studies in four ways. First, we call attention to *Occupational Culture* in the ISD context as consisting of more than the values and practices relevant to IS developers. In this study values relevant to the project management discipline were also influential in guiding the actions of the ISD teams. This suggests that when diverse specializations are required to collaborate in ISD projects the cultural influences pertaining to the *Occupational Culture* will be diverse and nonconformist.

The second contribution relates to the illustration of various types of *Cultural Contradictions* and at which overlapping cultural levels they might emerge. We contribute to existing theory by suggesting the presence of *Role Contradictions* during ISD, not previously explicated in the literature.

Third, while our research contribution has been framed as an extension of prior work on cultural levels and cultural conflict zones (Karahanna et al., 2005; Lawrence, 2013; Trice, 1993; Waring & Skoumpopoulou, 2012), our conceptualization of *Cultural Contradictions* has broader applicability, for instance to research exploring cultural diversity. The metaphor of cultural diversity as a “double-edged sword” for work groups, with the potential for both positive and negative effects, is widely accepted (Stahl & Maznevski, 2021). Diversity affects both divergent and convergent processes in work teams: Increases in divergent processes lead to greater creativity (gains) and increased conflict (losses), while decreases in convergent processes lead to less groupthink (gains) and reduced cohesion (losses). Our work provides a framework to address the calls for further research that examines more precisely the multiple sources and levels of cultural diversity and intersections of diversity of different types (Stahl & Maznevski, 2021), and for further research examining how cultural diversity is managed (Minbaeva, Fitzsimmons, & Brewster, 2021). Additionally, while the focus of this study is on understanding contradictions as the emergent phenomenon, we recognize the possibility that complementarities might emerge at cultural level overlaps. Future research could usefully expand on prior research (e.g., Lawrence 2013) and explore this possibility. For instance, our data did not reveal any type of *Cultural Contradiction* at the overlap between the *Culture of the IS* with the *Occupational Culture* and *Project Culture*. These cultural levels might serve as a useful start in exploring complementarities between overlapping cultural levels.

Finally, by conceptualizing culture as dynamic and fluid our findings illustrate the simultaneous influence of culture from multiple and diverse cultural levels on ISD teams and extends the points of overlap between *Levels of Culture* that can emerge during ISD projects.

6.2 Practical Contribution

Successful ISD outcomes require interactions between cultural levels to be successful (Lawrence, 2013). Despite variation in the context and software development methods of each project, the findings indicate similarity in the nature and effect of the emergent *Cultural Contradictions*. Consequently, we submit that ISD teams would benefit by including individuals capable of dealing with discordant interactions that emerge from overlapping cultures. This proposal is aligned to earlier studies (Geeling, Brown, & Weimann, 2017) that reveal the importance to ISD of individuals with “cultural intelligence” (Gregory, Prifling, & Beck, 2009). These individuals use their practical experience and knowledge to situate the behavior of others in a broader context and are thus better positioned to recognize and respond to the underlying causes of problems (Gregory et al., 2009). This research suggests that consciously developing and effectively deploying individuals with high cultural intelligence to ISD projects would benefit the performance of ISD teams. Future research could seek to validate the existence of *Cultural Contradictions* and develop explanatory theory as to their impact on project performance. Investigations could also be conducted to explore the coping mechanisms used by ISD teams to manage these cultural contradictions.

6.3 Limitations

The projects selected for the research used two different software development methodologies: Blend used a waterfall approach while Kindle used an agile approach. Ideally, we would have preferred each project to follow the same methodology to limit the influence of extraneous factors on our findings.

However, as the software methodology itself is a cultural manifestation (comprising assumptions, beliefs, values, rules, techniques etc., conceptualized as the *Culture of the IS* in this study), and was scrutinized as such, the different methodologies provided an opportunity to compare cultural contradictions related to the software development methodology. Our findings show how both methodologies raised cultural contradictions with the organizational culture, but especially the agile methodology. This supports the need for close attention to potential cultural implications when introducing the agile methodology into organizations (e.g., Dennehy & Conboy, 2019; Jovanović et al., 2017)

Most of the IS workers in this research are working outside the IS industry, in a financial services organization. In such circumstances these workers identify more strongly with the IS profession than they do with the organization (Gannon, 2013). This context may have had a bearing on how participants perceived the organization and their role on the project.

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Appendix A

A search of the IS literature from 2005-2021 available on the Web of Science and Scopus databases and published in the 51 journals contained in the “M Litbasket” (Boell & Wang, 2019) returned 108 articles using the search criteria (*Cultur* AND (conflict* OR contradiction*)*). Pertinent author supplied keywords and a subsequent reading of the article abstract reduced the list to 14 unique and relevant empirical studies. Table A1 illustrates an analysis of this literature from the perspective of overlapping cultural levels.

