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International Journal of Information Systems and Project Management

IJISPM

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The IJISPM publishes leading scholarly and practical research articles that aim to advance the information systems management and project management fields of knowledge, featuring state-of-the-art research, theories, approaches, methodologies, techniques, and applications.

The journal serves academics, practitioners, chief information officers, project managers, consultants, and senior executives of organizations, establishing an effective communication channel between them.

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The IJISPM offers wide ranging and comprehensive coverage of all aspects of information systems management and project management, seeking contributions that build on established lines of work, as well as on new research streams. Particularly seeking multidisciplinary and interdisciplinary perspectives, and focusing on currently emerging issues, the journal welcomes both pure and applied research that impacts theory and practice.

The journal content provides relevant information to researchers, practitioners, and organizations, and includes original qualitative or qualitative articles, as well as purely conceptual or theoretical articles. Due to the integrative and interdisciplinary nature of information systems and project management, the journal may publish articles from a number of other disciplines, including strategic management, psychology, organizational behavior, sociology, economics, among others. Articles are selected for publication based on their relevance, rigor, clarity, novelty, and contribution to further development and research.

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IJISPM

Editorial

It is our great pleasure to bring you the fourth number of the third volume of IJISPM - International Journal of Information Systems and Project Management. The mission of the IJISPM is the dissemination of new scientific knowledge on information systems management and project management, encouraging further progress in theory and practice.

In this issue readers will find important contributions on information systems conflicts, performance management in software development, and recruitment of IS/IT project managers.

The first article, "Information system conflicts: causes and types", is authored by Albert Boonstra and Jan de Vries. Conflicts are an inherent part of organizational life and managers deal with confrontations and conflicts on an almost daily basis. Information Systems implementations are a type of change that often leads to open or hidden conflicts. Managers and others involved can only deal with such conflicts effectively if they understand its nature and causes. To contribute to such an understanding, this article focuses on the analysis of IS conflicts, aiming to identify various types of IS conflicts and to develop a framework that can be helpful in assessing these conflicts. To this end, the authors have conducted a meta-ethnographic study. It is proposed a two-dimensional framework of IS conflicts that leads to a categorization involving four IS conflict types: task; implementation process; structure; and value conflicts. Based on the conflicts that were studied, the paper also reveals that, in reality, many IS conflicts have a hybrid form and develop from one type to another over time.

In the second article, "Towards holistic goal centered performance management in software development: lessons from a best practice analysis", Thomas Murphy and Kathryn Cormican, state that there are strong motivating factors for more effective performance measurement practices in software development. Astute practices in this domain are lauded to improve efficiency and effectiveness. However previous studies have shown that measurement in software is intricate, complex and fraught with challenges. Consequently it is poorly managed in practice. The authors' research seeks to better understand performance management in a real world software development setting in order to identify the challenges and generate a roadmap for improvement. The paper presents findings from an inductive analysis of a radical measurement program in a global software organization. The study investigates the level at which non-compliance with best practice can explain the company's disappointing results. The authors found that a narrow focus on projects, rather than on organizational goals, has seriously hindered its success. They also found that the rate of change in the organization as a whole was impinging on the effective implementation of its measurement program. An analysis of the results demonstrates just how challenging software measurement is. The findings provide an evaluation of best practice relative to the literature that is informed by real industry experience.

Leif Marcusson and Siw Lundqvist, in their article "Why advertise the obvious? Learning outcomes from analyzing advertisements for recruitment of Swedish IS/IT project managers", claim that when Swedish employers advertise for IS/IT project managers they tend to list almost obvious qualification requirements instead of describing those that are unique for their companies' competitiveness or, more precisely, instead of expressing those that really matters. The findings point to an inadequate ability to understand and/or express the requirements that should be decisive for the appointment in order to grasp the essence of what the job actually involves, which brings on problems for both the applicants and the employers. The practical implications of the study pursue a need for employers to stop advertising mostly general requirements for the benefit of more specified ones, that take the sector's, the organization's and the project's requirements into consideration. By doing so, the prospect applicants will have a better opportunity to understand what a certain job entails and the employers will have a better chance to appoint the right individual. The research implications point to a need for acknowledging, and set about solving, problems concerning qualification requirements in advertisements for IS/IT project managers.

We would like to take this opportunity to express our gratitude to the distinguished members of the Editorial Board, for their commitment and for sharing their knowledge and experience in supporting the IJISPM.

Finally, we would like to express our gratitude to all the authors who submitted their work, for their insightful visions and valuable contributions.

We hope that you, the readers, find the International Journal of Information Systems and Project Management an interesting and valuable source of information for your continued work.

The Editor-in-Chief,

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João Varajão is currently professor of information systems and project management at the *University of Minho*. He is also a researcher of the *Centro Algoritmi* at the *University of Minho*. Born and raised in Portugal, he attended the *University of Minho*, earning his Undergraduate (1995), Masters (1997) and Doctorate (2003) degrees in Technologies and Information Systems. In 2012, he received his Habilitation degree from the *University of Trás-os-Montes e Alto Douro*. His current main research interests are in Information Systems Management and Information Systems Project Management. Before joining academia, he worked as an IT/IS consultant, project manager, information systems analyst and software developer, for private companies and public institutions. He has supervised more than 50 Masters and Doctoral dissertations in the Information Systems field. He has published over 250 works, including refereed publications, authored books, edited books, as well as book chapters and communications at international conferences. He serves as editor-in-chief, associate editor and member of the editorial board for international journals and has served in numerous committees of international conferences and workshops. He is co-founder of CENTERIS – Conference on ENTERprise Information Systems and of ProjMAN – International Conference on Project MANagement.

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Information system conflicts: causes and types

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Abstract:
Conflicts are an inherent part of organizational life and managers deal with confrontations and conflicts on an almost daily basis. Information Systems (IS) implementations are a type of change that often leads to open or hidden conflicts. Managers and others involved can only deal with such conflicts effectively if they understand the nature and causes of information system conflicts (IS conflicts). To contribute to such an understanding, this study focuses on the analysis of IS conflicts. In so doing, it aims to identify various types of IS conflicts and to develop a framework that can be helpful in assessing these conflicts. To this end, we have conducted a meta-ethnographic study – that is, we synthesized earlier case studies in which IS conflicts are described. We purposefully selected 11 descriptions of IS conflicts and we analyzed the topics, contexts, and processes of these conflicts. Based on this analysis, we propose a two-dimensional framework of IS conflicts that leads to a categorization involving four IS conflict types: task; implementation process; structure; and value conflicts. Based on the conflicts that were studied, this paper also reveals that, in reality, many IS conflicts have a hybrid form and develop from one type to another over time.

1. Introduction

Empirical research [20, 23, 27], theoretical arguments [41], and anecdotal evidence, all support the view that conflicts are a pervasive phenomenon during the design and implementation of information systems (IS). During IS projects, multiple participants with different goals interact under uncertain conditions which can easily lead to confrontations, maybe about the inclusion or exclusion of certain stakeholders during the project, the introduction of new and unfamiliar working processes, or unwelcome structural, political, or cultural changes.

Despite this, in many situations, IS project managers demonstrate a low degree of 'conflict awareness'. IS project proposals are frequently presented from an implicit 'unitarist view' of organizations [38]. Within this view, organizations are perceived to be essentially harmonious, with conflicts both unlikely and undesirable. Moreover, recent studies in the IS field indicate that IS implementation plans are often based on rational and technical considerations. As such, the new IS is often heralded as innovative and beneficial for the company, and therefore as progress for all involved. For this reason, design and implementation plans often follow a logical and linear approach [44] and reflect a lack of awareness of conflicting characteristics of the IS. One possible explanation for this lack of awareness is that in both the IS literature and IS curricula relatively little attention is explicitly paid to IS conflicts, leading to a situation where implementers are not trained in the identification and management of IS conflicts [4].

Although conflicts are an inherent part of organizational life, and research on conflicts in organizations is acknowledged and studied in many fields including psychology, sociology, organizational behavior, and marketing [4], the IS literature on conflicts is fairly limited. The work of Liu et al. [27], Meissonier and Houzé [30], and a few others are the exceptions. The IS literature on power [18, 40] and resistance [23] associated with IS projects has produced a considerable understanding of the politics surrounding IS but, to our knowledge, there is no systematic perspective on conflicts related to IS projects. This paper aims to take a first step in addressing that challenge by examining and categorizing such conflicts. In doing so we seek to promote a theoretical understanding while also helping practitioners to recognize IS conflict types in the belief that such an understanding will contribute to more competent conflict management. Consequently, this paper addresses two research questions: (1) what are the topics, processes, and contexts of IS conflicts; and (2) how can IS conflict types be categorized in an IS conflict framework. Insights into the answers to these two questions will be derived by following a meta-ethnographic approach [34] in examining eleven descriptions of IS conflicts.

IS conflicts are different from many other organizational conflicts for several reasons. First, IS implementation often involves drastic changes in work processes of the employees involved. This implies that employees are challenged to move away from what they know, and start doing their jobs in a completely different way. As we know from the literature, changing the status quo leads to conflicts, because the people involved are risk aversive [31]. Secondly, IS are developed by specialists in the IS field, often not specialists in the profession were they are consequently used. People in the profession view this as a breach into the profession were some IT-specialist is trying to tell them how to do their work [23]. These two reasons explain why IS conflicts are both different from other types of conflict. It also hints at the fact that there may be a very different evolvement of the conflict, and thus a different way of managing is necessary.

To establish a basis for the proposed framework, the theoretical backgrounds to our study are first outlined. Based on these backgrounds, an initial perspective on IS conflicts is presented. Following this, the research methods are explained, followed by an analysis of the IS conflicts in our sample. Based on this analysis, an IS conflict framework is proposed and applied in a single IS conflict case. This application demonstrates how the framework can be used by implementers to understand and diagnose IS conflicts and then develop a conflict management approach that fits with the conflict in its context. The paper concludes by acknowledging the limitations of the study, assessing the usefulness of the framework, and suggesting avenues for future research.

2. Background

In this paper, we follow Thomas's definition of conflict as: '*a process which begins when one party perceives that another has frustrated, or is about to frustrate, some concern of his*' [41, p 265]. During this conflict process, some form of interaction between parties takes place, and so conflict can be seen as a relational construct that arises when parties feel that they are motivated and able to take action. A conflict assumes interfering goals or a disagreement in terms of interests, values, or power. In other words, conflicts involve a perception of incompatibility among concerns, and this often creates negative emotions. As such, conflicts involve contextual (interdependence), cognitive (disagreement), behavioral (interference), and affective (negative emotion) elements [4, 197-198].

An IS conflict is one that is related to the introduction or use of an information system that is perceived as inappropriate and as a threat to tasks, competencies, processes, values, and power relationships of individuals, groups, or organizations. IS conflicts are associated with resisting behaviors which express reservations in the face of pressure from change supporters seeking to alter the status quo by implementing an information system and related organizational changes [46, 11, 24, 30].

The idea of IS conflicts is consistent with a political perspective on information systems [29] and inconsistent with a rational view. Within a rational view, participants harmoniously cooperate to achieve the enterprise information systems' objectives that parties have agreed upon [38]. Rationalists articulate information systems in relation to efficiency and rationality concepts. They perceive the development of information systems as a natural sequence of events through initiation, design, implementation, and use. Within the political view, participants all have their own goals, and use the organization as a means to achieve those goals. Starting with this idea, proponents of a political view argue that information systems are in various ways related to the social and political processes that exist within organizations [15]. They believe that information systems can affect the balance of power between actors, and may lead to competition among stakeholders surrounding the implementation [18]. Consequently, attention to process and contextual aspects of an IS implementation is often promoted. Proponents of a political persuasion consider IS conflicts to be a natural consequence of introducing information systems [14].

In line with the rational versus political perspectives on organizations, researchers disagree about the functionality, or not, of IS conflicts and the optimal styles of conflict management. Among others, Barki and Hartwick [4] and Liu et al., [27] argue that IS conflicts are a negative phenomenon and that managers should be active preventers and resolvers of conflict. Contrary to this view, Tjosvold [42] argues that conflicts are healthy signals of growth, development, diversity, and unity. Meissonier and Houzé [30] concur and argue that latent conflicts present during IS development should be made explicit. Their view is that a passive management style stimulates team members to more effectively cope with conflict situations. Others take a more neutral stance [2, 31]. Clearly, IS conflicts can be a natural part of almost any change process in organizations that result in threats and disagreements about the change involved. As such, IS conflicts can be functional when they contribute to signaling problems or unintended effects. Such a signal can lead to a better system. However, IS conflicts can also be dysfunctional when they lead to disruption, stagnation, and lengthy disputes during the design and implementation process. In this study, we take a neutral stance towards IS conflicts and assume that the functionality depends on the type of IS conflict and on how it is managed [24].

Conflicts are often divided into cognitive and affective types [20, 35, 30]. With a cognitive IS conflict, the disagreement focuses on the 'hard' part such as the system, its goals, related tasks and processes, and its effects on structural issues. Affective IS conflicts on the other hand have a more psychological basis and are relational in nature. They are related to system threats perceived by some actors. These threats can be feelings of exclusion and loss during the implementation process or the perception that the system conflicts with the status quo, cultural principles, social relations, or values [31]. Some IS conflicts will be primarily cognitive or affective, while others simultaneously have both cognitive and affective elements.

