Structural Design, Personal Traits, and the Effectiveness of Teamwork

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Abstract

This article introduces performance levels to be attained by software development teams involved in the implementation of customized information systems software (CISS), especially in enterprise resource planning (ERP) projects. The focus is on the customer team (CuTe) – professionals from the client organization that contracts the development of information systems tailored to fit at least one of its strategic business processes, who are assigned categorical business and information technology roles for interacting with outsourced developers in such projects. Research findings come from a three-year case study within a landmark ERP implementation in a Brazilian university that provided benchmarks for 88 measures, 27 metrics and 7 indicators addressing the structural design and personal traits (the social subsystem of the socio-technical approach) of CuTes in CISS endeavors.

1 Introduction

The most important cost factor in customized information systems software (CISS) development is represented by people. In two recent surveys, the commitment to attracting, developing, and retaining information technology (IT) professionals ranked fourth (Luftman & McLean, 2004) and second (Luftman, 2005) among the top five IT managerial concerns reported by chief information officers and other IT executives. Nevertheless, it is not clear how to promote teamwork (Leidner & Jarvenpaa, 1995), but it is also true that teams that master how knowledge is distributed among members perform better (Faraj & Sproull, 2000). Adding complexity to such a scenery, management is a social construction in organizations (Currie & Glover, 1999), thus being naturally delineated by subjectivities of many orders. Broadly speaking, management deals with uncertainties (Miller *et al.*, 1996; Morgan, 1996), makes decisions on imponderable matters (Simon, 1979), struggles against the chaotic organizational reality, and tries to elucidate how the obscure causal relations with the organizational performance may take place (Motta, 2000). But alternatives for mitigating uncertainty still constitute a challenge for research (Terwiesch & Loch, 1999) and little is known, in particular, about the causes, the consequences and the management of innovation (Galliers & Swan, 1999), like in CISS development. As a result, one of the most important ventures is to timely decide on resuming or getting rid of problematic information systems (IS) projects (Keil *et al.*, 2000). IS project managers are, anyway, needed (Pavur *et al.*, 1999).

Notwithstanding the challenges, there is a need to manage work with a set of objective, clear criteria causally linked to organizational performance. Such a need is put in evidence in the particular case of CISS development when we understand that the relationship between service providers and customers are expected to be durable, and that customized products are likely to strengthen such ties (Stump *et al.*, 2002). Poor management, thus, may compromise the natural, mutual commitment.

Our research, fulfilled during the doctoral studies of the first author, is particularly interested in setting parameters for customer activity in CISS projects, with a focus on the *customer team* (CuTe) – professionals from the client organization that contracts the development of IS tailored to fit at least one of its strategic business processes, who are assigned special business and IT roles for interacting with outsourced developers (the X-Teams, named after *external teams*) in such projects. Findings come from a three-year case study within a landmark enterprise resource planning (ERP) implementation in a Brazilian university that provided benchmarks for 88 measures, 27 metrics and 7 indicators addressing

the structural design and personal traits (the much neglected social subsystem of the socio-technical approach) of CuTes in CISS endeavors.

One benefit stemming from the effective measurement of customer activity in software projects is that, if putting down in contract a customer's assessments of acquired products, the supplier is assured that products will be rejected only if (accurately) assessed by the customer and deemed actually defective (Baiman *et al.*, 2000). Another benefit of setting criteria for the participation of customers in projects lies in trials that may be faced by organizations that do not institutionalize and follow quality practices (Gooden, 2001). In general, it is more profitable to prevent flaws prior to running projects, as by partnering for institutionalizing joint-work practices between customers and external developers (Jiang *et al.*, 2002), what is also true for any outsourcing contract (Lacity & Hirschheim, 1999).

As a matter of fact, the management of mutual responsibilities in software endeavors was not found in the international literature. Thus, expected benefits from our research on setting performance level for CuTes in CISS projects cover a wide range of academic and industry interests, such as: (1) greater transparency and accuracy in contracting the participation of CuTe professionals; (2) real-time assessment of CuTe performance (a side effect would possibly be the emergence of academic interest in studying the satisfaction of X-Teams in CISS projects); (3) better judgment on the actual performance of X-Teams (from comparing their performance to that of the CuTes with which they interact, and to the overall performance of the projects they jointly execute); (4) informed distribution of people (from their historical performance) in CuTes; (5) anticipated knowledge of CuTe members about the performance criteria with which they will be assessed by employers (the client organizations) in CISS projects; and (6) improved rationale to unify areas of great interest for the IS field, including customization, quality management, seller-buyer interaction, and teamwork.

