Aligning Organizational Values in Systems Development Projects: An Empirical Study

W. Alec Cram
Queen’s University
wcram@business.queensu.ca

Abstract
This paper examines the concept of alignment between the organizational values embedded in a systems development approach and the organizational values of a project team. Though past research has suggested that firm performance relates to the degree of strategic and structural alignment, the role of organizational values alignment remains ambiguous at the project level. Using a multiple case study approach, this research explores systems development project teams at three organizations, each using a development approach that incorporates different organizational value dimensions. By comparing the dominant values between the project teams and their development approach, we find varying degrees of alignment. Where alignment is high, perceptions of the systems development process are associated with satisfaction and enthusiasm; where alignment is low, perceptions focus on frustration and discontent. Based on the study’s findings, four propositions are outlined for examination in future research.

1. Introduction
Cultural values within organizations play an important role in the development of information systems [1]. Past research has suggested that the orientation of an organization’s culture can influence the extent to which development processes are used, supported, and perceived to have an impact [2]. Organizational culture is also manifested within systems development project teams, where values such as hierarchy, innovation, and passivity can characterize a project’s culture in the same way that values characterize an organization, business unit, or department [3]. Similarly, the systems development approaches used by project teams can be distinguished by the core values they embody [4, 5]. For example, recent research on agile development suggests that values of adaptability, sociability, and task-orientation are adhered to [6, 7, 8], while more traditional development approaches advocate values of consistency and hierarchy [9].

This study examines the antecedents and implications of aligning the organizational values of project teams with the values inherent in systems development approaches. Past research suggests that when development processes conflict with organizational values, project inconsistencies and challenges can arise that are difficult to overcome [10]. However, the specific project performance implications resulting from the degree of alignment remain uncertain.

Two research questions are posed. First, how successful are organizations at aligning the organizational values of project teams with the values inherent in systems development approaches? Second, what antecedents and implications relate to the degree of alignment achieved between project team values and systems development approach values? By considering the extent of information systems (IS) values alignment, this study will contribute to uncovering the links between culture and systems development, including how alignment or misalignment can influence project outcomes. In addition, this research answers calls for empirical studies related to IS cultural alignment [1] and agile development methods [11].

We adopt a multiple case study research approach by investigating the organizational values at three companies. Interviews are conducted with 22 development team members, including project managers, development managers, developers, and business analysts. We examine the interview data based on the taxonomy of cultural value dimensions proposed by Leidner & Kayworth [1]. These dimensions are also used as a basis for categorizing the core values inherent in the agile and waterfall systems development approaches. Based on a comparison between project team values and development approach values, the level of IS values alignment is evaluated and patterns are identified across each of the project instances.
This paper is organized as follows. The next section reviews the pertinent literature referring to organizational values, systems development values, and IS alignment. This will be followed by a description of the research methodology. Next, the results and a discussion of the findings will be presented. Finally, the paper will conclude with research propositions and implications of the study.

2. Theoretical background

This study draws on past research relating to three concepts: organizational values, systems development values, and information systems alignment. An overview of key aspects from this literature base is discussed below.

2.1 Organizational values

Organizational values refer to the specific, underlying dimensions that represent manifestations of the culture and beliefs of an organizational group [1]. Distinct from the values associated with a national culture (e.g. power distance, uncertainty avoidance), organizational values are directly associated with a specific organizational setting such as business unit or work group [12].

Past organizational values research has proposed alternative methods for categorizing the fundamental values that define and differentiate organizational groups. One popular view is the competing values model [14]. Under this view, four types of cultural types are proposed: group, developmental, hierarchical, and rational on the basis of differing perspectives: internal versus external focus and flexibility versus control structure. Of these, group and developmental culture represent ‘flexibility’, characterized by values of cohesion, trust, participation, creativity, adaptation, and growth. The remaining two cultural dimensions, hierarchical and rational, represent ‘control’ and are characterized by values of stability, efficiency, goal achievement, security, order, and routine [2, 14].