Only a few studies have examined IS conflicts and their management. Barki and Hartwick [4] focus only on *interpersonal* conflicts during IS development and do not consider groups or organizations. Further, they follow a static and retrospective variance approach while it would be more appropriate to view conflicts as a process [41, 36]. Further,

they do not consider how a conflict evolved or how implementers could address conflicts. Liu et al. [27] examine the relationship between conflict and outcomes in terms of process, product, and project using the expressions 'good' and 'bad'. They also follow a quantitative variance approach. Meissonier and Houzé [30] focus in their 'IT Conflict-Resistance Theory' on how resistance and conflicts emerge and evolve during the previous stages of an IS project, the so-called pre-implementation phase. In their action research paper, they conclude that conflicts are productive and that an avoidance style of management is appropriate.

Starting from the ideas addressed above, there is an apparent need for further explanation and understanding of the different types of IS conflict. Such an understanding can be helpful in addressing potential actions that constructively deal with IS conflicts. It is quite possible that the effectiveness of an IS conflict intervention depends on the type of conflict. Based on our review of the literature, we believe that IS conflicts can best be understood by viewing them as a process in a particular context. On this basis, a tentative framework was developed in order to study IS conflicts in greater depth. Here, we focus on the topic and causes of a conflict against a background of the conflict process and its context.

The topic of the IS conflict addresses the reason for the interference. The conflict topic can be related to the impact of the system on work, business processes, organizational structure, or strategy. The conflict topic can also be related to the implementation process, such as when actors feel frustrated about their exclusion or their limited influence. Finally, the conflict topic could be related to a perceived negative impact on organizational norms and values. In this study we will identify the primary cause of a conflict, and treat the main concerns of the actors involved and their perceptions of possible negative consequences as the main attributes of the IS conflict topic.

The process of the IS conflict reflects how the conflict emerges and evolves, and how it is managed. Conflicts evolve over time, justifying the choice of a process analysis over a static analysis [14, 20]. Wall and Callister [47] view a conflict as a cycle with causes and topics, a core conflict process and effects that feed back to the causes. Throughout the conflict process, the topic of the conflict may change, perhaps from a task conflict to a relational conflict. Part of the conflict process may involve conflict management [4]. Most authors seem to agree that managers and implementers should anticipate potential conflicts that could affect a project. Thomas's model [41] has attracted considerable attention. Thomas identifies five conflict management styles: collaboration, competition, accommodation, avoidance, and compromise. He argues that conflict managers can optimize the welfare of one party (a partisan choice), both parties (a joint welfare choice), or the larger system of which the parties are members (a systemic choice). With regard to IS implementation, Lapointe and Rivard [24] consider four possible conflict-handling modes: 1) inaction; 2) acknowledgment; 3) dissuasion; and 4) rectification through negotiation or mediation. Rectification can involve system adaptation (topic), organizational adaptation (context), or process adaptation (implementation process). In this study, an IS conflict process is described in terms of its duration, intensity, behaviors, conflict management activities, and conflict outcomes.

The context of an IS *conflict* describes the social, political, and institutional context in which an IS conflict arises. This context can be on the interpersonal, intergroup, and inter-organizational levels. An interpersonal IS conflict for instance occurs when two individuals within a department confront each other over the functionality of a contract system [22], 1992). Ahn and Skudlark [1] describe an intergroup IS conflict when they address a situation in which two business units strongly disagree over a telecommunications services system. An example of an inter-organizational IS conflict is where two hospitals disagree over the system being introduced to share patients' medical data [6]. In this research, we use this contextual dimension to characterize the organization and its environment and the key actors surrounding the conflict.

3. Research design and method

Since this study's objective is to identify the causes of and responses to IS conflicts in order to identify IS conflict types, an in-depth perspective, as is offered by the case-study approach, is appropriate. To meet the objectives, a multiple-case study design is needed in order to be able to compare the various IS conflicts, to identify common

patterns, and to categorize them in groups. It is difficult however to identify and study fresh conflict cases although there are many well-documented cases that describe IS conflicts. Given this situation, we adopted a meta-ethnography research strategy [34]. This approach is relatively new in the field of IS although meta-ethnography is widely applied in other fields including education studies [16] and healthcare [8, 9]. A meta-ethnographic study follows three stages consisting of systematic selection, analysis, and synthesis of recorded case studies [34, 16].

1) Selection - In this study, the unit of analysis is an IS conflict, which is considered to start when a conflict is identified and end when some sort of closure or solution is achieved. Here, the cases selected come from scholarly articles in peer-reviewed journals. We also consulted with other IS scholars to see if they knew of published case descriptions we might have missed. This selection process led to an inventory of potential case studies from which eleven were purposively selected. The selection process was organized based on specific inclusion and exclusion criteria. Cases were possible contenders provided they reported: 1) an instance of an IS conflict; 2) evidence of the nature of the IS conflict; and 3) a rich description of events and the perceptions of key stakeholders. Cases which met these inclusion criteria were however discarded when: 1) it was impossible to identify the causes and backgrounds of the conflict; 2) the conflict did not take place in an inter-organizational context; and 3) the methods used for data collection and analysis were not rigorous or explicitly described. The selected cases (see Table 1) vary in terms of industrial sector, country, conflict origin, and conflict type. Noblit and Hare [34] encourage meta-ethnographers not to avoid differences but rather to view these as valuable in terms of maximizing variation sampling.

Table 1. Overview of included cases

Study	Country/region	Organization	System
Case 1) Van Akkeren & Rowlands [43]	Australia	Large geographically dispersed radiology practice	Enterprise wide IS
Case 2) Jensen & Aanestad [21]	Denmark	Medium-sized hospital	Electronic patient record
Case 3) Markus [28]	USA	Large geographically dispersed radiology practice	Financial information system
Case 4) Knights & Murray [22]	UK	Medium-sized mutual life office	Core contract system
Case 5) Ahn & Skudlark [1]	USA	Telecommunication services provider	Telecommunication services IS
Case 6) Boonstra [5]	Europe	Dairy products multinational	Enterprise resource planning system
Case 7) Chu & Smithon [10]	Europe	Major automotive manufacturer	e-business applications
Case 8) Doolin [15]	New Zealand	Major hospital	Performance measurement system
Case 9) Lapointe & Rivard [23]	Canada	Acute care hospital	Electronic medical record
Case 10) Levine & Rossmoore [26]	USA	Large financial transactions	Process management system
Case 11) Meyer & Young [33]	New Zealand	Mental health enterprise	IS for cost and output information

The regions and countries vary, with cases from North America, Europe, and Australia/Pacific. Different types of stakeholders were involved in the conflicts of the selected cases, such as doctors, accountants, executive managers, division managers, IS departments, and consultants.

2) Analysis - The second stage of a meta-ethnography process is the analysis. Each of the selected studies was independently reviewed by two experienced business researchers and their level of agreement determined. They approached the selected cases with the following descriptive and analytical questions that were derived from the initial perspective on IS implementation process conflicts:

IS conflict topic: What was the system's aim? What was the initial cause of the IS conflict? What were the related structural, cultural, or political issues? What were the concerns, interests, and positions of the key actors?

IS conflict process: How did the IS implementation process conflict evolve? How was the IS implementation process conflict managed and what was the outcome?

IS conflict context: What were the organizational and external contexts of the IS conflict? Who were the key actors involved in the IS conflict?

Answers to these questions were derived from the case descriptions. Each case analysis can thus be seen as a new interpretation through the lens of the tentative IS conflict framework.

3) Synthesis – The final stage of the meta-ethnographic process is synthesis. This is the interpretation of the collection of studies as this relates to the meta-ethnographical research question. The key difference between analysis and synthesis is the change in perspective from viewing the cases as parts of a collection to viewing the collection as a whole. In this process we synthesized the IS conflicts in terms of the four main themes that emerged from the analysis of the eleven IS conflicts.

4. IS conflicts: topics, processes and contexts

4.1 IS conflict topics

Most of the analyzed conflict-causing enterprise information systems that commonly contribute to IS conflicts share one or more of the following four characteristics:

1) IS conflicts arise from mandatory systems [7]. This is not surprising since mandatory systems force users into new prescribed behaviors. Such systems create dependency and may negatively affect autonomy. In comparison, when systems are voluntary, they tend to support users and enable discretion. Therefore, IS conflicts are less likely with voluntary systems.

2) IS conflicts arise from systems that transcend units, departments, or organizations and establish horizontal or vertical links. Systems that cross borders force actors to provide, collect, share, interpret, and use information. The likelihood that this causes functional, cultural, or political conflicts is greater than with local, internal, systems.

3) IS conflicts arise from systems that aim to standardize, enforce discipline, and monitor. Systems that facilitate managers in controlling their organizations or units can cause conflicts because this may threaten appreciated autonomy and self-control by workers and others.

4) IS conflicts arise from systems that are initiated because of pressure from external or distant bodies, for instance from government agencies or headquarters.

However, the analyzed cases also demonstrate that the conflict topics that emanate from the identified enterprise information systems can be diverse and multidimensional. We identified a main concern plus various topics that are often inter-related. For example, when users are dissatisfied with the tasks and functions of a system, they also tend to disagree with the implementation practices. Once we had identified conflict topics, we categorized them under four categories of IS conflicts: 1) IS implementation process conflicts; 2) IS task conflicts; 3) IS structural conflicts; and 4) IS value conflicts.

EIS implementation process conflicts amount to disagreements about the process of system design and implementation. Examples found included a lack of training (case 1), lack of consultation (case 4), little attention to relationship building (case 7), and the perception that the system was 'pushed down the throat' (case 9). IS task conflicts are disagreements about the immediate consequences of the system on work and related business processes. Examples found were 'technical problems' (case 1), 'difficult to use' (case 1), 'unequal division of economic advantages' (case 5), and 'detrimental effects on internal processes' (case 6). Disagreements about the effects of the system on the organizational structure, including control mechanisms and power redistribution, are viewed as IS structural conflicts. Instances included 'greater control of work practices' (case 2), 'losing control, a shift in power' (case 5), and 'domination of one business unit's working processes at the expense of those of the other business units' (case 6). IS value conflicts are seen as disagreements about the effects of the system on shared beliefs, values, and the culture of stakeholders. Examples found were 'new system conflicted with the customer-focused culture of two business units' (case 6), 'threat to the status of health professionals' (case 9), and 'system caused culture of distrust, suspicion, and secrecy among functional groups' (case 10).

4.2   Conflict processes

In terms of the processes, we identified duration of the conflict, conflict intensity, conflict behaviors, conflict management, and the outcome of the conflict. The duration of the studied IS implementation process conflicts varied from relatively short periods (case 2) to several years (case 3). IS conflicts also vary in intensity and can remain as latent conflicts (as in case 2) or develop to severe crises and even 'war-like' situations, such as in case 9. The conflict intensity is reflected in the so-called conflict behaviors, which can develop from complaining (case 3), through criticism (case 8), rejection of use (case 5), resignation (case 9), to sabotage (case 11). In many instances, managers take action during IS conflicts. Our analysis revealed various conflict management behaviors including job rotation (case 3), compromise (case 4 and 6), system abandonment (case 7), and downplaying (case 11).

4.3   Contexts of IS conflicts

Table 1 gives an indication of how the nature of the selected enterprise information system s varied. The systems included financial enterprise information systems, electronic patient records, CRM, ERP, and various types of performance measurement systems. IS conflicts in the implementation process took place on various organizational levels. Many IS conflicts occurred between two units, such as the vertical inter-unit conflicts between senior management and business units (cases 3 and 5). IS conflicts were also found between organizations (inter-organizational conflicts, case 7) and between individuals (inter-personal IS conflicts, as in case 11). Many IS conflicts have multilevel characteristics: they may start at the inter-personal level, maybe between the head of IS and a business unit manager, but can develop into an inter-organizational conflict (as in case 4).

5.   IS conflict framework

We have categorized the various IS conflicts by developing an IS conflict framework. This framework uses two dimensions to categorize IS conflict topics and is based on theoretical concepts as well on the case studies outlined above. The first dimension, the impact of the conflict, has already been discussed in the background section and distinguishes between cognitive and affective IS conflicts. The second dimension, the reach of the IS conflict, categorizes IS conflicts in terms of direct *versus* wider organizational consequences. Direct consequences of an IS conflict are ones that relate to immediate effects of the system and its implementation. Wider organizational consequences refer to wider and deeper consequences, such as conflicts over structure, control, autonomy, and culture. Establishing these two dimensions results in four archetypical IS conflict topics: 1) IS implementation process conflicts; 2) IS task conflicts; 3) IS structure conflicts; and 4) IS value conflicts (Fig. 1). Table 2 summarizes conflict topics according the identified categories.
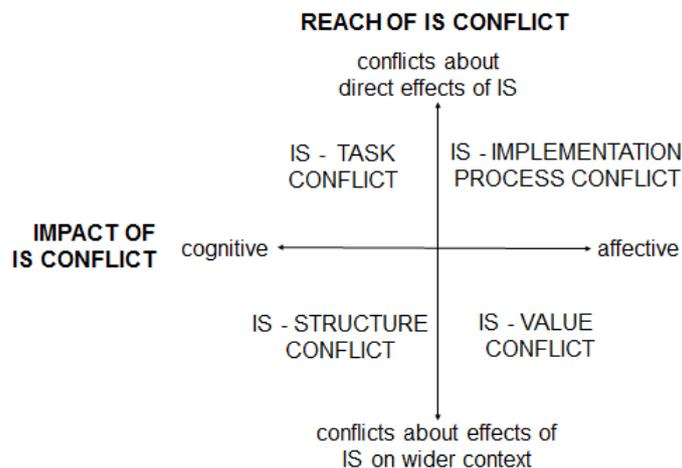
Fig. 1. Information system conflict framework

Table 2. Examples of IS-conflict topics

Conflict topic	Implementation conflict	Task conflict	Structure conflict	Value conflict
Definition	Disagreement about the process of system design and implementation	Disagreement about the technical qualities, use, functions, financial benefits and business processes	Disagreement about how the system changes structure, control and redistributes power division	Disagreement about the effects of the system on shared beliefs, values and culture
Examples from cases	Lack of training (case #1) No consultation case (#4) Little attention to relationship building (case #7) 'Pushed down the throat'(case #9) Fighting process (case #8) No attention for deeper processes (case #12)	Technical problems (case #1) Uneasy to use (case #1) New and undesired tasks (case #2) Unequal division of economic advantages (case #5) Detrimental effects on internal processes (case #6)	More control of the work practices (case #2) Losing control, shift of power (case #5) Domination of the working processes of one BU at the expense of those of the other BUs (case #6)	New system conflicted with the customer focused culture of two BUs (case #6) Threat to status of health professionals (case #10) System caused culture of distrust, suspicion and secrecy among functional groups (case #11)

We first discuss these four archetypes and related management interventions before moving on to discuss how in practice IS conflicts are often combinations of these archetypes and how IS conflict topics may develop and change over time.