The article is organized as follows: first, we define the main concepts of interest in this research, like that of teams, high-performance work systems, and measurement as a means to effectively manage teamwork; second, we describe the case that provided us the opportunity to understand in practice how high-performance teamwork is designed, effected, managed and assessed; third, we propose a first benchmark for the structural design and personal traits (the social architecture) of high-performance CuTes working jointly with X-Teams in CISS projects; and fourth, the relevance of this research for theory and practice is briefly discussed.

2 Work Systems and CISS Projects

Usually, two organizations get involved in CISS development: the client and the outsourced company responsible for the best global practices in IT and business processes. A third organization is found in most projects as well – a consultant firm responsible for implementing the project. As said before, our research is interested in a peculiar group within the client organization – the CuTe. From a theoretical perspective, work within the CuTe is here framed as a socio-technical system (Trist & Murray, 1993). Below, we discuss the theoretical grounds of CuTe socio-technical work design.

2.1 Teams

A *team* is a group of people whose complementary skills and common goals and thinking enable them to carry out tasks on which each member is equally responsible (Church & Te Braake, 2001). By engaging in a team perspective, painful relationships between line and staff personnel can be mitigated (Scarbrough, 1999), an entrepreneurial attitude is leveraged (Richards & Gupta, 1985), and knowledge creation is nurtured (Leidner &

Jarvenpaa, 1995). From Peled (2000), one can frame teams as the most effective layout for the IS-business workforce in CISS development:

- teams are generally small, and this adheres to the assumption that size reduction is necessary for people to be in contact with each other for work coordination (Semler, 1989);
- the technical competence of team members is in line with our premises that CuTes are also responsible for the success of CISS development (along with the X-Teams) and that they should meet performance levels;
- the high levels of team autonomy espouse the selection of a socio-technical framework for designing the work system in CISS development;
- the fact that teams work as compact units make them able to satisfy demands in which task complexity exceeds an individual's cognitive ability (Simon, 1979); and
- the vendor-client nature of the relation of teams with other entities in projects is of particular importance to address the role of IS-business people (both from the customer and the external companies) involved in CISS development.

2.2 Socio-technical Design and High-performance Work

Superior organizational performance implies that social *and* technical issues be taken as interdependent, equally important and simultaneously satisfied in the design of any work system, in order to achieve functional effectiveness and quality of life (Mumford, 2006; Palvia *et al.*, 2001; Garrety & Badham, 2000; Mumford, 1999; Trist & Murray, 1993; Nadler & Gerstein; 1992). Alternatively to fitting people and organizational structures to an optimum technology-and-processes system, a joint optimization of the technical and the social domains should be sought. The socio-technical approach thus advocates the following principles (Mumford, 2006; Trist, 1993; Nadler & Gerstein, 1992):

- the work system as a whole constitutes the unit of analysis – instead of the job positions into which it decomposes;
- internal supervision by the group replaces individual supervision;
- although work principles and processes for achieving success need to be set, nothing more than the indisputable essential is defined (*minimum critical specification*);
- each member is required to be skilled in more than one function (*redundancy of functions*, not of parts), for the work system to be flexible and adjustable (thus implementing *holography* to address *requisite variety*);
- interdependent functions are allocated within the same departmental boundaries;
- IS provides information to where it is needed for decision making and action;
- deviations from the ideal process are controlled at the source; and
- people complement the machine – they are not part of it.

These principles relate to the important belief that people are able to effect bold actions when offered opportunities. The socio-technical exhortations are long reported to be effective (Mumford, 1999).

As an extension of the socio-technical approach, Nadler & Gerstein (1992) suggest that *high-performance work systems* (HPWS) should be targeted at the effectiveness of the organization within its environment; and Peled (2000) puts forth the concept of *high-performance teams* (HPT), which are elite units comprised of a small number of professionals with complementary skills devoted to shared objectives, responsibility, and performance goals. Key for HPT is *empowerment* (Dawson & Newman, 2002): the development of (1) skills for learning from available information, (2) trust in experimentation with new things and learning from experience, (3) skills for finding solutions, (4) trust in the ability to select and pursue reasonable paths of action, (5) skills for explaining what is done, and (6) skills for working in teams. For Morley and Heraty (1995), HPT members report an increase in work

variety, autonomy, and satisfaction with feedback on performance. Such teams are vital for the success of mission-critical IT projects (Peled, 2000).