Table A1. Empirical Studies: Overlapping Cultural Levels

Reference	Description	Overlapping cultural levels
Alvesson & Kärreman, 2007	Critically interprets the meaning and the functions of a human resources management (HRM) system. It seeks to highlight and interpret the significance of organizational culture in accounting for the role of HRM systems and practices.	Culture of the IS vs organizational culture
Berger, 2007	Explores the tension that transpired between the organizational culture and the Agile development approach.	Culture of the IS vs organizational culture
Guzman et al., 2008	Assesses the existence and importance of the occupational culture of IT personnel and its relationships with other types of personnel within organizations.	Occupational culture vs occupational culture
Kankanhalli et al., 2006	Explores the effect of cultural diversity on task and relationship conflict in global virtual teams.	National culture vs national culture
Koch et al., 2013	Underscores the interplay between organizational culture and technology by investigating an organization's effort to implement a digitally enabled social network.	Culture of the IS vs organizational Culture
Pscheidt, 2011	Aims to understand an information systems development project involving teams with African and European backgrounds.	National culture vs national culture
Ramesh et al., 2017	Examines the adaptation of agile practices in organizations in China, India, and South Korea.	Culture of the IS vs national culture
Bunduchi et al., 2020	Investigates a public-sector technology project aimed at delivering a unified human resource information system (HRIS) across regional health organizations in one country.	Organisationnel culture vs organisationnel culture
Gavidia, 2016	Explores the impact of the conflict between a parent and subsidiary on the process of an ERP implementation in a multinational enterprise (MNE).	National culture vs national culture
Alfaro & Chandrasekaran, 2015	Proposes that national diversity creates barriers to the integration of information among members of global software development teams, negatively impacting software quality and development speed.	National culture vs national culture
von Stetten et al., 2012	Explores how culture-specific behaviors impact social capital among team members and how firms can manage the strains.	National culture vs national culture
Garrison et al., 2010	Tests the effect of perceptions of diversity on trust, cohesion, and individual performance in globally distributed teams.	National culture vs national culture
Shachaf, 2008	Focuses on the effects of national culture diversity and ICT on team effectiveness.	National culture vs national culture
Iivari & Huisman, 2007	Analyzes the relationship between organizational culture and the deployment of systems development methodologies.	Culture of the IS vs organizational culture

Appendix B

These questions were used as a guideline for the semi-structured interview. The objective of the interview was to get a perspective from the individual on cultural influences, leadership, and project performance.

Organizational Information

- If you had to describe what the organization is like, how would you describe it?
- If you had to describe what it is like to work at the organization, what would you say?
- How long have you been with the organization?
- What is your role in the organization?
- Is there support in the organization for your role?
- If you could change one aspect of the organization, what would that be?

Project Information

- If you had to describe what the project is like, how would you describe it?
- If you had to describe what it is like to work in the project, what would you say?
- How long have you been on the project?
- What is your role on the project?
- How do you feel about the project goal / objectives?
- What is the most important knowledge/skill you bring to the project?
- Did you need to learn any new technology for the project?
- How would you describe relationships on the project?
- Have you had any previous involvement with project team members, social or professional?

Project Leadership

- Who would you describe as the leader(s) on this project?
- Could you give examples of how they demonstrate their leadership? What do they do or say?
- Does anyone else on the project do or say similar things?
- How do you feel about the leader(s)?

Project Performance

- How would you describe the status of the project?
- Do you think the project objectives are achievable?
- What aspect(s) of the project do you feel are the main contributors to current performance?
- If you could change one aspect of the project, what would that be?

Appendix C

The Levels of Culture subthemes and concepts are illustrated in Table C1. Definitions for the theme and subthemes are provided in Table 2.

Table C1. The Levels of Culture Subthemes and Concepts

Theme	Subthemes	Concepts
Levels of culture	Culture of the IS	Culture changes technology (K)
		Technology changes culture
	Occupational culture	Empowering individuals
		Facilitating collaboration
	Organizational culture	Attitude to challenges
		Collective decision making
		Excellence matters
		Great company to work for
		Historical influences
		It's a family
		People are important
	Project culture	Building trust
		Creating a project identity (K)
		Gaining commitment from stakeholders
		Positioning to achieve objectives
		Processes are important (K)
Note: Most concepts were represented in both datasets. Concepts unique to either Kindle or Blend are indicated by a (K) or (B) respectively.		

About the Authors

Sharon Geeling completed her PhD at the University of Cape Town (UCT), South Africa in 2019, after spending almost 25 years in various specialist and consulting information systems roles in industry. She is currently a Junior Research Fellow in the Centre for Information Technology and National Development in Africa at UCT. She has authored research articles published in leading AIS conferences such as ICIS and ECIS. She is the technical editor of The African Journal of Information Systems and reviews for the Communications of the Association for Information Systems, the European Journal of Information Systems, Information & Management, and The African Journal of Information Systems. Her research focus is on social phenomena in the context of information systems with topics that include information systems development, project management, culture, and ethics.

Irwin Brown is a Professor of Information Systems (IS) at the University of Cape Town (UCT). He maintains a broad interest in all areas of IS research, but with a specific focus on understanding and theorizing IS phenomena within context. He has contributed to over 120 research articles to date. Notable outlets include the European Journal of IS (EJIS), IT for Development Journal, Communications of the AIS, International Journal of Information Management, and leading AIS conferences such as ICIS and ECIS. He is currently Editor-in-Chief of the African Journal of IS (2021-present) and was a Guest Editor for the EJIS Special Issue on “Advancing the Development of Contextually Relevant ICT4D Theories”.

Peter Weimann graduated as a Master in Computer Science in Germany and completed his PhD at the University of Cape Town, South Africa. For over 10 years, he worked in the industry and consulting business in different management positions. Thereafter he held different professorship positions at the University of Cape Town and at universities in Germany. Currently, he is Professor for Information Systems at the Berlin University of Applied Sciences, Germany, and Honorary Associate Professor the school of IT at University of Cape Town, South Africa. Further, he is programme director of the international MBA Renewable Energy at the Berlin University of Applied Sciences. He has co-authored several textbooks and written research articles in the field of Information Systems, Business Engineering, Project Management and Health Management. He is Member of the Editorial Board of the Journal of Information Technology and Management and reviews for the Journal of Information and Management and International Journal of Project Management. His research topics are IS applications and sustainability in hospitals, project management, virtual teams, research methods, business engineering.

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