More recently, Leidner & Kayworth [1] define a taxonomy of cultural values, which identifies twenty-six organizational values dimensions cited from past literature. These dimensions are noted in Table 1. Because of its comprehensiveness, Leidner and Kayworth’s [1] taxonomy is used in our study as a means to consider the broad spectrum of values that could exist within an organization. Specifically, we examine how the organizational values that characterize project teams fit with the values embedded in the development approach that guides a team’s day-to-day activities.

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<tr>
<th>Table 1. Organizational value dimensions (adapted from Leidner &amp; Kayworth [1])</th>
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<tr>
<td><strong>Organizational Value Dimension</strong></td>
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<td>Task-Orientation</td>
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<td>Concern for Production</td>
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<td>Parochial Values</td>
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2.2 Systems development values

Systems development broadly refers to the activities, methods, practices, and transformations that are used to develop and maintain software [15]. Though there is some disagreement relating to the terminology used to describe systems development activities, we consider systems development approaches to refer to the goals, principles, and fundamental concepts of the systems development process [16]. Past systems development research has identified specific systems development methods that are perceived to be more suited to projects depending on characteristics such as schedule, requirements, level of control, or complexity [22]. Similarly, we argue that some development approaches align better than others on the basis of organizational values.

This study focuses on the unique values that characterize development approaches and project teams at three organizations. Each team utilizes a different approach: the first adheres to a strictly agile approach, the second utilizes a traditional waterfall approach, and the third employs a hybrid approach, which draws on aspects of both agile and waterfall. Comparisons between agile and waterfall approaches have been made in past research [5, 8], but have not concentrated exclusively on organizational values.

Agile development is an increasingly popular systems development approach and is the basis for numerous underlying methodologies, including eXtreme Programming, Scrum, and Crystal. The agile approach is based on a collection of twelve core values advocated by Beck et al. [6]. These values focus on concepts such as the continuous delivery of working software, flexibility to accept changing requirements, collaboration between developers and users, face-to-face interactions, and self-organizing teams. Agile development contrasts with more traditional, structured approaches to development by avoiding significant technical documentation and establishing only loosely defined roles and responsibilities [7, 17, 18].

Waterfall development is a decidedly more structured and traditional approach to systems development that was first introduced by Royce [20] and Boehm [9]. In contrast to the iterative processes of agile, the waterfall approach divides development into discrete phases, such as design or testing, that are completed in a predefined order. Such plan-driven development is commonly characterized by a focus on comprehensive requirements gathering and detailed planning at the beginning of the project, so as to minimize the requirement to revisit design issues later in the process. Project team members are traditionally assigned to specific job roles and responsibilities and

<table>
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<th>Organizational Value Dimension</th>
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<tr>
<td>Adaptability</td>
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<td>Clans</td>
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<td>People-orientation</td>
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<td>Pragmatism</td>
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We argue in this paper that systems development approaches are built on core cultural values in the same way that an organization, department, or project team exhibits values. The research questions for this study seek to investigate how the aggregated values of systems development project team members align with the values of the systems development process that the team uses. Limited prior research has been conducted in relation to cultural alignment in information systems
development and it represents a promising area for additional examination [1]. The following section provides a brief overview of IS alignment as it pertains to this study.

2.3 Information systems alignment

The study of IS alignment stems from strategy research focused on investigating the compatibility between an organization’s operational activities and strategies [24]. Alignment refers to the “fit, match, agreement, or similarity between two conceptually distinct constructs” [25, p. 51] and can either strengthen or diminish the joint effects that individual activities can have on firms [26].

Consistent with Chan and Reich [30], we view past IS alignment research as representing multiple dimensions and levels, including strategic alignment, structural alignment, cultural alignment, and project alignment. Past research on strategic alignment comprises the greatest proportion of work in the IS alignment area [30] and refers to “the fit between the priorities and activities of the IS function and the business unit” [27, p. 99]. A second dimension is structural alignment, which refers to the extent of centralized versus decentralized decision-making related to the management of IS functions and processes [28]. A third and largely unexamined area within the IS discipline is cultural alignment, representing the fit between an organization’s culture and the culture of the IT unit [1]. Finally, a new and emerging area of alignment research relates to project alignment, which is defined as “the degree to which an IS’s project deliverables are consistent with the project’s objectives, which are shaped by the organization’s IS strategy” [29, p. 35].