2.3 Team Performance Measurement

Our research seeks improvements in knowledge and managerial practices about the participation of CuTes in CISS projects, in order to lead the teams towards higher levels of performance. Such an intervention is aligned with the facts that there should be some motivation for the buyer to employ its knowledge when interacting with sellers (Athaide & Stump, 1999), and that, following Chatman and Barsade (1995) and the main thrust of the *theory of reciprocal action*, people behave according to expectations on the action of others (in this case, the assessments). In other words, the relationship with customers, particularly when aimed at transparency, asks for some sort of external coordination (Sivula *et al.*, 1997), and an effective management of relationships during new product development antecedes the success in industrial, technology-based markets (Athaide & Stump, 1999).

We do *not* aim, however, to achieve unconditional power over the routines of CuTe individuals through measurement of performance levels, due to efficacy, efficiency, and ethical reasons. The following excerpts illustrate this point:

- some knowledge serves best if kept tacit (Bloodgood & Salisbury, 2001);
- for people to take healthy organizational initiatives, they need to feel secure in work (Bednar, 2000), thus metrics cannot serve as tools for punishment – just the opposite, metrics play a key role in acknowledging good performance, since appropriate rewards are also needed (Kirsch *et al.*, 2002); and
- operations control systems may institutionalize the manufacturing of defective products, since people realize that there is an admissible "fault quota", which is also not under their managerial responsibility (Morgan, 1996).

3 Methodology

The research unfolded as follows: first, we informally developed insights on how companies interact to develop CISS products, mainly through case studies and informal interactions with companies in a leading Brazilian IT cluster; second, we designed the research's rationale and the instruments for data collection by means of a thorough literature review; third, we argued on the available methods to answer the main research question (that searched for the structural design and personal traits of high-performance CuTes); fourth, we developed a case study within a landmark ERP project, in which it was possible to (1) interact with CuTe and X-Team professionals, (2) carry out in-depth interviews with select CuTe professionals, during which they performed self-assessments about personal traits and performance in the project, and (3) carry out in-depth interviews with the manager of those CuTe professionals for assessing them on the basis of personal traits and performance, as well as for assessing the structural configurations that were designed for or emerged from their professional interactions; and fifth, we validated the findings with the help of external judges from academy and industry.

The methodological procedures enabled as much as possible (1) an understanding about the fundamentals of software customization and the participation of CuTe professionals in it, (2) insights into practices and needs of customers and developers of CISS projects for managing their teams, (3) the identification of actual practices of joint work between CuTes and X-Teams in CISS projects, (4) the development of a set of metrics for managing the participation of CuTes in such projects, and (5) the definition of performance levels expected for each metric from a high-performance CuTe.

Prior to the case study, we developed 7 indicators, 27 metrics and 103 measures (then reduced to 88) on the structural and people design of CuTe work (Table 1), based on a systematic literature review. Due to space limits, the data collection instruments and the theoretical sources for each measure are not mentioned here; indeed, the instruments are lengthy, since they were coded as open-ended questions addressing each of the 103 original measures. Details can be found in Bellini (2006) and Bellini *et al.* (2007).

Indicator	Definition and Metrics
Adhocratic Design	How far is CuTe structural design from the adhocracy standard: organizational fit (*Fit*), task interdependence (*Interdep*), goal conflict (*Conflict*), formality & knowledge sharing (*Formal*), cooperativeness (*Coop*), and genuine participation & autonomy (*PartControl*).
Eligibility	Pre-screening mechanism for assembling the CuTe based on more stable personal traits of the individual: personality (*Person*), trustworthiness (*Trust*), innovativeness & entrepreneurship (*Innov*), and expertise & transactive memory (*Expert*).
Risk-averse Attitude & Social Integration	How the individual aligns with the company's present needs: strategic enrollment (*RiskStrat*), role cherishing (*RiskRole*), and system championing (*RiskSyst*).
Self-preservation	The expedients used by the individual to justify his/her pro- or anti-project behaviors: goal incongruence (*GoalInc*), psychological self-justification (*NfPsycho*), social self-justification (*NfSocial*), sunk cost effect (*SCostEff*), and completion effect (*ComplEff*).
Transaction Costs Management	The individual's behavior in business transactions: contractual relationship (*Contract*), relationship monitoring (*Monitor*), and opportunism & information asymmetry (*OppAsym*).
Interpersonal Effectiveness	The effectiveness with which the individual reports to its external partner: organizational proxy (*Proxy*), collaborative elaboration (*CollElab*), customer learning (*CustLearn*), and customer communication & leadership (*CustComm*).
Prospect	The likelihood that the individual will be included in future CISS efforts: cooperative interdependence (*Balance*), and partnership propensity (*ProPart*).