5.1 Four archetypical IS conflicts

1) IS implementation process conflicts - During an IS implementation process conflict, at least one party is frustrated about the design and implementation process of an enterprise information system. Parties can especially experience such frustrations when top-down approaches, without consultation or participation (case 1), are adopted. The likelihood of such IS conflicts can increase when other parties, for example those who are part of a pilot scheme, have more

opportunities to influence system design than others (case 6). IS implementation process conflicts can also arise when participants feel that they are not being taken seriously by implementers. Since participation can be a time-consuming activity, parties can feel frustrated if their participation does not lead to real influence and acceptable outcomes (case 10). The literature on user participation, user involvement, and stakeholder management [29, 6] suggests that parties experience ownership and responsibility for a certain outcome if they have participated actively in the problem definition, and the development and implementation of a solution. If this is not the case, feelings of exclusion, passivity, alienation, and anxiety can arise, and these are expressions of IS process conflicts. A typical strategy in managing IS implementation process conflicts is to adapt the implementation process. Implementers can rectify the implementation process and invite parties to participate in the system and also train prospective users [23]. Ownership and shared responsibility for the proposed solution can reduce frustration among parties.

2) IS task conflicts - During an IS task conflict, parties become frustrated about the immediate consequences of an enterprise information system on their tasks, work processes, work design, or finances. This frustration can be related to technical problems, such as a slow response time or the unavailability of the system (cases 1 and 3). The system can also be difficult to use or reflect unfamiliar working practices, such as in case 6. Certain IS task conflicts are related to a perceived negative effect on the performance of work or as a distraction from 'the real work' (case 2). This is in line with the technology acceptance literature [13] that highlights the criticality of the system's perceived usefulness and perceived ease of use. Venkatesh et al. [45] complemented this model with other task-related variables in their UTAUT model, such as performance expectancy and effort expectancy. We have opted to categorize conflicts about the financial consequences of enterprise information system s as task conflicts because they are directly related to the tasks, roles, and responsibilities of people. In case 5, parties disagreed over the unequal division of the economic value of an enterprise information system. In a number of the IS conflicts investigated (cases 1, 2, 3, 8, 9, 10, and 11) the immediate motivation for introducing IS was to control costs or to generate new business, and the users felt that they did not receive a reasonable share of these benefits. In the event of an IS task conflict, typical behaviors are non-use (cases 3, 5, 8, and 11), using shadow systems (cases 1, 3, 6, and 7), and non-cooperation (cases 5 and 8). IS task conflicts may also arise when IS users feel that the system negatively impacts on their work motivation. This amounts to a perceived negative influence on skill variety, task identity, task significance, autonomy, or feedback [32], as was seen in cases 7 and 9. Typical strategies adopted to manage IS task conflicts include adapting the system to the work processes of its users, resolving the technical problems, and re-allocating the costs and benefits of the system.

3) IS structure conflicts - In an IS structure conflict, actors feel frustrated about the effects of an enterprise information system on structures, including on control structures, incentive systems, and power structures. In a number of our cases, we could observe greater domination and control by executive management as an IS outcome, at the expense of divisions, business units, and operational staff. Markus [29, case 3] provides a not uncommon example of accountants working at headquarters gaining power through a centralized financial enterprise information system at the cost of division-level organizational members. In the situation described by Jensen and Aanestad [21, case 2], the work practices of surgeons became more tightly controlled by top management. Case 8 [15] is another example of an attempt to scrutinize the work of medical specialists and to make their work visible and susceptible to intervention by management. These examples illustrate that IS structure conflicts may arise when a system interferes with established organizational practices or institutional logics [12]. This finding is in line with the IS literature on resistance. Antecedents of resistance to enterprise information systems are often related to wider contextual issues than the new system's technical and functional features. For example, Lapointe and Rivard [23, case 9] demonstrate how re-division of power and reorganization can lead to resistance whereas, in another situation, the withdrawal of a module and a relatively relaxed implementation scheme eventually led to supportive use of essentially the same system. Typical behaviors in the event of IS structure conflicts are the expression of negative attitudes and complaints (as in cases 2 and 4), threats of sabotage (case 11), and a lack of cooperation (e.g. case 5). Possible management strategies in response to IS structure conflicts are to renegotiate system specifications, allow other systems to be maintained for different units, restructure the organization before the actual system introduction, and offer incentives.

4) IS value conflicts - During an IS value conflict, actors feel frustrated over the effects of a system on shared beliefs, values, and culture of stakeholders. There is increasing evidence that enterprise information system s have the potential to affect organizational culture or subcultures. Robey and Boudreau [37] argue that culture can explain the contradictory consequences of implementing similar IS within different organizations. This IS in line with the findings of Leidner and Kayworth [25]. They conducted a review of the research on the culture – IS relationship, including the influence of IS on culture and found that similar systems can lead to different responses in different organizational cultures. Case 1 illustrates how an enterprise information system affected provincial practices, social networks, and a range of cultural attitudes leading to conflict in the context of a geographically dispersed radiology practice. Case 3 is an illustration of a system that challenged a culture of local autonomy and decentralization in a multidivisional organization. Similarly, case 6 shows how an ERP system was perceived as reflecting a bureaucratic and centralistic culture that conflicted with the flexible, fast, and market-oriented values of two business units. Doolin's study [15, case 8] describes how doctors, trained in a culture of scientific and positivist thinking, came into conflict with a managerial way of thinking that was more open-ended and 'trial and error' based. Typical expressions of IS value conflict are anger and aggressiveness (case 1, where 'radiologists, at least figuratively, kicked holes in walls', and case 9), cynicism (case 2), and illness and departure of key staff (cases 4 and 9). Conflict management styles seen in the event of IS value conflicts are the promotion of mutual understanding and job rotation.

IS conflict combinations - Our analysis shows that none of the studied conflicts can be categorized as of one single type. IS conflicts typically arise when external pressures (such as new government regulations) or strategic motives (such as to become an integrated firm) are translated into new enterprise information systems that are mandatory for its prospective users. These systems are often implemented in a top-down style, which can easily lead to an IS implementation process conflict. At the same time, these type of systems may be incompatible with people's tasks and work processes, which leads to an IS task conflict. After some time, parties may notice that the system increases the monitoring and control capabilities of management, at the expense of local-level discretion, which can lead to an IS structure conflict. Finally, the system may conflict with users' values, such as when management rationality collides with medical professionalism.

In such situations, IS conflicts are multidimensional and multilayered. The successful management of multidimensional conflicts requires the unraveling of the various dimensions of the conflict. An intervention may include a contingent combination of the IS conflict management approaches discussed above. In some situations, such a mix of interventions can be effective and may lead to an effective solution, as demonstrated in cases 5, 6, 8, and in two cases by Lapointe and Rivard [23 – case 9]. If such multilayered conflicts are not adequately addressed, they may lead to continuous tensions and problems (case 3) or to the abandonment of the system (case 7).

IS conflicts evolve and change over time - Typically, IS conflicts begin as an IS implementation conflict. If key actors are excluded during the implementation phase, they may become frustrated and criticize this process. The conflict may become more intense when the system is actually implemented, and when parties feel frustrated about a perceived lack of usefulness, incompatibility with work processes, or unequal division of financial benefits. If this situation develops, the IS implementation process conflict is likely to be followed by a more intensive IS task conflict. If this IS task conflict is ignored, more 'indirect' IS structure conflicts or IS value conflicts may arise. As such, IS conflicts can evolve and worsen over time if not addressed in a timely and acceptable manner.

5.2 Single IS-conflict case from the framework's perspective

We will now show how one IS-conflict develops within the dimensions of the model. This example demonstrates that the framework can be used as a tool to describe conflict topic, conflict process and intensity. Doolin [15] analyses the implementation of a large information system in a New Zealand hospital. The national health context was concerned with improving operational efficiency and the allocation of limited resources. Hospitals were forced by regional health authorities to become more commercial and to link funding with production. Hospital managers felt that they were lacking appropriate information to control costs and to use resources in efficient ways. It was this context where the hospital decided to develop a computerized resource management system capable of linking costs to clinical activities.

The system was intended to monitor and scrutinize activity of hospital doctors. Management hoped to influence clinical behavior through the increased visibility afforded by the system. The system provides a view on clinical practice and highlights variances between the performance of individual doctors and other specialists.

IS Implementation conflict - During the implementation of this system the conflict started in a latent mode expressed by cynicism of some hospital staff members. They perceived the system as another management tool without clinical benefit. Staff was invited to participate during the development and implementation but the response to these requests was low. Many staff members expressed a lack of interest and others felt that this was 'pushed down the throat'. In Fig. 2 this is expressed by 't1' light grey color in the 'IS 'implementation process' box. At this stage there was disagreement about the involvement: management expected more understanding, participation and enthusiasm from hospital staff.
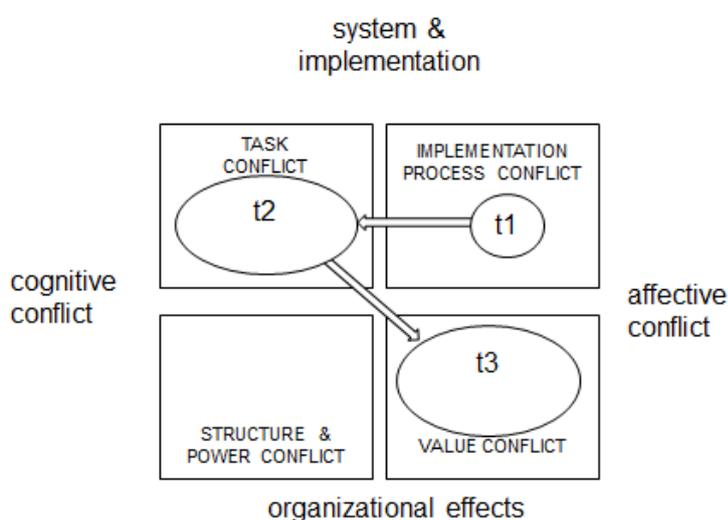
Fig. 2. IS-conflict development (t→ t1→ t2) of case # 8

IS Task conflict - After the implementation the conflict became more manifest. Doctors were expected to use the system but there was little cooperation in the data collection. Time spent on data collection was seen as a distraction from the primary clinical focus of patient care. Many staff members expressed their concern about the usefulness of the system. The system gave little benefit and was seen as a duplication of what they already did. Management made little incentives available to cooperate in the data collection and expected compliance. In Fig. 2 this is expressed by 't+1' in the 'IS task conflict' box. Conflict became more manifest, involved more actors and was focused on the task dimension. Data entry was time consuming and resulted in little clinical or financial benefit.

IS Value conflict - Later on the conflict developed towards a value conflict. The hospital management aimed to strengthen control of doctors and accountability of doctors. A corporate manager said: 'there are difficulties with managing doctors. I believe the only way of managing doctors is to get information through IS that provide them with the sort of reports in which peer pressure will bring some conformance to expenditure'. Information from the system offered a way to divide the hospital into visible and manageable parts built around the revenue streams related to clinical specialties. The system was also needed to coordinate the movement of patients between the clinical units and to match the resource utilization with the relevant purchase provider contacts. A hospital manager said 'I guess it's just their culture, their professional culture, that they're clinicians and managers shouldn't be telling them how to treat their patients. There was reluctance to use a tool provided by the management. It was seen as an intrusion on the professional

autonomy and clinical freedom of doctors. This conflict is placed in the IS value conflict box by 't+1'. During this stage the conflict was most intense.

The implementation of this system did not develop into a 'IS structure and power conflict' since the formative context of the organization such as structure, management style and background conditions remained unchanged. Management hoped for a cultural change by the distribution of relevant performance information but without changing structure, incentives, powers and responsibilities. The conflict finally resulted low use rates. Department heads of clinical units only used the information if they could claim more resources. Widespread use by doctors was never effectuated.

6. Conclusions

Conflict is an important organizational phenomenon and one that is clearly prevalent but under-researched in the IS discipline. Therefore, the main question addressed in this paper has been: what are the topics, processes, and contexts of IS conflicts, and how can IS conflicts be categorized in an IS conflict framework? We have answered this question by analyzing eleven published cases that included rich descriptions of conflicts that arose during the introduction of an IS system. We have analyzed the context, process, and topics of these conflicts. In characterizing these conflict types in a framework, we proposed four archetypical conflict types that are classified using two underlying dimensions: cognitive *versus* affective, and direct *versus* indirect consequences. The resulting archetypical conflicts are: 1) IS implementation process conflicts; 2) IS task conflicts; 3) IS structure conflicts; and 4) IS value conflicts. This study highlights that the types of IS conflicts that arise are not based solely on the technical and functional characteristics of the system, but also on the perceptions gained from actual interaction with the new technology in the specific organizational setting. Systems often impose control mechanisms and new roles that are not always welcomed by the intended users. Our analysis demonstrates that IS topics of conflict in real life can be characterized as combinations of the framework's archetypes, and that the topic may change over time. The path that is followed during the conflict process depends on how the conflict is managed and, for that reason, we propose the development of a contingency model for IS conflict management.