In this paper, we draw on multiple aspects of these four alignment dimensions using the term ‘IS values alignment’. We define this concept as the degree to which an organization, department, or project team’s cultural values are consistent with the core values embedded in the information systems processes and procedures conducted in pursuit of an organization’s IS strategy. This view integrates characteristics inherent in strategic alignment (e.g. a focus on innovation), structural alignment (e.g. a highly bureaucratic or hierarchical organization), cultural alignment (e.g. varied organizational culture perspectives) and project alignment (e.g. a level of analysis that includes project phenomena, such as those occurring during information systems development). Though we view IS values alignment as being a multi-level construct, the current study examines the alignment of values exclusively at the project level as it relates most closely to the cultural values embedded in systems development methodologies.

Past research has argued for alignment to be conceptualized as either an end state or as a process [30]. In this study, we subscribe to the later view due to the evolving nature of organizational values over time [14].

Measurement of the alignment phenomenon also takes a number of different approaches within the literature. Techniques include qualitative assessments of processes [31], direct computation [32], assignment of ideal types [33] and the matching of types [34]. In this study, we adopt a qualitative approach to evaluate the values inherent in both the project team and the development methodology, and then match the value categories together to determine the level of alignment. In this context, we consider a high degree of IS values alignment to represent a large proportion of project team values that are consistent with the development approach values, while a low degree of alignment represents a small proportion of consistent values.

3. Methodology

A positivist, exploratory case study approach is utilized in this study in order to address the research questions pertaining to how well organizational and systems development values are aligned in practice, as well as the alignment antecedents and implications. We adopt qualitative techniques to approach the research questions as a means to best capture the social and behavioral aspects of organizational values and project management that would be difficult to capture using quantitative techniques.

3.1 Research design

Three organizations located in Canada were selected to participate in this research project on the basis of their differing approaches to systems development, different industry, and different sizes. By selecting a diverse set of companies, we follow Yin’s [35] guidance for sampling logic in multiple-case studies based on literal replication. That is, by selecting a sample we expect to represent a diverse range of organizational and systems development values, we aim to uncover similarities in the antecedents and implications of alignment and misalignment across all three companies.

The unit of analysis for this study is the project level. Though cultural values can exist at a broad, organizational level, similar values are also exhibited in lines of business, departments, and project teams. By focusing on the values exhibited within the project.
team, we conduct a more focused evaluation of the alignment that would be possible if a more complex set of values, such as those at other levels of the organization were considered. In examining the organizational values of the project team, we focus on the beliefs expressed by team members during the interviews. These beliefs are then compared to the values of the systems development approach, which are drawn from the systems development literature.

The first organization, referred to by the pseudonym AgileOrg, is a small software development organization based in Ontario, Canada. The company provides development services to the financial services, retail, and manufacturing industries. All software development activities at the organization utilize a highly agile process, whereby users are involved throughout the project, working software is delivered frequently, and the team utilizes practices such as pair programming and shared code ownership.

The second organization, referred to as WaterfallOrg, is a large, international manufacturing organization based in the United States. The interviews for WaterfallOrg were also conducted in Ontario. The company uses a largely hierarchical structure, whereby systems development teams located around the world report to a centralized IT leadership group. Development activities follow a strongly waterfall approach, including a focus on up-front requirements and design, sequential development cycles, and formal approval of phase deliverables.

The third organization, referred to as HybridOrg, is a large media and technology organization based in the United States. The interviews for HybridOrg were conducted in British Columbia. Interviewees were participants on a team responsible for developing a customer-focused financial application. Though the organization generally adheres to a waterfall development approach, the local team had begun to introduce some agile techniques such as daily stand-up meetings and short, iterative development cycles to supplement more traditional techniques such as detailed documentation and project budgeting.

3.2 Data collection and analysis

Data was collected via semi-structured interviews with project managers, systems developers, and business analysts at the three organizations during the summer of 2009. Twenty-two interviews were conducted; each was digitally recorded and transcribed. The resulting text totaled 169 pages.

A formal case study protocol was established to guide the interview questions and QSR NVivo version 8.0 was used as a case study database to store interview notes and transcripts.