Table 1: Indicators on CuTe structural design and personal traits.

3.1 Unit of Analysis and Research Site

The unit of analysis for the case study was the set of formal and informal, declared and hidden, voluntary and mandatory, deliberate and unconscious, work-oriented practices during the joint work of one high-performance CuTe with one X-Team in a landmark CISS project. The research's rationale and measurement instruments were empirically applied to a company here called UnivERP. UnivERP is a private Brazilian university that is prominent in IT capabilities and initiatives, and, as part of a comprehensive redesign of its institutional strategy, business processes and commercial orientation, it has implemented a large enterprise resource planning (ERP) package from PeopleSoft, giving birth to a socio-technical endeavor hereafter referred to as the entERPrise. ERPs are information systems that support business processes with timely, accurate enterprise-wide information for decision making (Vemuri & Palvia, 2005) in a cost-effective, best-in-the-industry manner that trades-off between software customization and organizational change (Pollock & Cornford, 2004).

The entERPrise started in August 2003 and extended through December 2005, in a partnership that included business and IT professionals from the client organization (UnivERP), the world-leader vendor (PeopleSoft), and a local consultant firm experienced with ERP implementations (hereafter referred to as PartnERP). The implementation followed a two-year mapping of the company's operational processes and the selection of the most appropriate ERP package from several solution providers. The chosen package was expected to reduce inefficiencies in operational processes, speed up management and make it less complex, and provide transparency and improved effectiveness to organizational decisions.

With 145 employees and 15 teams, the entERPrise challenged the managerial practices. It can be easily framed as a *death march project*, in which typical project parameters (like budget, functionality, required performance, and the size of the team) "exceed the norm by at least 50 percent" (Yourdon, 1997, p. 2), thus leading to a situation where the likelihood of failure is greater than that of success. Indeed, entERPrise professionals were hired upon compliance with a major requirement: to contribute to a team that was expected to learn fast and go live with a fully functional system within a tight schedule – and that system was nearly the complete PeopleSoft ERP solution. This is to say that the entERPrise would define a new world benchmark for PeopleSoft, and common challenges included, among others, such things as managing very different people, building a cohesive team, making planned or fortuitous replacements, maintaining high levels of motivation, struggling against fatigue, and negotiating politics (Yourdon, 1997).

3.2 The High-performance CuTe

The whole implementation team – formed by the CuTe and the X-Team – is conceptualized as a high-performance unit. It was designed according to such principles as (1) hiring professionals with superior learning skills (and not only experts in current technologies), (2) meeting functional/expertise redundancy (and not redundancy of parts/professionals), (3) promoting teamwork for the effective interaction of technology experts, business analysts, and lead users, (4) assigning high levels of autonomy to the professionals for the identification and correction of detours, and (5) leveraging the spirit of genuine group cohesiveness for achieving group goals. Additionally, the whole team can be conceived as a mature unit in terms of its strategic business practices (Luftman, 2005).

The first author was assistant professor of information systems at UnivERP from March 2002 to February 2006, where he interacted on a weekly basis with most professionals of the entERPrise's implementation team. All respondents in the in-depth interviews (Table 2), except the manager, attended at least one course taught by the first author at UnivERP. At class, theoretical issues on ERP implementation were frequently raised, and discussions invariably ended up addressing the entERPrise, since classes had on average three students who also worked in the project. Thus, besides getting information directly from project leaders and experiencing the "winds of change" at UnivERP, he was also provided with fresh, up-to-date facts from the shop floor reported by the student workers.