Existing conflict theories are general in nature and ignore the various types of confrontations that are characteristic during the introduction of enterprise information systems. The same is true of approaches to conflict management. The dominant model seen today, that of Thomas [41], is descriptive in nature and does not take account of the conflict type. Lapointe and Rivard's [24] introduction of conflict handling modes partially fills that gap, but this views system rectification as the only appropriate IS conflict management style. Here, our study has a number of theoretical implications and suggests that a contingent approach to the management of IS conflicts is required. IS conflict management may need to involve adapting and revising system functionalities as well as implementation practices. This study's framework can be used as a starting point for the development of such a contingent approach to conflict management. This research has also demonstrated both the feasibility and the value of conducting meta-ethnographic research based on published IS cases.

The value of these findings for IS project managers and others responsible for the implementation of enterprise information systems is that the IS conflict framework proposed in this study could contribute to recognizing and understanding conflicts that arise during IS implementations. Such an understanding may help implementers to apply conflict management approaches that suit their particular conflict. We would stress that no conflict management approach is universally applicable, and the nature of a specific conflict may point toward a particular intervention. For example, a conflict in an IS implementation process may lead to adaptations being made in the degree of participation and involvement during the introduction of the system. In comparison, in the event of an IS structure conflict, negotiations among the powerful parties and adaptations to the system might be needed to resolve the conflict.

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Towards holistic goal centered performance management in software development: lessons from a best practice analysis

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Abstract:
There are strong motivating factors for more effective performance measurement practices in software development. Astute practices in this domain are lauded to improve efficiency and effectiveness. However previous studies have shown that measurement in software is intricate, complex and fraught with challenges. Consequently it is poorly managed in practice. Our research seeks to better understand performance management in a real world software development setting in order to identify the challenges and generate a roadmap for improvement. This paper presents findings from an inductive analysis of a radical measurement program in a global software organization. Our study investigates the level at which non-compliance with best practice can explain the company's disappointing results. We found that a narrow focus on projects, rather than on organizational goals, has seriously hindered its success. We also found that the rate of change in the organization as a whole was impinging on the effective implementation of its measurement program. An analysis of the results demonstrates just how challenging software measurement is. The findings provide an evaluation of best practice relative to the literature that is informed by real industry experience.

1. Introduction

Researchers recognize that performance measurement programs are central to the improvement of the software development process and hence an organization's overall productivity levels [1]-[2]. However, these programs are extremely difficult to implement and success rates are low [3]-[5]. The challenges are wide and varied but seem to arise from two main sources: software and people. Software by its very nature is difficult to quantify and measure; and people, again by their nature, are resistant to having their work measured. Therefore it seems that an organization that wishes to improve productivity through measurement must ensure that the correct metrics are implemented and that the system makes sense to its people. Notwithstanding the inherent difficulties in measuring software productivity, there is a wealth of research in the field offering guidance as to best practice. This research investigates if there are underlying reasons as to why, despite the availability of guidance, software measurement programs still encounter difficulties and yield disappointing results. We present a case study of a global software company (referred to as GSC) that has been through a radical measurement program and has undergone significant organizational change in the process. The organization in question has not had the desired level of productivity improvement from the program. This research focuses on the Irish business unit. It was conducted through a series of detailed structured interviews with 21 people from three different levels involved in the measurement program and aims to determine the extent to which non-compliance with best practice can explain GSC's poor results from their measurement programs.

The research found that there was a disparity between how senior managers, middle managers and developers viewed the effectiveness of the measurement process. It extrapolates the reasons for the perceived failure of the measurement program across the roles of senior management, middle management and developers, and synthesizes and collates their experience. The lessons learned in GSC were found to be primarily in terms of attitudes towards measurement and the difficulties inherent with dealing with high levels of change. Furthermore, we identified a pervading culture of focusing on the delivery of individual projects, rather than learning from other projects and sharing information. It also seems that in the rush to deliver projects on-time, quality and productivity issues were being neglected. It is hoped that the findings of this paper will offer a more complete overview of how a large software organization can avoid some of the pitfalls inherent in software measurement programs.

The next section synthesizes the literature and identifies, categorizes and discusses critical success factors found to be effective in software measurement. Section 3 presents the research methodology employed in this study. Section 4 analyses the results from our study, and finally section 5 discusses these results and provides some recommendations to academics and practitioners based on our findings.

2. Challenges with software measurement

Software measurement programs are lauded to enable effective control, reliable communication and improved productivity [6]-[7]. However, software measurement is an emerging field and remains a major challenge for many organizations [8]-[9]. Published research has highlighted many problems in this regard [7], [10]-[11]. For example, we learn that despite significant investment the majority of software measurement programs fail in practice. In other words, they do not last more than two years, and they do not have an impact on the organization's management decisions. Many researchers refer to the complex nature of productivity measurement which inhibits attempts to improve the productivity of software development processes in software engineering organizations [6], [10]-[11]. Researchers such as Munson [10] emphasize the enormity of the challenge experienced by software engineering organizations in implementing metrics programs. It seems that the software industry is making slower progress than the hardware industry in measuring, analyzing and implementing improvements in productivity.

Kasunic [12] outlines problems in this regard that clearly needs to be addressed. These include:

- There is still a significant gap between the current and the desired state of measurement practice due to a lack of effective implementation and follow-through when it comes to measurement practices;

- There are different perspectives between management (executives, program managers or project managers) and practitioners (engineers, analysts and programmers) indicating a lack of "congruent communication" between the two groups;

- Measurement information is not always used effectively because it is not acted upon.

It seems that a holistic, goal-orientated approach to measurement, combined with effective management practices, is required to address the challenges faced in these areas directly.

3. Holistic goal centered measurement

Izhar et al. [13] stress that measurement must start with the articulation of high-level organizational goals, putting it simply: '*a bottom-up approach will not work*'. In order to achieve a purposeful measurement system specific performance metrics must be developed that operationalize and align with the organizations goals [14]-[15]. Indeed if metrics are not tied to goals and context, there will be no way of interpreting the data in a meaningful way. Many models have been proposed to provide such alignment [7], [16]-[17]. Attention must also be paid to wider organizational factors that impact measurement of software productivity, and many researchers stress the importance of measuring all project and process activities. A growing number of researchers argue for a holistic view that considers both technical and non-technical aspects measures as well as their interconnectedness [5], [18]-[22]. A synthesis and analysis of the literature identified critical success factors (CSFs) known to be effective in software productivity measurement. These are (a) people, (b) technology, (c) organization, (d) information structure and (e) management practice. These critical success factors, when considered together, ensure a balanced and holistic approach for effective software measurement.

3.1 Organization

A goal-centered approach that encompasses business objectives is critical to the success of a measurement initiative [12]-[13], [20]. Metrics should be tied to business and improvement goals, and all data should have a specific purpose. Otherwise the program runs the risk of collecting redundant data. Furthermore, a measurement program needs dedicated resources; if measurement is done on a voluntary basis without key personnel it will become directionless. Therefore a metrics program should have dedicated personnel involved with the necessary skill sets for driving the program and making the data collected meaningful.

3.2 Management practices

Senior management practices and attitudes towards measurement programs will influence their success: if management insists on a radical approach prioritizing their own department's metrics, there will be mixed results. There also needs to be cross-departmental agreement on the measurements use so that data is clear and meaningful to all. Research suggests that an incremental approach should be adopted. Defining and collecting metrics incrementally over time allows for timely feedback and fine-tuning of the program. Incremental implementation is also less risky than a single push [23]-[25]. In addition measurement programs should be standardized in order to reduce effort and ensure clarity [23]-[26].

3.3 People

Non-technical, 'human' issues are the most critical to the success of an organization's metrics program. Metrics need to be transparent and there needs to be clarity across the key stakeholders as to the rationale for measurement. It is the work of practitioners that will be mostly measured so that there needs to be buy-in from the outset. If the activities

being measured are viewed as being to blame rather than improve then the data is open to manipulation. Software developers should be involved from the outset of the design of a metrics program in order to ensure buy-in and active participation during the implementation phase [23], [25], [27]. In addition, internal or external champions for the measurement program can increase awareness, enthusiasm and understanding [23], [25]-[26]. As with any process improvement program, staff should be trained at the appropriate level, whether in terms of raising awareness of the rationale for the program, or specific training in data collection or analysis.

3.4 Information and communication

Clear, positive communication regarding the rationale behind a metrics program is needed to secure tacit support from practitioners and management; otherwise the program runs the risk of being viewed as being for blame purposes rather than for productivity improvement. Best practice should ensure the following three factors. Consequently transparency is essential. In other words, there needs to be clarity on the nature of the data being collected and also the on purpose to which it is being put [23], [25], [28]. There also need to be clarity on the usefulness of the data so that participants understand the rationale for collecting it [23]. Feedback mechanisms increase visibility of a metrics program and reassure participants that the data is being put to use [25], [27].

3.5 Technology

The technology used in a metrics program should maximize data collection efficiency and accuracy – ideally data collection should be automated and a platform that can be understood and utilized across the organization for both reference purposes, comparison and historical analysis. Automated collection of data ensures more efficient use of resources and accuracy of data [23], [25]-[26]. A data repository is also needed to store data for comparative analysis and to evaluate overall trends, allowing a cyclical process whereby metrics are controlled and evolve according to business needs [23]. Finally, the metrics used should be based on robust data that is not open to manipulation [25].

4. Research methodology

4.1 Research method

The goal of our study was to uncover deep insights into a particular context specific phenomenon. More specifically we wanted to examine the attitudes of staff to a software measurement program and to determine why significant improvements are rarely made. Therefore an inductive case study analysis was used as it is best suited to this type of research. The strength of case study research lies in the ability to undertake an investigation into a phenomenon in its context. This case study is used to explain a situation and to provide a basis to apply solutions to situations. The advantages of the case study method are its applicability to real-life, contemporary, social-technical systems [29]. Case study results relate directly to everyday experience and facilitate an understanding of complex real-life situations.

4.2 Case profile

GSC is a leading global financial services organization providing enterprise software development services to the financial sector. There are approximately 35 business units. The Irish operation was established almost 20 years ago and it focuses on software development. Significant organizational transformation has occurred within the software engineering division to improve efficiency and effectiveness. The total technology spend has been significantly more than its competitors for many years. However, management has had difficulty in demonstrating the return on investment of such a significant investment. Consequently, the measurement program was reviewed and amendments to metrics and processes ensued. The major challenge has been to transform the metrics from simply measuring adherence to activities, to metrics that clearly demonstrate the value-add or improvements in those activities. A monthly and quarterly analysis of all key software engineering activities is presented to the top management of the organization and trends and trajectories are examined in a bid to spur key organization improvement changes. Despite these efforts GSC found that they were not making significant productivity improvements and that the overall results were disappointing.

4.3   Sample

Software measurement programme spans many functions, disciplines and hierarchies. Therefore it is essential to set boundaries in order to maintain a clear scope. Consequently, the unit of analysis in this study centered on: (a) senior managers; (b) middle managers; and (c) developers. To do this a purposive, stratified non-probability sample was employed. Tansey [30] indicates that a non-probability sample is effective when, as in this study, the research is exploring what is occurring. Patton [31] suggests that a purposive sample '*has a logic and power - and provides rich information'*. Our sample selection was dictated by replication logic instead of a statistical one in accordance with best practice in case study research [32]. Consequently the researcher's judgment was used to select the sample elements in order to ensure that rich and meaningful data was collected. The sample was stratified to include opinions from three key areas represented in the unit of analysis. The number of subjects chosen from each of the strata was not based on the size of the stratum relative to the target population size. Instead it was specifically chosen to equally represent senior managers, middle managers and developers. Therefore detailed structured interviews were conducted with 21 people from three different levels involved in the measurement program in Ireland. 7 representatives of senior management; 7 representatives of middle management; and 7 software developers participated in our study. All of the participants are involved in measurement activities and productivity improvement. Every attempt was made to ensure internal validity (i.e. that any causal conclusion is warranted and free from bias).

4.4   Constructs and measures

In order to analyse the challenges associated with software measurement programs a number of best practice models and frameworks were studied. Five constructs were identified which significantly impact on software measurement programs. These include (a) organisation, (b) management practices, (c) people, (d) information & communication and (e) technology. Upon further analysis we identified 13 factors from the literature that aligned to the categories. Specific variables and measures were developed to operationalize these constructs. Multiple indicators (i.e. independent variables) for each best practice construct (i.e. dependant variable) were developed to increase the validity of the data collection instrument. Table 1 summarises these five categories and 13 success factors.

Table 1. Critical success factors used in data collection protocol

Category	CSF	Description
Organization	Goal-oriented approach	Metrics should be tied to business and improvement goals, and all data should have a specific purpose
	Dedicated metrics team	A metrics program should have dedicated personnel involved with the necessary skill sets for driving the program and making the data collected meaningful
Management Practices	Incremental approach	Defining and collecting metrics incrementally over time allows for timely feedback and fine-tuning of the program. Incremental implementation is also less risky than a single push
	Standardised procedures	Standardised processes and procedures in measurement activities within an organization reduce effort and ensure clarity

Table 2. Critical success factors used in data collection protocol (cont.)