The data analysis process was conducted in two stages. First, the interview transcripts were reviewed for references to the organizational value dimensions cited in the cultural value taxonomy proposed by Leidner & Kayworth [1]. Value references were tagged into one or more coding categories.

The second step was to conduct searches for cross-case patterns to identify within-group similarities and intergroup differences [36]. The proportion of project team value codings were compared to the baseline values by development approach noted in Table 2 to determine the level of IS values alignment between the development team and the development process. As the proportion of values shared between the development team and the development approach increases, we consider the degree of alignment to also increase; as the proportion of shared values decreases, so does the degree of alignment. As part of this analysis stage, the interview transcripts were reviewed to determine if there were any project or team factors noted by interviewees that correlated with an apparent alignment or misalignment between project team values and the development approach.

4. Findings

All of the organizational value dimensions we examined from Leidner & Kayworth’s [1] taxonomy correspond to evidence from the interviewee transcripts. That is, specific comments were closely associated with the terminology utilized in the values and definitions contained in the taxonomy. In all three systems development project teams, the majority of organizational values corresponded with the dominant values of the development approach; however, varying levels of conflicting values existed depending on the project team.

Unsurprisingly, each organization was distinct in the organizational values subscribed to by the project team. AgileOrg was comprised of 10 value dimensions, WaterfallOrg exhibited 11 value dimensions, and HybridOrg displayed 10 value dimensions. However, the existence of development team values that appear to be in misalignment with the development approach values provide unique insights into antecedents and implications of the phenomenon. In the sections below, details of the values displayed by each project team are noted, as well as a selection of illustrative interviewee quotes.

4.1 AgileOrg IS values alignment

The dominant values identified within AgileOrg were involvement, innovation, people-orientation, and
adaptability. In total, all 9 of the 9 agile values (100%) noted in Table 2 were identified within the interview transcripts. The following quotes highlight the importance of involvement and people-orientation to team members:

As an individual, I guess I like the idea of being involved in this project, I feel commitment to the project, so that is sort of why I personally like to be involved in as much of it as possible. (Developer, AgileOrg)

I’ve totally been sold on the idea... I mean just love the collaboration and the code ownership and the sense of a team. I just really like that. (Developer, AgileOrg)

As well, only 1 of the 6 waterfall values (17%) noted in Table 2 was noted during the interviews. In comparison to the other two organizations, the proportion of development approach values that align with the project teams values is high, while the degree of conflicting values is notably lower, indicating a high overall level of IS values alignment. The interviewees appeared to have a close, personal connection to the development approach and genuinely assimilated their views and the development method’s views. This alignment is noted in the following quotes:

Every project room has slightly different rules. That is one of the things that I think that we do well. We are not dogmatic, so we are quite pragmatic. One team for example does no pairing, one team pairs exclusively. So it is whatever kind of works for the personalities and I think that we try to juggle the personalities internally to satisfy that. You know, juggle the team make-up. (Developer, AgileOrg)

The people here, they embrace agile. It’s not just like a top level kind of thing...people actually believe in it because it works. (Developer, AgileOrg)

Often the [project] rooms are strongly related to the technical team leader in that room. In fact, if you walk around the rooms you tend to see the rooms look very different. Like some rooms you will see people pair programming and they are talking all the time, other rooms and everyone is by themselves and it is silent. I think that a lot of that reflects the person who leads that team. (Developer, Agile Org)

Though AgileOrg did not demonstrate obvious evidence of misalignment between the core development team and the development approach, interviewees did suggest a level of misalignment with some external customer groups who participate as pseudo team members.

Some people are more agile or less agile. [Sometimes] the customer’s organization is not agile; the opposite of what we want to do. So there is this pressure for how they want to work or how they need to be successful. There is this pressure of how we think we are going to be successful. (Developer, AgileOrg)

One of the big distractions that we often have is getting the level of collaboration we need with the customer. We have projects that range from business experts being in the room with the team to projects where we can only get in front of the customer occasionally. (Developer, AgileOrg)

4.2 WaterfallOrg IS values alignment

The dominant values identified within WaterfallOrg were bureaucracy and involvement. In total, 5 of the 6 waterfall values (83%) noted in Table 2 were identified within the interview transcripts. The following quotes illustrate the sense of bureaucracy values within the project team:

I have been trying to keep the methodology from becoming too rigid. You know we will talk to somebody in [head office] and they will say, ‘Oh the deadline for delivering requirements is July 30th’. I really dislike having a deadline that says that they are going to work on requirements until that day and then suddenly it is our job to work from then on. (Developer, WaterfallOrg)

As well, 6 of the 9 agile values (67%) noted in Table 2 were noted during the interviews. Compared to the other two organizations, the proportion of development approach values that align with the project teams values is relatively low, while the level of conflicting values is notably higher, indicating a low overall degree of IS values alignment. This misalignment is illustrated in the following quotes:

I think a lot of my problems stem from analysts working as secretaries rather than actually using analytical thought. And it becomes a sort of customer driven design where a customer comes up with a screen and then hands it to me through the analyst, which is why we end up re-
architecting a lot of the designs because they are just really amateurish, they’re not done by people who actually understand technology in any way.

(Developer, WaterfallOrg)

I can’t say that I enjoy all the documentation and all the crap that is required for that. So we often just did what we needed to do to get by with it.

(Development Manager, WaterfallOrg)

[Head office says] ‘here it is, boom this is what we want’. We have one guy that... seems to handle it fairly well. For the rest of our group, we don’t like doing it. It takes away some of the free thinking, some of the things that we were trained to do earlier as far as providing ideas, having our say in how things should look.

(Business Analyst, WaterfallOrg)

[Management] keep retreating into more of a waterfall approach and say ‘no, we’re really only comfortable with about three code drops in the test’. Well, three iterations for the amount of development we want to do sometimes is just plain insufficient. So we’d do little mini code drops of our own and we’ve implemented continuous integration and mechanisms like that, so we can continue to run tests. We’ve got a whole series of automated tests that we’re trying to do here, but it feels like we are this little microcosm inside the larger scheme. Again, running very iteratively with a larger project that management would prefer to run in a waterfall.

(Development Manager, WaterfallOrg)

4.3 HybridOrg IS values alignment

The dominant values identified within HybridOrg were concern for people, involvement and bureaucracy. In total, 4 of 6 waterfall values (67%) and 6 of 9 agile values (67%) were noted during the interviews. The following quotes illustrate the values important to team members:

I think any QA [quality assurance] person will tell you that the better the requirements, the better the job they can do because you know what you should be testing against what.

(QA Analyst, HybridOrg)

The process is reliant on developers doing a good job at decomposing their work into small tasks and then estimating each of those tasks well. But then, I think you could argue that most software development is dependent on that for success.

(Developer, HybridOrg)

The results from HybridOrg are consistent with the hybrid development approach the project team employs. As a group, the organizational values were balanced between waterfall and agile values; however, the interviews suggest that some members of the team tend to subscribe to one set of values or the other, rather than incorporating a balanced collection of values. Although the aggregated values of the team appear consistent with the development approach values, the inconsistencies at an individual level suggest that HybridOrg represents a moderate degree of IS values alignment. Evidence of this position is noted in the following quotes:

Agile is hard to sell to people who aren’t believers already. Unless [you] already believe in an iterative approach, it’s hard to sell the entirety of an agile technique.

(Developer, HybridOrg)

I still don’t see the real need for [daily stand-up meetings]. I mean, besides the fact that it is the time that you just have to be at work and that it is sort of like a push to make sure that I have something to report the next day. So I am kind of like ‘okay this is what you have to do and have something to report the next day’... The content of the conversation to me is not necessary...it is just more the mentality, that you have to be there and you have to tell people that you do this and this.

(Development Manager, HybridOrg)

Our project manager would be running around saying ‘have you been working on that?’ But in the developer world, we don’t like to be asked that. We don’t like to be asked, ‘I have [tasks] one to five, have you done one? Why are you doing three when you haven’t done one?’ If we are stuck at one, we will move to two or we will do four first because four is easy. Maybe we will do three, four, five and then one and two.

(Developer, HybridOrg)

5. Discussion

The findings suggest that although each of the three project teams exhibits a level of compatibility between the project team’s values and the values of the development process, each team also exhibits a level of divisiveness as well. The following sections outline possible antecedents and implications of alignment
based on the empirical data, as well as a series of related research propositions.