Our choice for the particular technique that would help us extract relevant conceptual categories from the interviews was a variant of the *revealed causal mapping* (RCM) approach (Nelson *et al.*, 2000), which introduces managerial cognitive maps into content analysis in order to reveal the causalities hidden in people's minds. At the end, 49 categories for structural design and 202 categories for personal traits were developed and put together in a first nomological network of constructs to help understand the social drivers of high CuTe performance in CISS projects. Due to space limits in this article, the reader is asked to contact the authors in order to be informed about the categories.

CuTe Member	Roles in the Project	Prior IS Experience	In the Company	In the Project[1]	In the Role
Developer1	webmaster	90 months	108 months	last 18 months (53%)	18 months
Developer2	webmaster	36 months	36 months	last 20 months (59%)	20 months
Analyst1	developer systems analyst	36 months	68 months	last 21 months (62%)	10 months
Analyst2	network administrator	-	45 months	from the beginning	from the beginning
Analyst3	webmaster systems analyst	222 months	120 months	from the beginning	from the beginning
Analyst4	network administrator	30 months	30 months	last 25 months (74%)	25 months
Analyst5	lead user business analyst	-	84 months	last 18 months (53%)	18 months
Manager	manager	120 months	120 months	from the beginning	from the beginning

[1] In reference to the project's duration.

Table 2.1: The respondents.

CuTe Member	CuTe Partners	X-Team Partners	Main Interaction with the X-Team	Duration of Interview
Developer1	15	2	face to face	103 minutes
Developer2	8	3	instant messenger	124 minutes
Analyst1	10	8	face to face	58 minutes
Analyst2	10	8	face to face	50 minutes
Analyst3	13	5	face to face	125 minutes
Analyst4	10	8	face to face	164 minutes
Analyst5	8	3	instant messenger	(by e-mail)
Manager	90	35	face to face	214 minutes

Table 2.2: The respondents.

4 Results

From the experience within the entERPrise, and assuming that its CuTe members performed as a genuine high-performance unit as reported by PeopleSoft, UnivERP, PartnERP and mass media, we believe to have learnt substantially from those professionals and framed how a high-performance CuTe is expected to be assembled and perform in CISS endeavors.

First, all social indicators in Table 1 (here understood as managerial principles for the assembly and assessment of CuTes) reportedly had a general positive effect on CuTe performance (Figure 1), exception made for the self-preservation personal traits, that is, the expedients used by the individual to justify his/her pro- or anti-project behaviors. In other words, a high-performance CuTe should perform generally high in all indicators, except for self-preservation. As a matter of fact, each metric within each indicator has also its own causal meaning (magnitude and direction), and accordingly should be assessed individually – but such a discussion is out of the scope of the present article.