Category	CSF	Description
People	Developer participation	Software developers should be involved from the outset of the design of a metrics program, in order to ensure buy-in during the implementation phase
	Practitioner training	Staff should be trained at the appropriate level, whether in terms of raising awareness of the rationale for the program, or specific training in data collection or analysis
	Program champions	Internal or external champions for the measurement program can increase awareness, enthusiasm and understanding
Information and Communication	Transparency	There needs to be clarity on the nature of the data being collected and also the on purpose to which it is being put
	Usefulness	There also need to be clarity on the usefulness of the data so that participants understand the rationale for collecting it
	Feedback	Feedback mechanisms increase visibility of a metrics program and reassure participants that the data is being put to use
Technology	Automated data collection	Automated collection of data ensures more efficient use of resources and accuracy of data
	Metrics database	A data repository is needed to store data for comparative analysis and to evaluate overall trends, allowing a cyclical process whereby metrics are controlled and evolve according to business needs
	Metrics integrity	The metrics used should be based on robust data that is not open to manipulation

4.5 Data collection

The method of generalisation for case studies in general and our study in particular is analytical generalisation (as opposed to statistical generalisation) in which a previously developed theory is used as a template to compare the empirical results of the case study [33]. This however is a complex endeavour and so great care and attention was paid to maintaining scientific rigour in our data collection process. Therefore best practice techniques were used to ensure reliability and validity [32]. In order to ensure construct validity a chain of evidence was established and a sample of key informants (n=6) reviewed the draft case study report. Internal validity was strengthened by the use of respondent maps and pattern matching. In addition a comprehensive research protocol helped to improve external validity.

5. Analysis of results

The results (Table 2) showed that across the board, staff did not view the implementation of the metrics program as effective. While they agreed that the success factors were important, they did not view their company's implementation of them as effective. The views of senior management on how successful their implementation was, is seriously at odds with how middle management and practitioners view them. Middle managers have the highest opinion of the importance of the success factors, yet have the lowest opinion on how the company is implementing them.

The results clearly demonstrate that while the organization understood that best practice was important, they were unable to implement it. The underlying reasons for this non-compliance are teased out in the following analysis of the interviews carried out with participants.

Table 2. Attitudes towards critical success factors and implementation

	Senior Management	Middle Management	Software Developer
CSF perceived importance %	86	100	100
CSF implementation effectiveness %	43	7	14
CSF implementation ineffectiveness %	28	71	57

5.1 Organization

Organization structure and culture accounted for the highest percentage of reasons offered for non-observance of best practice. Strong efforts have been made to move focus away from projects and on to products by creating the product-portfolio organizational structure and relevant changes in information systems and measurement reports, so that application data is incorporated. However, there has been a significant lag in getting working practice behaviors in tune with the new structure. Local issues still resonate more with staff than do enterprise-wide ones. Senior managers also felt that challenges of collecting data across the global organization were not fully appreciated by the executive team, and not sufficiently resourced.

A highly significant finding was the extent to which the company culture was project-driven. Focus on delivering projects on-time means that schedule-orientated success metrics take precedence over measurements that show success at delivering in terms of quality and organizational goals. Project managers tend to operate independently - viewing each project as unique - without regard to projects running in parallel. As a result, lessons learned through project reviews tend to get shelved and are not cross-referenced again. A project-centric culture can inhibit the incremental introduction of a metrics program. It runs the risk of the metrics program being just another project with a definable start and finish date and key deliverables.

5.2 Management practices

Interviewees felt that since the metrics program went global, that data was collected in order to blame individuals for poor performance with a view to forcing behavioral change. Initially, the metrics were viewed as being genuinely geared towards improvement rather than towards enforcing change. We found that when a metrics program is viewed in this negative light, it is more likely that data will be manipulated to show untrue results. There was a widespread reluctance to highlight failures or lack of knowledge to management. It was felt that 'bad' news should be buried as it could hinder career advancement. However, when poor results are not admitted to, lessons are not learned.

Developers were frequently not included in the metrics definition process and consequently the measures were often seen as impractical or unsuitable. Developers also seemed to resist measures because they did not trust the motives of management. There was also a strong resistance to the use of outside experts, and a prevailing view that the company had all the expertise they needed in-house.

5.3 People

There was no specific training provided to staff in measurement activities and it is expected that people engaged in this activity as part of their everyday roles. Similarly there was a lack of appropriate training for middle management. Middle management development programs incorporate two narrow strands: a people management strand and project management certification. There is no training on wider strategic operations management skills, or industry best practices such as ISO 20000, Capability Maturity Model Integration (CMMI) or Information Technology Infrastructure Library (ITIL). Voluntary roles being filled by people unsuited to the role was also a problem that was noted.

In terms of involving metrics champions in the program, there was no skills database in operation. Interviewees opined that individuals selected to champion the program were those who had good relationships with management, and that the skills of individuals further down the organization were ignored.

There are no random audits done on data. This leads the data open to manipulation: if individuals feel they are overworked, they will supply whatever they can; if they are afraid of being negatively impacted by "bad" data they will omit the "bad" data.

Practitioners felt they have no meaningful input into the measurement process because they have no control over or input into what data is sensible to collect. This leads to an attitude of "it is what it is" towards the quality of data gathering. Practitioners also were found to hold the view that that GSC as an organization will not reward good measurement behavior but will punish for bad behavior.

5.4 Information and communication

Most developers were not aware of the existence of the GSC measurement program. There are no communication processes which enable developers to view this information. Thus developers do not see how the organization has benefited from their measurement efforts, and momentum is lost.

We learned that project managers cannot interpret the relevance of the metrics to their particular function, and therefore are unable to deduce what components of an activity needs targeted improvement. For example, when a metric report highlights below-target project budget and schedule results, the reason why cannot be clearly seen. Whilst there are categories of reasons for failure, no in-depth analysis occurs as to what contributed to the failure. It seems that this loop should be closed.

Much of the information on the metrics used in the GSC measurement program is used to generate statistics on adherence to particular processes. For example, the percentage of project managers that are certified, the percentage of projects that went through a development audit, and percentages of staff have received 'Secure Code' training, and so forth. However, the value of these activities is not clearly demonstrated or reported on. This has caused employees to be resentful of carrying out these activities, resulting in compliance being lower than it should or could be.

We found that senior managers implicitly trust the data that is passed upwards. They believe that the threat of deliberate misinformation carrying disciplinary penalties is adequate to ensure the "real" story is being told. Interviewees viewed this trust as being misplaced in some instances.

Control mechanisms surrounding project development audits, technical reviews and secure code reviews are relationship oriented or subjectively (as opposed to objectively). The level of scrutiny an audit panel can bring to the measurement program depends on who they are reviewing, and there were instances noted of passing projects that should fail an audit. This leads to a perception that key audit processes are "toothless" in reality and foster a culture of "process for process sake". In time, the audit reports are not taken seriously, but are produced to provide a number for the measurement report.

Practitioners feel that if senior management knew the level of effort that goes into manual data gathering, they would be more committed to automation. Senior management, on the other hand understood the difficulties inherent in automation - they noted that only when the measurement processes, data accuracy, reporting mechanisms, verified and

visible use of the data are all in place can automation be attempted. Better communication of one another's viewpoint would help achieve a more positive commitment to automation.

Key measurement reports do not get communicated across or down the organization. Many practitioners and middle managers do not see the end-result of their data gathering endeavors and therefore do not see the value of what they are doing. There was also no voluntary cascading of data as personnel do not see the benefit for themselves in doing it.

5.5 Technology

Significantly for a technology organization, this was the lowest scoring category, emphasizing the importance of the interpersonal and behavioral aspects to measurement. A large degree of autonomy was given to the site during the initial phase meaning that choices of technology were based on local preference, rather than on compatibility with the technology at other sites. This is being addressed now, but there is a long timeline needed to address the current challenge of consolidation. This has also meant that where it is reasonable to deploy a minor tool in a location as a test-bed for wider organizational use, this gets little support from senior management. For example, an automated peer code review application was developed by a graduate intake program group. This would have simplified peer code review report and data gathering and aided timely submission. It was not accepted, even as an interim solution, on the basis that a larger enterprise-wide suite of tools would have the necessary functionality in time.

In later phases it became mandatory to use a particular software suite for many data-related processes on project billing, time, compliance, and utilization. However many interviewees find the current tool unwieldy and non-user-friendly. The same is true of a problem and incident management tool. But a strong cultural bias of "Made in GSC" inhibits decision-makers as to what makes sense from a functional and value perspective with regard to using third-party tools.

Many expressed the urgent need to have information systems and technologies that enable data to be aggregated within a single repository, so that various analyses can be performed on the same raw data. Currently in GSC there are separate systems for processing customer-billable hours of work, timesheet entry, email, expense reporting, and vacation management. The desire by executive management to have information quickly, especially in times of transformation and change, was cited as the reasons for a reluctance to consolidate data onto one system as it could potentially involve delays.

Developers strongly believe that it is not possible to compare 'like with like' in any meaningful way in terms of productivity measurement. They cited the range of diverse technologies coupled with the varying complexities of each environment as a major reason. The GSC development environment involves a mixture of pure development projects, enhancement projects, technical support projects, a wide variety of hardware platforms, a wide variety of development tools, and many versions of the tools.

6. Discussion and recommendations

This research uncovered new information in terms of the underlying reasons for non-observance of measurement program implementation best practice. The key contributory issues are summarized as follows:

- A project-based view of measurement prevents customer-centric measurement;

- A silo mentality to work processes rather than a holistic and enterprise-wide approach restricts measurement in a global organization;

- Managing by fear inhibits a lessons learned culture developing in measurement;

- Executive management not being aware of the true levels of change, and the ad hoc nature of change initiatives;

- Over-reliance on relationships-oriented work practices leading to subjective rather than objective measurement decision-making;

- Metrics based on measuring adherence to activities rather than measuring the true value-add of the activities;
- Personal motives and politics, and lack of data audits which lead to data manipulation and measurement role issues.

A number of the characteristics of the measurement program in GSC concurred with the problems identified in the literature; amongst these were the difficulties inherent in measuring software activities and a lack of congruent communication between the different layers in the organization. Moreover, a project focus, rather than a goal orientated approach meant that many of the employees in GSC could not see that value-add of the measurement program. Furthermore, the need for an effective framework to link organization improvement goals with measurement goals ensuring appropriate data collection was borne out by the research. Our study also revealed a disparity in how senior management and practitioners engage with the process.

In light of this analysis we propose the following recommendations to practitioners.

6.1 Adopt an holistic approach

In many organizations there are a number of transformation programs running in parallel. These initiatives exert pressure on personnel, processes and activities in a measurement program. Often there is no process in place to streamline the resources used on the various programs. The result is that there are multiple levels of data gathering, analysis and reporting, leading to over-burdened personnel and inefficient resource use. Executive and senior managers must try to view the organization holistically and see the overlaps within information technology, software engineering, product measurement and program/project management.

6.2 Customer centric best practice

Management must be more conscious of industry best practice. In large scale organizations, there can be a view that the organization's own practices are unique, and are the only ones that fit the organization. Especially in technology companies, there can be an over-reliance on in-house technology and tools. Rigid adherence to established company process can lead to a belief that other practices are not translatable to the organization. Executive management should consider an industry best practice think-space among executive, senior and middle manager by ensuring regular attendance and contribution to appropriate industry fora. In relation to productivity measurement itself, the end-product or service, not the delivery mechanism - the project - ought to be the focal point of productivity measurements. These measurements can therefore include true external performance indicators based on quality, reliability, cost, functionality, speed and durability rather than on the more inward-looking measures of delivery cost, delivery speed and functionality, which typical projects measure.

6.3 Goal centered decision making

Management decisions frequently do not lead to productivity improvement and do not have a clear link to organization goals. To address this, a management-decision audit system should be put in place, where all key decisions must demonstrate the business justification behind them, linking them to the organization goals. One of the many goal centered models could be used as a core for this audit system. Furthermore a clearly understood productivity model should be put in place that contains outputs that can be quantified using a standard productivity equation thereby demonstrating value-add and costs.

7. Conclusion

The findings of our analysis support two key claims of this research. Firstly despite the availability of best practice factors for program measurement implementers, there are many underlying factors that impede effective implementation. Secondly, an analysis of the real reasons for the non-compliance of best practice, rather than simply highlighting non-observed factors is critical to solving the measurement program implementation issues that are

pervasive in the software engineering industry. Research on measurement program implementation in software engineering primarily focus on validating new, and re-validating existing, best practice for measurement program success. Yet, the majority of measurement program implementations continue to fail in the longer term. This research has highlighted a number of underlying reasons that need to be addressed holistically if measurement implementation success rates are to be improved. Program managers can check if staff is trained or untrained, involved in design or not involved, whether suitable data repositories and information processing technologies are deployed or not deployed, and so forth. However, unless the intangible aspects: the psychological motivators and de-motivators of personnel, their true capabilities, abilities to cope with and manage change, to learn new technologies, to lead people effectively, to articulate a vision of improvement, and create a holistic learning organization culture – are attended to, the gap between measurement program implementation knowledge and actual measurement program implementation effectiveness will remain. The findings presented in this study are the first step towards addressing that gap.