5.1 Antecedents to IS values misalignment

Three distinct antecedents of IS values misalignment emerged during the data analysis. First, inconsistent values existed between the core project team and the customer (i.e. system sponsor) at AgileOrg. Because of the relatively uniform values exhibited by the project team in favor of an agile culture compared to some customers who adhered to more traditional organizational values, a level of IS values misalignment was created.

A second antecedent of IS values misalignment appears to stem from acute value contradictions within the project team. In the case of HybridOrg, some team members appeared to subscribe strongly to agile values, while others subscribed strongly to waterfall values. Although in aggregate these seem to align with a hybrid approach at the project team level, at a lower level of granularity the inconsistency across team members reveals a moderate level of misalignment between the team members.

Finally, in the case of WaterfallOrg, most team members appeared to be sympathetic to a more progressive set of values aligned with agile development, despite the organization’s adoption of a strictly waterfall approach. Consistent with Orlikowski’s [37] findings, more senior project team members tended to employ development ‘work-arounds’ when the prescribed approach was considered sub-optimal, whereas less experienced staff tended to interpret development guidelines more literally.

Past research on agile development has suggested the need for alignment between management strategy and team functioning. Maruping et al. [38] find that the agile methodology allows teams to cope with requirements change, but only when management provides a supportive environment to do so.

Based on these observations, the following propositions are put forth:

Proposition 1: The degree of IS values alignment is contingent on the consistency of perspectives across members of the core project team, project sponsors, and users.

5.2 Implications of IS values alignment

The study’s findings suggest that when strong IS values alignment exists, the project team has positive perceptions of the development process; interviewees were explicit in their satisfaction and contentment with the development process. In contrast, when IS values were misaligned, project team members were forthcoming with their frustration and discontent.

Past research suggests that when employees are satisfied with their work, performance improves [39]. Similarly, discontent is noted as being associated with lower levels of performance [40]. Though an assessment of project outcomes is beyond the scope of this research, the findings suggest that a high degree of IS values alignment may relate to improved project performance, while misalignment may relate to performance erosion. This view is consistent with past alignment research [41] and also relates to past work pertaining to the fit between the preferred cognitive style of developers and the cognitive style required by a job environment. Chilton et al. [42] suggest that as the gap widens between the preferred cognitive style and the cognitive style required by a job environment, performance decreases and stress increases.

Based on these observations, the following propositions are put forth:

Proposition 2: When the project team’s organizational values and the values of the systems development approach are strongly aligned, the project team fosters increasingly positive perceptions of the systems development process.

Proposition 3: When the project team’s organizational values and the values of the systems development approach are strongly misaligned, the project team fosters increasingly negative perceptions of the systems development process.

Proposition 4: Project team performance is positively related to the degree of alignment between the project team’s organizational values and the values of the systems development approach.

6. Implications, limitations, and future research

By examining the alignment of project team cultural values with the values inherent in a development approach, this study contributes to both research and practice. From a research perspective, we address prior calls for empirical research pertaining to agile development [11] and IS cultural alignment [1]. As well, we empirically evaluate the concept of IS values alignment, which considers multiple aspects of alignment within the information systems function. From a practical perspective, the findings from this study can be a useful tool to project managers and
developers considering the use of a new systems development approach or evaluating the effectiveness of their current approach. By considering the alignment between the values of the project team and the values of the development approach, organizations may be able to minimize negative perceptions of the development process and increase project performance.

There are several limitations of this study. First, we exclusively consider the values inherent in agile and waterfall development approaches. As a result, caution should be taken in attempting to generalize the findings to other approaches. Second, because the concepts of organizational values and development approaches are fluid and constantly evolving during the course of a project, the cross-sectional view depicted in this study highlights only a point-in-time perspective of each project.

This paper has examined the concept of IS values alignment and conducted exploratory work in three organizational settings. Future research could build on these findings by testing the propositions suggested above using a more explanatory study to examine the strength of causal relations between IS values alignment and project performance. As well, future research could consider the use of longitudinal studies to examine the progression of values over time and the effect on the level of IS values alignment.

7. Acknowledgements

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8. References