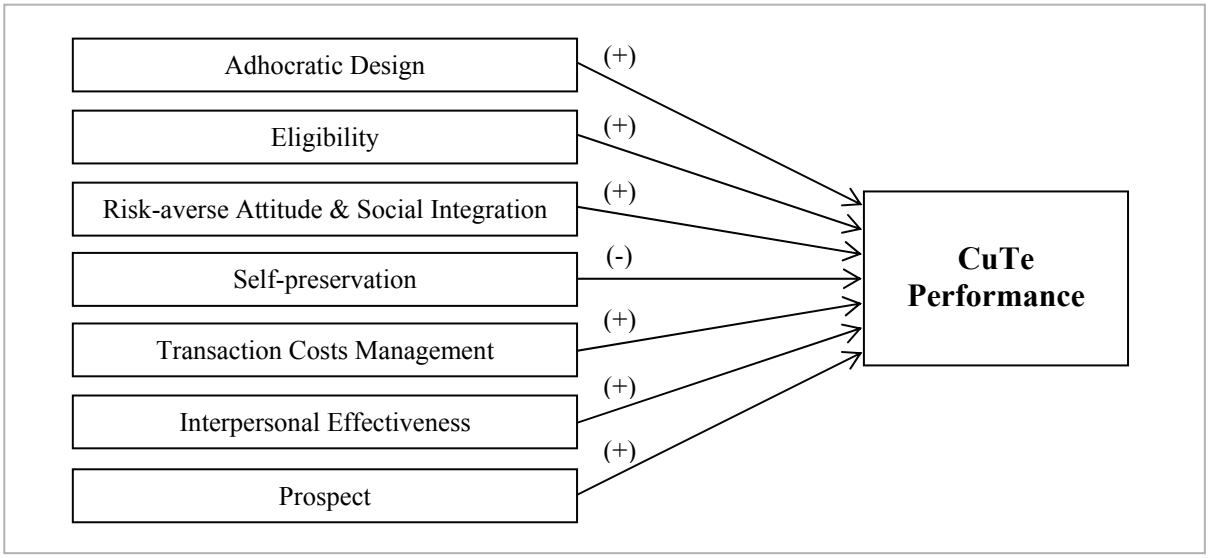
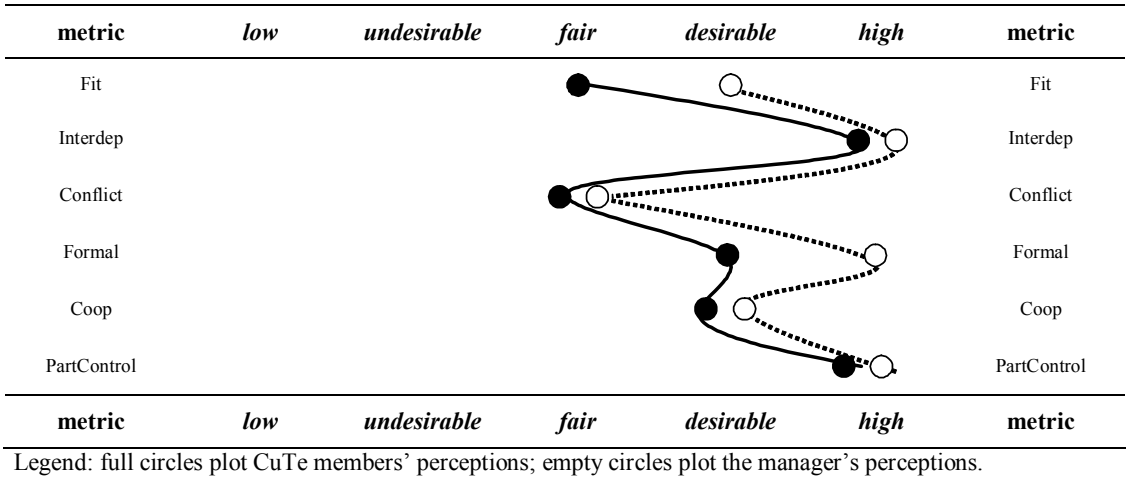


Figure 1: Causalities between indicators and CuTe performance.

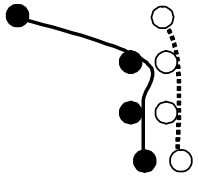
Second, Figures 2 to 8 plot the structural design and personal traits (the social architecture) of the entERPrise's CuTe. It is relatively straightforward to conclude from the "competence maps" that the entERPrise's CuTe performed really well, having scored high in most metrics. This enabled us to suggest that the levels achieved by this CuTe in each indicator can serve as a first benchmark for high-performance CuTe work in very large CISS development, like in ERP implementation.



Legend: full circles plot CuTe members' perceptions; empty circles plot the manager's perceptions.

Figure 2:
Perception map on CuTe structural design – adhocratic/organic organization.

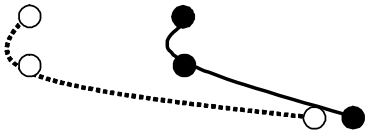
metric	*low*	*undesirable*	*fair*	*desirable*	*high*	metric
Person						Person
Trust						Trust
Innov						Innov
Expert						Expert
metric	***low***	***undesirable***	***fair***	***desirable***	***high***	**metric**



Legend: full circles plot CuTe members' perceptions; empty circles plot the manager's perceptions.

Figure 3:
Perception map on CuTe personal traits – eligibility.

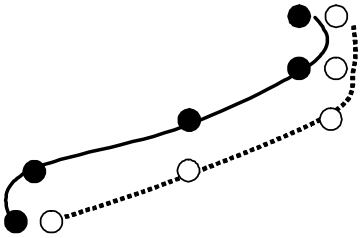
metric	*low*	*undesirable*	*fair*	*desirable*	*high*	metric
RiskStrat						RiskStrat
RiskRole						RiskRole
RiskSyst						RiskSyst
metric	***low***	***undesirable***	***fair***	***desirable***	***high***	**metric**



Legend: full circles plot CuTe members' perceptions; empty circles plot the manager's perceptions.