These findings deepen and expand our current understanding of the area in a real world setting and provide a unique insight into the area of performance management in software development. In sum the contributions of our study are three fold. The study has answered calls for research, provided new insights on variables and uncovered novel relationships between the constructs studied. However it is important to note that this study is not without its limitations. This study focuses on a single site case study and the findings may be seen as context specific and difficult to generalise. In addition, the data collection method employed in the study relied on self-reported data which can be difficult to verify independently. In other words, we were obliged to take what respondents say during interviews at face value. However certain biases could be apparent such as; selective memory (i.e. only recalling or not remembering experiences or events); positive attribution (i.e. attributing positive events and outcomes to themselves but attributing negative events and outcomes to external forces) and exaggeration (i.e. representing outcomes as more significant than is actually the case). Future research could be conducted in multiple case settings to calibrate the internal and external validity of our findings.

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Why advertise the obvious? Learning outcomes from analyzing advertisements for recruitment of Swedish IS/IT project managers

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Abstract:
When Swedish employers advertise for IS/IT project managers they tend to list almost obvious qualification requirements instead of describing those that are unique for their companies' competitiveness, or more precisely, instead of expressing those that really matters. The research behind this paper studied job advertisements during four years (2010–2013). The findings point to an inadequate ability to understand and/or express the requirements that should be decisive for the appointment in order to grasp the essence of what the job actually involves, which brings on problems for both the applicants and the employers. The practical implications of the study pursue a need for employers to stop advertising mostly general requirements for the benefit of more specified ones, that take the sector's, the organization's and the project's requirements into consideration. By doing so, the prospect applicants have a better opportunity to understand what a certain job entails and the employers have a better chance to appoint the right individual. The research implications point to a need for acknowledging, and set about solving, problems concerning qualification requirements in advertisements for IS/IT project managers.

1. Introduction

When staffing a project, the most important role to fill is usually the project manager's, since the project manager is accountable when it comes to producing and delivering the ordered product, i.e., the project's result [1]. Hence, it is an essential and weighty task to recruit and appoint *the right* individual for the assignment, which stresses the importance of scrutinizing which qualification requirements that are put down in job advertisements (henceforth ads.), and further how the ads. are worded/formulated. There are principally two main alternatives that could be applied, either could the ads. request: i) general project competence, or ii) unique competence that could be adapted to the specific project. Projects are by definition unique, therefore a critical question appears concerning the opportunities of supplying unique projects with merely general requests and models [2]-[4]. This reasoning indicates a paradox that makes it legitimate to question if it is reasonable to assume that project managers using solely general project models are best fit to lead unique projects, or if the paradoxical situation requires that unique projects are matched with specific competence. Even though it is rather well described, e.g., in the PMBOK Guide [2], what kind of tasks/duties a project manager is supposed to master, these descriptions are still on a general level. Hence, they do not provide enough information, at least not if used as the only source for a job description/request. It is not clear if the matching problems originate from: i) a lack of understanding what the project manager's assignments, responsibilities and qualifications are; ii) a lack of understanding the specific requirements due to a unique project; iii) if the problems are descending from a straitjacket effect caused by a too strict following of the standards available; or from iv) ignoring the standard. It might even be possible that the answers, at least partly, could depend on how the job ads. are formulated.

A lot of responsibilities are inherent in the project manager's assignments such as "… understanding and applying the knowledge, tools, and techniques that are recognized as good practice" [2, p. 17]. Besides, competencies regarding interpersonal skills are mentioned as necessary for effective project managers. Further, project managers are expected to behave properly during the project and its related activities. A project manager needs to master both specialized knowledge, as well as experience from the field, and there is a fundamental wish to find the individual who's competence and experience meets these requirements with a good balance between them [5]. Discussions have been going on for years about whether project management in general has gained status as a profession, and there are for example different opinions about project management standards' contribution to the professionalization process, and likewise about the employers' involvement in the process as corporate members of project management associations [6]–[9]. As regards IS/IT project managers, the discussion about their competence and qualification requirements had an upswing right before the year 2000 because of the millennium shift, which was feared by many in and around the IS/IT industry because of the technical problems that was expected to occur to all kinds of information systems [10].

All the different areas that project managers are supposed to master are often mirrored in the ads. through sometimes almost overwhelming lists of competencies, experiences and personal traits. Hence, there is a risk that the requirements in the ads. will confuse the applicants more than they are being helpful. Alongside of this rather well-established view of project managers' individual responsibilities, and as a contrast to the spectrum of nearest unattainable qualification demands, there are also voices [11, p. 86] advocating that it is almost "inappropriate" to make the project team fully responsible for whether a project is successful or not. The reasons behind the latter argumentation are based on the customer's obligations to share the responsibility for how the project turns out in the end, meaning if the product will satisfy the organization's needs as expected. This throws light on the customers'/clients'/roles and their responsibilities as competent professionals, who can determine what should be delivered from a certain project in order to fulfill the goals. The sponsors are expected to be competent when it comes to explicitly expressing the critical requirements for a certain project's result (i.e., the product). Consequently, it is just as important that the organization's representatives (e.g. managers, Human Resources (HR) personnel) including the project sponsor are able to clearly, and as exactly as possible, formulate relevant qualification requirements for the recruitment of project managers.

Recruitment always involves great responsibility and precision from the employers' side since it is on the one hand essential to hire *the right* individual, and on the other hand it is a costly and delicate procedure, not least in case of a mismatch leading to an unsuccessful appointment. Recruiting IS/IT personnel in general makes no exception from this

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basic principle and recruiting IS/IT project managers could easily be regarded as particularly important and essential for the prospect of successfully handled projects that deliver, the right product within budget and meet or exceed the requirements. Taken together it can be regarded as difficult to attract and hire *the right* IS/IT project manager [12]. Hence, there is a need to find ways to facilitate and further develop the delicate task of recruiting IS/IT project managers.

Even though there are some project standards available, often referred to as bodies of knowledge (henceforth BOKs) these do not seem to be enough informative when it comes to formulate qualification requirements. One of the greatest player in the field of project standards is the PMBOK Guide [2], which is frequently referred to when project management standards are on the table. Nevertheless, to solely apply standards in the project management practice or in the recruitment process do not provide any guarantee for successful projects or recruitment of *the right* individual, at least not without any further attention [13], [14]. An example of such further action is, for example, ability to differentiate with regard to the actual context, which means to tailor the project to the current organizational culture [15], which probably could be just as adequate to highlight in the recruitment process (e.g., in the ads.). Another perspective of the standardization discussion lays in the paradox that is inherent in the project standards; on the one hand assuming that all projects are alike and generalizable, and on the other hand that projects are unique [6]. Hence, the standardization of project management could also lead to "...'blackboxing' of knowledge," [7, p. 431] meaning that the guidelines in the standards do not provide a clear answer to "... what skills, knowledge and competence" [2, p. 441] it will take to manage a certain project. Still these variables need to be seriously acknowledged in a recruitment process and should possibly also be decisive, at least partly, for how the ads. are formulated since the advertising usually is an important part of this process. For being additionally helpful for the applicants, the ads. should also disclose the employer's expectations on the individual that is being appointed. Ahsan et al. [16] studied project manager ads. in the public domain in order to analyze competencies and recruitment signals. They [16] took a standpoint in various standards (e.g. PMBOK Guide [2]) when they formulated key variables from the literature for the analysis, and their main findings were differences between industries and countries but also regarding how industry ads. *vs.* the literature highlight competencies.

The purpose of this study was to search for issues that could facilitate recruitment of *the right* IS/IT project managers. Ads. for IS/IT project managers were chosen as study objects since particularly many examples of unsuccessful projects origin from the IS/IT sector [17]. The increased risk for failure puts even more pressure on these projects which consequently leads to even higher demands for IS/IT project managers in general. Appointing *the right* individual is fundamental for achieving project success and fulfilling project goals [1]. To judge from the problems connected with achieving IS/IT project goals, which is mostly blamed on the IS/IT project manager's achievements, finding *the right* one seems to be easier said than done since the project goals are often not reached successfully [17]. A weighty reason for why recruitment is difficult seems to a large extent being related to the paradox of project standards and best practices [2], which implies that projects are very much alike, and at the same time projects are known to be unique (at least to some extent). In other words the standards could actually be more difficult to apply properly than the eagerly suggested applicability that branch organizations make pretense of [6]. As a consequence of this paradox, a mismatch between the IS/IT project manager and a certain IS/IT project could convey that the project outcome would be negatively influenced, or even that it would become a total failure [1]. Yet, another purpose of this study was to fill a gap within research regarding the paradox of standards in the context of recruiting IS/IT project managers.

The propagated use of standards on the one hand and the project uniqueness on the other hand, which both are in play when IS/IT project managers are recruited, are important issues to deal with, and should therefore be acknowledged in the formulation of the job ads. The first research question is: *How can the paradox of project standards' general applicability and projects' uniqueness be overcome in order to enhance recruitment of IS/IT project managers?* The second research question is: *How can the ads. be formulated in order to facilitate recruitment of the right IS/IT project manager?*

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The remaining of this paper is structured as follows: section 2 provides a background to project managers' qualification requirements in the recruitment process; section 3 presents the research design and data collection; section 4 gives a presentation of the findings; section 5 analyzes and discusses the findings; and finally, section 6 concludes, i.e., answers the research questions, presents implications and suggests further research on this topic.

2. Background to the qualification criteria in ads. for project managers

The paradox that lays in project management standards [2]-[4], which on the one hand hold out the prospect of simplification and generalization possibilities, and on the other hand paint a picture of project uniqueness [6], is problematic in the light of finding the project manager, who has the right qualifications for a certain project. The project managers' professionalization process is closely connected to the standards by, for example, project management associations' certifications and some companies' own career models which could be comparable to standards.

2.1 The strive for professionalization of project management

Projects have their roots far back and examples of famous ancient projects, described in the Bible, are for example the building of the Noah's Ark and the Tower of Babel. Daniel Defoe published a book about projects "An Essay upon Projects" [18] in the 17th century that describes Prince Rupert's weapon manufacturing in 1680. However, project management, as we know it today, started in the armed forces as huge US defense and aerospace projects during the cold war. Projects like the Manhattan project (the first atomic bomb), the Polaris projects (naval missile systems), as well as the Apollo projects (to put a man on the moon in the US space program), are all precursors of today's projects. Subsequently, the methods gradually spread to other industries, a development that led to an initial need for synchronization, and furthermore to standardization initiatives concerning project methods and theories. Besides, project managers also needed their own arena for co-operation and support, something that the project management associations provided as well. Standardization activities have served as means for further development of project management as a profession [19]-[21]. Career models, developed in individual companies, are other examples of how project management workers have moved towards professionalization as in-house project competence cf. [22]. Organizations sometimes fear that project workers will move on to other organizations while striving for further career opportunities, and one way to counter such a competence draining process is development of career models connected to specific companies. However, individual companies have limited opportunities to control their own career models since these finally rest on standards developed in the project management associations, at least if the career models should gain any real legitimacy [22].

In addition to different companies' career ladders [22], and various project associations' BOK initiatives (e.g. PMBOK Guide [2]) another professionalization movement, called corporate professionalization, thrives [23], [24]. Corporate professionalization includes factors like [23]: organizational membership; client engagement; competence-based closure; and internationalization. The tactics and strategies behind corporate professionalization differ from other professions' tactics and strategies (e.g. law and medicine) for example as regards: i) knowledge co-production with the industry (competence focus); ii) market closure (not statutory closure); iii) legitimization (by market value - not public benefit); iv) individual as well as organizational membership (but not only individual); v) not licensed or regulated by state; vi) close engagement with clients; and vii) international jurisdictions [23, p. 460]. Important issues of corporate professionalization are the employing organizations' functions "… as sites of professional formation and regulation" since the corporate memberships are based on corporate interests and the project management associations aiming at increasing their focus on commercial services to attract new corporate members continuously [23]. Besides, the employing organizations, the project management associations and the project managers (individuals) influence each other and have mutual interest in convincing the market about the value-adding that lays in professional project workers who could realize the project goals. At the same time they have partly different modus of operandi when it comes to accreditations and certifications. An example of this is that only individual project managers can be certified through the project management associations, and the corporations are not allowed to certify their own personnel "…'en masse'" [23, p. 453], and likewise the corporations career ladders are exclusively addressed to their own employees.

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Project management associations stand behind various project management certifications connected to these associations respectively (e.g., [2]). Even though these certifications have attracted many organizations and project managers certifications are not especially highly represented among Swedish employers' competence/qualification requirements, at least not if judged by Swedish ads. for IS/IT project managers [25].

2.2 Standards as a short cut to professionalization – or the longest way round

The project management workers' strive for being regarded as professionals have led to development of standards and certifications. Professionalization was primarily about finding effective ways to grasp and execute the project sponsors' goals for their projects. To satisfy their requests and needs have always been critical if the project manager's work should be acknowledged as successful. Project management associations have developed their own set of guidelines and standards for this purpose. The PMBOK Guide [2] is an example of a so called global standard of project management that emphasizes both of the above perspectives (efficiency and professionalization). This standard is often promoted as an assurance to attain excellence in project management performance while emphasizing project management as an accepted profession. The Project Management Institute's (henceforth PMI) first version of the PMBOK was established in 1976 and published in 1983, and several other project management associations published their own guidelines over the following 10-15 years. Major companies are large consumers of standardization products (e.g. BOKs, certifications) often due to a seeking of assurance for their projects, which is an important step towards professionalization of project management [26]. Hodgson [27, p. 819] stated that the professionalizing attempts that have been carried out "… have already served to enforce a mode of discipline over managers and staff".