Figure 4:
Perception map on CuTe personal traits – risk-averse attitude & social integration.

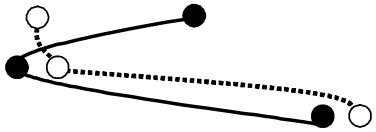
metric	*low*	*undesirable*	*fair*	*desirable*	*high*	metric
GoalInc						GoalInc
NfPsycho						NfPsycho
NfSocial						NfSocial
SCostEff						SCostEff
ComplEff						ComplEff
metric	***low***	***undesirable***	***fair***	***desirable***	***high***	**metric**



Legend: full circles plot CuTe members' perceptions; empty circles plot the manager's perceptions.

Figure 5:
Perception map on CuTe personal traits – self-preservation (reverse-coded).

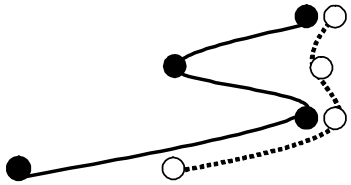
metric	*low*	*undesirable*	*fair*	*desirable*	*high*	metric
Contract						Contract
Monitor						Monitor
OppAsym						OppAsym
metric	***low***	***undesirable***	***fair***	***desirable***	***high***	**metric**



Legend: full circles plot CuTe members' perceptions; empty circles plot the manager's perceptions.

Figure 6:
Perception map on CuTe personal traits – transaction costs management.

metric	*low*	*undesirable*	*fair*	*desirable*	*high*	metric
Proxy						Proxy
CollElab						CollElab
CustLearn						CustLearn
CustComm						CustComm
metric	***low***	***undesirable***	***fair***	***desirable***	***high***	**metric**



Legend: full circles plot CuTe members' perceptions; empty circles plot the manager's perceptions.

Figure 7:
Perception map on CuTe personal traits – interpersonal effectiveness.

metric	*low*	*undesirable*	*fair*	*desirable*	*high*	metric
Balance						Balance
ProPart						ProPart
metric	***low***	***undesirable***	***fair***	***desirable***	***high***	**metric**

Legend: full circles plot CuTe members' perceptions; empty circles plot the manager's perceptions.

Figure 8:
Perception map on CuTe personal traits – prospect.

Third, further insights into high-performance CuTe work come from the following remarks made during the interviews:

- the entERPrise was worth every Herculean effort and persistent abnegation along the 18-month implementation, although the financial and status rewards were deemed insufficient; this is related to the general sense that IT professionals are used to *"hard but fulfilling work"* (Developer2) and to *"doing some nightshifts"* (Manager);
- improving the personal organization is a permanent need, but this is not as important as accomplishing the tasks and observing the deadlines; this is related to an old behavioral dilemma – that of being effective and expeditious at the same time;
- prior technological knowledge is not as important as learning capability; this is related to the flexibility needed in face of the technological changes and the pressures for creative solutions;

• the team was indeed effective, that is, we found that the professionals in this CuTe were mutually supportive in reckoning the others' performance at work; this is related to the autonomy-with-responsibility design of socio-technical work systems, which also implies corresponding rewards (like the acknowledgment from peers);

• at the beginning of the partnership between UnivERP and PartnERP, the entERPrise's CuTe and X-Team interacted stressfully; this is intriguing, since stress in business relationships is expected to develop through time;

• training was ineffective; this is contrary to good project principles, but the team proved to have outstanding learning capabilities to perform the tasks and even break world records in terms of ERP implementation standards; and

• the contract between UnivERP and PartnERP was a black box for non-managers; this led to shortfalls in productivity, since controversies between the partners were not promptly solved, and similar tasks were sometimes superimposed.

And fourth, not all discourses were light regarding the entERPrise's *raison d'être* and the performance of its CuTe professionals. In addition to the fact that human endeavors are axiomatically imperfect, the entERPrise suffered from occasional and recurrent critiques from individuals and groups concerned with UnivERP's downsizing and fierce commercial orientation. Some technical attributes of the implementation also asked a high price from the professionals – like the large number of people to be managed, their different competencies and conflicting interests, tight deadlines, the shortage of rewards, limited help from the X-Team, and high turnover rates typical of the software industry. Finally, since the entERPrise's CuTe was, by definition, composed only of UnivERP's personnel, the adverse organizational climate had a prevailing negative effect on the individuals – and this is expected to have moderated their performance.