Even though the project management standards are widespread and highly appreciated, there are still opinions asserting that the research is insufficient regarding the connections between the following of standards and successful project outcomes. Another common critique of the standards concerns how research findings are (or rather, are not) utilized in order to update the standards, while allowing the practitioners to benefit from recent research outcomes. Critical voices argue that only few (if any) changes have been made to the standards (BOKs) over the years, thus the standards are considered as being too dated to pay any real attention to [26]. Sometimes the competence of the practitioners, who originally developed the standards, is questioned as well. According to some researchers in this field it is risky to consider BOKs as reliable sources of best practices [13], [14], [26].

Brunsson [28] stated that standards are simplifications that disregard experiences and issues that are not generic and generalizable. Hällgren et al. [9] pointed out that practical project experiences that are transferred through standardization to best practices actually lose their relevance instead of becoming more useful. The latter is due to a kind of double-fault since these best practices, that are simplified generalizations, and not specializations, subsequently are transferred back to reality [9].

Milosevic and Patanakul [29] studied standardized project management variables and found three (tools, leadership and process) that were of a generally higher interest for project success. However, these findings concurrently showed that standardized project management variables that suited one company did not necessarily fit others, which led to the following statement: "…each organization may have its own set, or 'size' of standardized project management factors on the OPM level" (p. 191), (OPM stands for organizational project management). Milosevic and Patanakul [29, pp. 188–189] also found that organizations tended to standardize to a certain point, i.e., to the "inflection point", meaning that the key to project success actually involves to find the point of standardization that maximizes the project success since going beyond the "inflection point" would most likely decrease the project success. This is an example of a pragmatic attitude to standardized project management that would allow trusted project managers to set the standards aside when it seems to be more convenient for the time being. Milosevic et al. [15] stated that standards cannot solely serve as means for project success, not without any further actions taken concurrently. Hodgson and Cicmil [7] argued that the PMBOK (3rd edition from 2004) did not satisfy the information needs that should be decisive in order to determine what would be the most appropriate skills and competencies for a project team. Furthermore, the authors [7, p. 444] criticized the PMBOK's attempt to establish a "globally accepted terminology, indeed ontology, for the field of project management" even though these terms were not unique to project management. The PMBOK's glossary's 2nd

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edition ran to 15 pages and the 3rd edition to 34 pages [7]. The latest edition of PMBOK [2] of the term glossary includes 42 pages. The glossary could be perceived as a sign of PMBOKs' aim at conveying their view of best practices and normative rules to the project management practice as a whole. Hodgson and Cicmil [7, p. 446] discussed problems related to this normative approach and stated: "… that the 'black boxing' of knowledge in this area, as definitions, techniques and procedures become set in stone, effectively removes ethical and political questions from the agenda", and also expressed their concerns about best practices that are not adapted in a manner that allow project managers to let their projects diverge from the "imposed standardization" that comes out of these BOKs [7, p. 447]. Muzio et al. [23, p. 444] argued that "… 'corporate' professionalization which departs in significant ways from established paths and which is more appropriate" is preferable for project management. Project management is different in many ways not least because of its temporary nature, the demarcation of jurisdictions as well as its hierarchical structure and temporary matrix organization [23].

2.3 Recruitment of project managers in general and IS/IT project managers in particular

Recruitment of project managers are known to be both challenging and crucial for the prospect of successful project outcomes, particularly as regards IS/IT projects [2]. Ahsan et al. [16] studied job ads. for project managers in the public domain, in Australia and New Zeeland. The study focused on comparison between well-known standards from the literature and how the ads. were formulated. The most prominent findings were that the ads. emphasized soft skills and competencies in a different way that the literature (e.g. BOKs and standards), which in turn point to a contradictory distribution of competencies, demands and recruitments. Ahsan et al. [16] suggest further studies in the field of recruitment of project managers, e.g., as regards how ads. attract prospect applicants.

When it comes to recruitment of highly specialized personnel, as is the case with IS/IT project managers, it is essential that the employers realize what competence a specific project core product will require, i.e., which project core competence will it take to manage a certain project in order to deliver the requested product. The company's core product is critical since the project's core product is supposed to support the company's core product and therefore it adds tremendously to successful project outcomes if the core competence is elucidated throughout the recruitment process [30], [31]. According to Chipulu et al. [32], industry are however more interested in generic skills than in specific competence such as project management knowledge and expertise knowledge.

In order to succeed with the recruitment yet another factor should be acknowledged as important for the outcome: the individual's personality traits [33] that could enhance the opportunities of applying a holistic view of the project. Working as a project manager requires a combination of several competencies and qualification requirements, as well as of specific personality traits if the best possible match should occur; besides the job context is also of importance for the outcome [33].

3. Research design and data collection

An inductive, longitudinal study over a period of four years (2010-2013) has been carried out that studied Swedish employers' requirements for IS/IT project managers from the perspective on how the job ads. were worded/formulated. The data from the study was principally qualitatively analyzed with some quantitative features included [34], [35]. The research design was chosen in order to gain an understanding of how Swedish employers estimate the value of IS/IT project management competence. The literature review was mainly carried out firstly after the data collection had taken place and the analysis had started. The choosing of research design always involves a search for a valid and reliable way of collecting the empirical material. In this case the ads. were considered to provide such information/data. The collection of the ads. was carried out once a year between 2010-2013, and the fact that the findings hardly differ within these four years, was interpreted to indicate stability of the findings.

The decision to collect ads. only once yearly relates primarily to the fact that it is rather easy to drown in an overload of information [36]; still the longitudinal perspective was considered to be helpful for providing a realistic picture of what was actually requested in the ads.

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The collecting of the ads. were carried out with the following considerations in mind: i) to study changes, on a longitudinal basis; and ii) to ensure that sufficient time had passed in order to avoid collecting the same ads. over and over again. The sectors included in this study were foremost IS/IT, but also other sectors that were in need of hiring IS/IT project managers. The collecting of the job ads. has geographically included Sweden as a whole, and the companies were acting on a Swedish and/or a global market (further accounted for in sub-section 4.1). The study applied ads. instead of questionnaires or interviews in order to avoid employers/HR personnel/recruiters being tempted to talk warmly for e.g. the need of certifications, or against it, without being really convinced of either of the alternatives just because they wanted to please the interviewer who they thought was searching for something in particular. It is well known that interviewees sometimes try to adapt their opinions to what is expected of them in a given situation [37]. The ads. on the other hand are what they are since they were not touched up because of the ongoing study.

The ads. for IS/IT project managers were collected at the end of February or at the beginning of March. They were collected from the publication Computer Sweden's (henceforth, CS) job advertisement's website (2010 and 2013), because this site is a very common place for Swedish IS/IT project manager ads., and from the Swedish Employment Agency (2010-2013), (henceforth, EA), which is another frequently used place for all types of recruitment ads., the latter also available online. The ads. were analyzed in order to study what type of knowledge, personality traits, experience and/or education that were requested. As regards the years 2010 and 2013, data was collected from two sources (both from EA and CS websites) conveying a risk for redundancy when both sources had been simultaneously employed. In order to avoid misleading data (i.e. redundant), the material was searched for duplicates and, if two similar ads. were found in both the EA and the CS, one of them was removed.

Content analysis of the ads. was chosen as research tool. The qualitative content analysis provided the conceptual framework and the quantitative content analysis gave measurable terms for the framework [34], [35]. The content analysis was much inspired by Burnad's work [39], [40] as regarded the step-by-step procedure that was applied. To begin with, some fundamental and rather obvious categories, which should be expected in recruitment ads., were formulated, and then a database was designed in Excel based on these categories. Examples of basic categories are knowledge, education, experience and personality traits as well as profile data for the companies/organizations such as sector/industry and market. The collected ads. were printed out, and key words related to the categories were marked and entered into the database. As the collecting of data continued, a need for subcategories appeared, e.g., subcategories for sector and market, as well as qualification requirements on different levels of importance and priority (e.g. qualification requirements *vs.* additional requirements). During the whole first year, and partly during the second year, of the data collecting, the need for generating new subcategories consecutively were more urgent than the following years (i.e. 2012, 2013). Another thing that had to be handled throughout all the entering of data into the database was to relate similar, but not exact, word matches into the categories and subcategories, and it was sometimes difficult to translate words/expressions to English in case there were no exact matches available. The most obvious examples of this work is related to the descriptions of the requested personality traits, but also to descriptions of the work tasks, for example could "lead" be expressed in various ways and when no exact match was available the chosen translation was assessed to point in the same direction as the Swedish word that had been used.

The data was preliminary analyzed after the first round of the data collecting in order to find relevant literature for the theoretical background. When the data collecting was completed after four years, and the categories and subcategories were in place, the content analysis was mainly carried out by using word count in which the words were put in relation to the actual context (e.g. if they were mentioned as qualification requirements or additional requirements). Further, the analysis compared the findings with a commonly applied global standard for project management (i.e. PMBOK Guide [2]). The reason for choosing a standard to compare with relates to the well-grounded practice behind standards, even though standards *per se* sometimes are subject to criticism (e.g. [7], [9], [26]). The reason for choosing PMBOK Guide is that it is regarded as a leading global standard [2]. Certifications from PMI, that stands behind the PMBOK Guide [2], are applied in Sweden.

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About nine months after the first data collection an additional collecting of data was carried out (as a comparison) concerning ads. for other posts than IS/IT project managers. The reason was that the early/primarily data analysis showed that the descriptions of the assignments and the qualification requirements were scarce. Hence, 75 ads. for specialists, workers and managers were collected for comparison. This additional data collection was carried out once with the intention to compare whether other job ads. were just as scarcely described, or if they were more detailed.

4. Presentation of the findings

This section presents the study's findings. It should be noticed that tasks, qualifications and personality requirements that were mentioned only occasionally/solitary in the ads. have been excluded from the findings.

4.1 Some background data for the studied ads.

The 325 advertisements that are included originate from 158 companies. Additionally, the ads. were categorized by: i) the type of company (Table 1); and ii) the type of market (Table 2) they belong to. The main part of the ads. came from IT and recruitment companies on Swedish and global markets.

Table 1. The dispersion of companies

Type of company	No.	%
IT	170	52.3
Public authority	22	6.8
Recruitment	90	27.7
Other	43	13.2

Table 2. The dispersion of markets

Type of market	No.	%
Swedish	175	53.8
Nordic	34	10.5
Global	116	35.7

4.2 About requirement criteria in the ads.

The data revealed that the ads. sometimes lacked specific information about requirement criteria, for example information about work tasks (Table 3).

Table 3. Requirement criteria not listed in the ads. for IS/IT project managers

No listed requirement criteria	No.	%
Work tasks	105	32.3
Personality	71	21.8
Knowledge / education	58	17.8
Experience	20	6.2

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As Table 3 shows, one out of three ads., or more precisely 105 ads. (32.3 %), did not specify any work tasks at all.

4.3 About the occurrence of work tasks in other job ads.

Because of IS/IT project managers' managerial positions (irrespective of project manager's temporary leader status) comparison with managers in general, and to some extent also with specialists, was possible when it came to the listing of work tasks, but also regarding co-workers as, for example, IT strategists, computer operators and petrol station assistants. The comparative study that was carried out once in 2010 included 75 ads. (Table 4).

Table 4. How work tasks were handled in ads. collected for comparison

	Total no. of ads.	Not at all		In detail		In general	
	No.	No.	%	No.	%	No.	%
Managers*	31	3	9.7	9	29.0	19	69.3
Coworkers**	25	8	32.0	7	28.0	10	40.0
Specialists***	19	3	15.8	1	5.3	15	78.9
Total	75	14	18.7	17	22.7	44	58.7

* IT managers, workshop managers, chief administrative officers, and senior officials
** computer operators, IT strategists, and petrol station assistants
*** speech and language therapists, foresters, and actors

As shown in Table 4 the ads. that represent the managers' (69.3 %) and the specialists' (78.9 %) categories were more often generally described (i.e. the work tasks), compared to the co-workers category (40.0 %). The data also showed that a total of 22.7 percent of the ads. described the work tasks in detail. The comparison with IS/IT project manager ads. showed that the latter more often lacked task descriptions (cf. Table 3, 32.3 %), compared with other managers and specialists, but were almost equal to the co-workers ads. i.e. 32.0 percent (Table 4).

4.4 The most frequently listed work tasks

The most frequently listed work task was lead (or similar wordings for lead) that was represented in 60 percent of the ads. The second most listed was plan (26.5 %) and the third was follow up/report (21.2 %) (Table 5). This could be compared to Table 3 and the fact that 105 ads. (32.3 %) did not define any work tasks at all.

Table 5. The most frequently listed work tasks in ads. for IS/IT project managers

Tasks	No.	%
Lead	195	60.0
Plan	86	26.5
Follow up, report	71	21.2
Co-operate	42	11.9
Communicate	21	6.5
Product development	9	2.8
Educate	8	2.5

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The most frequently listed work tasks in Table 5 are all typical management tasks, which however are just as applicable for IS/IT project managers as for other project managers and/or managers in general. The principal reason was that the tasks were described on a general level.

4.5 The most frequently listed competence requirements

The listed competence/qualification requirements (Table 6) were mostly described in a general manner, i.e., experience of project management (no further demands on projects' type/size, project methods or sectors), and academic degree/education (no further demands on level, but the sector was usually pointed out). However, the language and certification demands were more precisely expressed, and the certification demand too, since project management at least was specified (there are a lot of other certifications of importance within the IS/IT sector). The far most listed competence requirement was experience of project management (80.3%) to compare with project management training that was mentioned in 5.8 percent of the ads. (4.3% as a qualification requirement and 1.5% as an additional requirement). The second most listed requirement was academic degree/education (specific to sector) (66.8%). The third most listed was language knowledge/skill as regarded Swedish and/or English (54.2%). PM certification was listed in 16.0 (of which 4.3% was a clearly expressed demand and 11.7% was mentioned as an additional qualification).