5 Conclusions

We believe to have proposed a first benchmark for the structural design and personal traits (the social architecture) of high-performance customer teams (CuTes) working jointly with outsourced teams (X-Teams) in customized information systems software (CISS) projects, thus answering positively the main research question. The research question was based on the need to address customer responsibility for project outcomes (a much neglected subject in the literature) and especially on the lack of measurement models dealing with social attributes of effective teamwork.

Our research argued on these concerns and searched for desirable levels of CuTe social performance during a three-year case study within a landmark ERP project (the entERPrise) carried out in a Brazilian university (UnivERP) with the help of an IT-business consultancy (PartnERP) that represented the technology vendor (PeopleSoft). Based on known project performance as reported in mass media and experienced through the daily routines in UnivERP, and based on professional interactions and in-depth interviews with key informants in the project, the empirical investigation showed that the entERPrise was actually carried out by a high-performance CuTe. This fact enabled us to estimate benchmarks for 88 measures, 27 metrics and 7 indicators that address CuTe structural design and personal traits in large CISS projects, like in ERP implementation. The benchmarks resulted from applying previously developed measurement instruments to that high-performance CuTe. The definition, theoretical sources and validation procedures of the measurement instruments are described in Bellini (2006) and Bellini *et al.* (2007).

Although only CuTe members (and not also the X-Team) could be directly interviewed in this research (what accounts for one of its limitations), the long, ongoing professional interaction between the first author and the respondents enabled a whole set of social rules to

be relaxed, thus granting him access to private facts about one's actual behavior and perceptions in the project. Therefore, by means of applying the research's rationale to the entERPrise (a world benchmark for PeopleSoft ERP projects), and especially to some of its brilliant professionals, we believe to have cast aside undesirable sources of influence over the findings; we thus also believe to have reached at a valid set of performance levels to guide CuTe participation in CISS development.

An important finding, although consisting of nothing really new, is that an effective management is integral to high-performance teamwork. As thoroughly discussed in the literature and confirmed in the entERPrise, management is the single most important factor accounting for effective teamwork. This finding does not contradict the autonomy principle of socio-technical design (which also does not preclude management's authority), and supports our original intent to discuss in greater depth how to manage the participation of customer professionals in CISS projects.

Nevertheless, generalization from organizational change projects – like the whole set of transformations of which the entERPrise was an example at UnivERP – is hard to seize (Paper & Simon, 2005), and this should be interpreted as a limitation in our findings. Another limitation is that an individual's statements (like those reported in the interviews) are populated with incomplete perspectives, bounded rationality, latent intentions, efficiency-driven simplifications of reality, and communication skills, such as when reporting perceptions on project risk (Keil *et al.*, 2002) and project success (Procaccino *et al.*, 2005). Also, PartnERP's professionals (the X-Team) were not available for assessing UnivERP's professionals (the entERPrise's CuTe), thus preventing us to measure more impartially (or at least from another perspective) the actual traits and performance of the latter. And finally, only a few measures are exclusive to CuTe nature – but this is not how the research should be interpreted in face of originality and contribution to the field, since the major gain was to undertake a comprehensive search in the literature for social (structural and people-oriented) measures that could frame the effectiveness of CISS implementation, and validate the measures for the *particular use* with CuTe members. In this regard, we believe that our research is coherent to its purpose, original in results, and useful for practice.

We believe that the rigor-*versus*-relevance debate on IS research (*e.g.*, Pearson *et al.*, 2005, Hirschheim & Klein, 2003, Benbasat & Zmud, 1999, Applegate & King, 1999, Davenport & Markus, 1999, Lyytinen, 1999, and Lee, 1999) and the fact that measurement is essential for contrasting companies on process maturity (Rainer & Hall, 2003) support the validity of our endeavor on setting desirable performance levels on social attributes for high-performance CuTes in CISS projects. This research now asks for wide investigation in industry about whether the performance levels here introduced are realistic, accurate within acceptable ranges, and deployable to development teams in assorted business and IT contexts.

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