Table 6. The most frequently listed competence requirements in ads. for IS/IT project managers

Competence requirements	No.	%
Experience of project management	261	80.3
Academic degree / Education	217	66.8
Language "Swedish and / or English" knowledge/skills	176	54.2
Certification (Project management)	52	16.0
Project management training	19	5.8

Comparison with other professions showed that the competence requirements were mostly generally described in these too. The IS/IT project managers' ads. were however somewhat more informative, because of the language and the certification demands.

4.6 The most frequently listed personality traits

When it came to personality requirements/traits, the most frequently mentioned one was to be communicative (32.0%). The second most listed was to be self-sufficient (20.0%) and the third was to be social (19.1%) (Table 7).

Table 7. The most frequently listed personality traits in ads. for IS/IT project managers

Personality traits	No.	%
Communicative	104	32.0
Self-sufficient	65	20.0
Social	62	19.1
Leader	51	15.7
Good at cooperation and collaboration	44	13.5

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These findings could be compared to Table 3 and the fact that there were no personality traits at all listed in 71 of the job ads. (21.8%), which is to say that it was more applied to not list any personality traits at all than to apply the second most listed alternative (self-sufficient).

5. Analysis and discussion

The first part of this section starts with an analysis of the findings from section 4 in the light of a commonly used global standard for project management (i.e. PMBOK Guide [2]); the second part discusses the findings and the analysis and the final part accounts for the limitations with this research.

5.1 Analysis - the findings compared with the PMBOK Guide's description of project management processes

The leading work on project management standards, the PMBOK Guide [2], describes project management processes as: i) initiating; ii) planning; iii) executing; iv) monitoring/controlling; and v) closing. The most obvious similarities between the studied ads. and the project management tasks, or processes, described in the global standard [2] are primarily that planning (mentioned in 26.5% of the ads.), executing (lead, 60.0%) and monitoring/controlling (follow up/report, 21.2%) occur in both, somewhat differently worded though as the words in the parentheses show, e.g. the ads. mentioned co-operate (11.9%) and communicate (6.5%), which could be construed as executing (Table 5). There were also some differences between the work tasks that were listed in the ads. and the standard's [2] processes; initiating and closing were missing in the ads.; product development (2.8%) and educate (2.5%) (Table 5) do not correspond to any of the processes and activities in PMBOK Guide [2].

The PMBOK Guide [2] describes project management interpersonal skills and the following items are mentioned: i) leadership; ii) team building; iii) motivation; iv) communication; v) influencing; vi) decision making; vii) political and cultural awareness; viii) negotiation; ix) trust building; x) conflict management; and xi) coaching. The comparison showed that the most apparent similarities between the studied ads. and the PMBOK Guide's descriptions were communication (communicative mentioned in 32.0% of the ads.) and leadership (leader 15.7%) (Table 7). Remaining skills from the PMBOK Guide [2] were only found in a few ads. (below 13.0%). Besides, personality items that were listed in the ads. only once, or a very few times, were excluded from the study and therefore not compared with the PMBOK Guide's listed interpersonal skills. The project managers' personality traits are however often regarded as an important part when it comes to the ability to apply a holistic view as a project manager [33]. The comparison between the standard's interpersonal skills and the personality traits signals a lack of consistency since the only listed item that possibly could be regarded as consistent to some extent was communication (communicative 32.0%).

The analysis and comparison showed on the one hand some degree of consistency (processes and work tasks), and on the other hand inconsistency (interpersonal skills and personality traits) still these findings could be regarded as interesting. Not least when considered in the light of professionalization of project management even though professionalization and standardization sometimes are seriously questioned by some (e.g. [2], [7], [23], [27], [29]). The standards and best practices that are supposed to support the professionalization process might also be utilized when it comes to formulating and creating ads. that reveal what the work actually would entail and the expectations on the individuals that are being appointed. As a consequence the basic processes and interpersonal skills that are described in the standards should not even be necessary to list in the ads. since they should be regarded as obvious and easily accessible via the standard compilations (e.g. the PMBOK Guide [2]). However, the processes listed in the standards that could be regarded as a baseline for project managers' work tasks should be complemented with further information about core competence requirements in order to be really useful [30], [31].

5.2 Discussion about the information gap in the Swedish IS/IT project manager ads.

Today's ads. for IS/IT project managers in Sweden can actually be looked upon as a display of the Ames room, i.e., a distorted room that is used to create an optical illusion that does not match the reality. Instead it displays a picture that could be quite the opposite of reality and its true perspectives. The findings showed that there were some information

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gaps in the ads., principally regarding the work tasks that the IS/IT project managers were expected to handle, but also when it came to the competence (knowledge, education, experience) and personality requirements. It is not evident why the ads. hardly ever provided more than just general requirements (if any at all) even though the literature findings point to possible explanations, such as certain companies' own developed career models [22], [23]. Companies that prefer to educate and train their project workers in accordance with company specific standards could be a reason for being brief instead of providing detailed qualification requirements. In any case, it would be necessary to consider that these career models still need to follow established project associations' guidelines and standards in order to gain legitimacy [22]. It should also be noted that there are insufficient research findings available about possible connections between the following of standards and successful project outcomes [13], [14], [26].

It was a common finding from the ads. that the tasks, demands and requirements that were specified were of a general type, and that only seldom was something pointed out that was unique to the industry, the company or even to the project and/or the product. Requirements that actually were more pronounced in the ads. were of a type that were nearest obvious and self-evident, which could be interpreted as they were still on a general level. It did occur a few times though that the ads. related the demands, experience and/or training to a specific industry. Still, when put together, the findings could be understood as if the same requirements were considered to be just as applicable for all project managers as long as they practice in the same industry or work in the same company. Since these requirements were described in a way that were in accordance with global project standards e.g. the PMBOK Guide [2] the possibility appears that it might be an opportunity to simply refer to these instead; even though the standards' applicability sometimes are questioned because of their general nature [9], [28]. Brunsson [28] pointed out that standards are simplifications that discard experiences and Hällgren et al. [9] emphasized that best practices actually lose their relevance when they are transferred back and forth between practice and generalization time after another.

About a third (32.3%) of the Swedish employers omitted more specific information about the work tasks; 21.8 percent did not include eligible personality traits, 17.8 percent did not request anything regarding education or knowledge, and 6.2 percent left out demands on experience (Table 3). Apropos of the latter, experience of project management was the most listed requirement of all (80.3%). Still the ads. only rarely explained the particular experience that was sought after. If these findings were related to an understanding of that it should be enough to simply define the job as belonging to IS/IT project management, or if it was due to other reasons could not be answered by this study. Project management is different compared with many other occupations/professions, partly because of its temporary nature, but also because of the necessity for project managers to adapt standards and methods in accordance with what seems to be the most appropriate for a certain project [7], [23]. The project uniqueness and the standards are paradoxically intertwined, which makes it even more troublesome for project managers, who are not allowed/expected to diverge from general best practices/standards, when it on the other hand is seriously recommended in the literature to do that if the project/product would benefit from it [6]–[8], [15], [23], [29]. Another finding with importance for the project outcome, i.e. the lack of specific and specialized core competences, is that the most frequently listed competence requirements (Table 6) indicated that the projects' core competence requirements were not acknowledged [30], [31] in the IS/IT project manager ads.

The ads. were for the most part solely providing general demands and descriptions and only rarely are there any details or more specific demands about sector, company or the project. General descriptions could however just as well be found in the BOKs, which opens up for the opportunity to simply refer to BOKs when it comes to general demands and qualifications (the white area in Fig. 1). Instead it would be more accurate to concentrate on listing specific information and demands that relate directly to the project core competence needs [30], [31] (the grey areas in Fig. 1).

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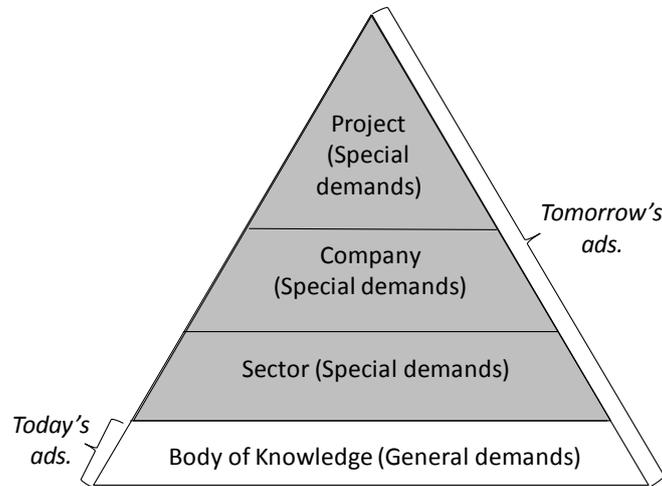
Fig. 1. What today's ads. contain and a suggestion for tomorrow's ads.

Even though standards sometimes are questioned since they are rarely updated in accordance with recent research findings, the "black boxing" [7, p. 446] of knowledge that lays in standardization, an understanding of the fact that general models do not necessarily (or rarely) fit all projects [15], [29], and also because best practices might be diluted when transferred between practices and generalizations [9] they still could have a place in order to express basic demands. Still, standards and also certifications could be applicable and helpful when it comes to providing general requirements, and it is the root of the matter that specific demands and requirements should be mentioned as well, simultaneously with references to standards. If the employers would focus more on the projects' scope and on formulating requirements accordingly to these, instead of describing almost solely generalizations this would most likely provide better opportunities for appointing *the right* project manager.

5.3 Limitations

This study is subject to limitations, which should be accounted for. The most important is probably that the data collections possibly could have been carried out more often, which could have provided more data and presumably even more valid findings. Besides, including ads. for other project managers than for IS/IT project managers could have broadened the research area and provided more data *per se*.

6. Conclusion

This concluding section focuses on providing answers to the research questions that were presented in the introduction part. Additionally, implications of findings are presented as well as suggestions for further studies on this subject.

6.1 Answer to the first research question

The first research question was: *How can the paradox of project standards' general applicability and projects' uniqueness be overcome in order to enhance recruitment of IS/IT project managers?*

The answer relates closely to Fig. 1. Today's way of advertising for project managers must change in order to better deal with the paradox of generic standards vs. project uniqueness. The analysis of the ads. showed that the requirements and the tasks were either described in a general way or not at all, which does not match the fact that projects are inherently unique, and therefore in need of specific competence and qualifications, which in turn should be mirrored in

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the ads. Hence, recommendations for employers and recruiters are that they take a standpoint in general requirements on the basis of standards, and formulate the ads. in accordance with such guidelines and requirements as a basis (the white area, Fig. 1). These general requirements must be supplemented with further requirements that are unique to the specific industry, the specific company and the specific project (the grey areas, Fig. 1). It should be noted though that both the white area and the grey areas are needed for enhancement of future ads. Adherence to these recommendations could contribute to further opportunities to provide a clearer and more specific picture of requirements for an IS/IT project manager's job. Besides, it would probably be easier to focus on the supplementary and more critical information that is likely to satisfy the project uniqueness better if the general and basic demands are referred to via BOKs. Additionally, if the project specific demands are visible in the ads. the applicant IS/IT project managers could be more certain of what would actually be expected of them.

6.2 Answer to the second research question

The second research question was: *How can the ads. be formulated in order to facilitate recruitment of the right IS/IT project manager?*

When employers formulate ads. in a way that solely display tasks and other requirements at a general level this could on the one hand mean just about everything, and on the other hand it does not say anything in specific, even though the qualification requirements *per se* could be overloaded with vivid descriptions. A concluding suggestion for how the ads. could be formulated in a way that provides more accurate and useful information, i.e. reveal more about what the job will actually imply, is pictured in Fig. 1. General information may well be referred to via BOKs or by demanding project manager certifications. Further, the basic information (the white area in Fig. 1) should firstly be given via references to standards or by demanding certified project managers, and secondly this information should be complemented with specific demands and qualification criteria that are adapted to the needs of the sector, the company and the project. Hence, the information referring to the white area in Fig. 1 should in tomorrow's ads. solely be given by references to BOKs and/or project management certifications in order to focus on the complementary, grey areas when the ads. are formulated.

6.3 Theoretical implications

The theoretical implications are principally connected to tying basic BOK criteria to the job descriptions in the ads. as general qualification requirements, which in turn conveys a need to supplement the basic demands with more specific ones that are connected to the project's core product, i.e. involving a need to discern which the project's core competences are.

6.4 Practical implications

The practical implications are mostly about facilitating the recruitment of IS/IT project managers (but should be applicable for any project manager), and about enhancing the possibilities for appointing *the right* individual with more certainty. Employers/recruiters who realize the necessity of describing demands and qualification requirements that actually match a certain project's specific needs, i.e. those that would acknowledge the project's core product and competence needs, are more likely to find *the right* individual for the job. Additionally, it would be more likely that prospect project managers, who are qualified will be motivated to engage more in applying certain jobs when the ads. clearly express what qualifications are sough-after.

6.5 Suggestions for further research on this topic

These research findings and their conceivable explanations point out the importance of further studies of why the Swedish employers do not find it critical to be clearer and more detailed about what they expect of their future IS/IT project managers when creating the job ads. Collecting and analyzing opinions about the possibilities to relate to standards for basic project manager qualifications and about the need for specific details regarding qualifications

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connected to the actual product, project, sector and methods would be helpful for further theory building. Yet another question to look further into is whether a fully realized professionalization of project management could further facilitate a consistency of decisive personality traits, or at least strongly preferred, for individuals aiming at project management posts.

Acknowledgments

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