

Reconciling global and local needs: a canonical action research project to deal with workarounds

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Abstract. *This paper discusses how research with practitioners can help reconcile the top-down requirements of headquarters with the bottom-up local needs in the context of global information systems. Based on a 12-month canonical action research project that took place at the Chinese branches of a French multinational corporation, our research revealed and addressed workarounds that the Chinese users of a company-wide global enterprise resource planning system had put in place that were not expected nor desired by company headquarters. From the local users' point of view, they were necessary to deal with Chinese legislation and cultural practices, but from the French headquarters' point of view, they meant that many of the potential gains of global standards were lost. Activity theory was used as a focal theory to analyse each of these workarounds and business process management as an instrumental theory to design solutions to the workarounds. We describe in detail how we used canonical action research to successfully deal with exemplars of each of the three types of workaround identified (data adjustments, process adjustments and parallel-system adjustments). Unusually, the research relates to post-implementation change rather than to that looking at change occurring before and during implementation. We argue that canonical action research and the particular combination of activity theory and business process management are appropriate for dealing with workarounds and this has not been demonstrated previously. Further, our research – deemed successful by managers, users and researchers alike – took place in China where previous literature suggests only limited success with such global systems.*

Keywords: canonical action research, workarounds, multinational corporations, activity theory, business process management, enterprise resource planning

INTRODUCTION

It has been widely recognized that chief executive officers put pressure on information systems departments to implement worldwide applications to help them control and manage the business processes of their different subsidiaries better (Holland & Light, 1999; Scapens &

Jazayeri, 2003; Quattrone & Hopper, 2005; Ferran & Salim, 2008). In terms of the information technology available, enterprise resource planning (ERP) software is a widely used solution as it can integrate a whole set of organizational functions within one information system (IS).

Among the three strategies suggested by Madapusi & D'Souza (2005), global, multinational and transnational, we concentrate our attention here on the 'global strategy', which aims to standardize data and processes and apply common rules. Whatever the local specificities of each remote site, many multinational corporations (MNCs) adopt this strategy as they expect all users to use the same set of data, reports and business processes through this unique worldwide IS (Dechow & Mouritsen, 2005; Elmes *et al.*, 2005; Hawking, 2007). On the surface, this strategy fits with the desires of MNCs facing different environments and different users, but in practice, MNCs running global IS solutions experience difficulties in attempting to put this into practice. Davenport (1998), Bingi *et al.* (1999), Krumbholz *et al.* (2000), Markus *et al.* (2000), Häkkinen & Hilmola (2008), Staehr (2010) and others have shown that among the barriers to transferring ERP systems successfully, organizational aspects figure prominently. Among organizational factors, misalignment of goals, alienation or rebellion of local managers towards the parent company; breakdowns in communication; and organizational power politics can all disrupt the smooth transfer of technologies (Kedia & Bhagat, 1988; Lin & Berg, 2001; Bhagat *et al.*, 2002). Holland & Light (1999), Zrimsek *et al.* (2001) and Xue *et al.* (2005) all report on company difficulties when trying to implement ERP systems at a local level.

Where an IS lacks sufficient pliancy and is not easily adapted or where headquarters (HQ) does not permit change to the system, users will often create their own special practices, called 'workarounds', to address local requirements (Ferneley & Sobreperez, 2006; Alvarez, 2008; Azad & King 2008, 2012; Alter, 2014). Difficulties due to misfits can be particularly apparent in the Chinese context (Martinsons, 2004; Xin, 2004; Xue *et al.*, 2005; Newman & Zhao, 2008) as there might be crucial distinctions between the current western IT solutions and those appropriate for the Chinese environment. These may relate to institutional structures, legal requirements, accounting rules, work practices, disclosure of information and so on.

Therefore, the misalignment between the intentions of HQ using an ERP template for standardization on the one hand and local requirements leading to workaround practices on the other may lead to some serious concerns and conflict between HQ and subsidiary companies. This phenomenon of IS misalignments between HQ and worldwide subsidiaries is not new and has already been reported (Lin & Berg, 2001; Avgerou, 2002; Rolland & Monteiro, 2002; Madapusi & D'Souza, 2005; Hawking, 2007). For example, local users might reject the global IS or use it in different ways than expected, while HQ may have a misleading picture of business activities in its subsidiaries, which may consequently lead to inappropriate decisions being made. It leads us to question this global strategy adopted by many MNCs that aims to design, implement and diffuse a global and standardized IS, as local contingencies and requirements cannot be ignored (Madapusi & D'Souza, 2005). Given this context, our contribution aims to move beyond mere observations of these misalignments by asking the following research question: *How can requirements of MNC HQ for standardized worldwide processes (top-down) be reconciled with local requirements expressed by users (bottom-up)?*

This article is organized as follows. In the next section, we present a literature review of previous studies discussing issues related to global IS and related workaround practices. The third

section presents and justifies our choice of canonical action research (CAR) as an appropriate approach for our project and the use of activity theory as focal theory and business process management (BPM) as instrumental theory. The fourth section presents the specificities of our 1-year, one-cycle action research (AR) project. The fifth section focuses on three distinct workaround practices to discuss how these were addressed by the intervention guided by our theoretical framework. The sixth section reflects on this AR project and its contributions.

LITERATURE REVIEW

Global information systems

In order to support the quest for global effectiveness, global IS are usually implemented by MNCs to create efficient and standardized processes providing predictable worldwide outputs (Akmanligil & Palvia, 2004). The widespread use of centralized ERP systems by MNCs is a major demonstration of this quest for consistency, transversality, visibility, control and practice diffusion. Whatever the local specificities of each remote site, users are expected to use the same set of data, reports and business processes through a single worldwide IS (Ferran & Salim, 2008). A path to reach this management control 'dream' is to promote organizational discipline in two ways: first by constraining users to follow prescribed processes through the use of an ERP 'template', which defines and imposes the company standard, and second by limiting their access to only that data related to their specific organizational roles. However, this often proves to be more difficult to achieve than firms contemplate. There is much published research discussing ERP projects, but ERP in use has been under-researched as most published research tends to focus on issues of implementation (e.g. Holland & Light, 1999; Esteves & Bohorquez, 2007). The works of Wagner & Newell (2004), Robey & Boudreau (2005) and Ignatiadis & Nandhakumar (2009) are exceptions.

Some implementation studies (Sia *et al.*, 2002; Elmes *et al.*, 2005; Robey & Boudreau, 2005) demonstrate that the inherent design of global ERP systems tends to give local users more job discretion than intended. ERP solutions for MNCs, such as those of SAP and Oracle/PeopleSoft, are expected to work across different institutional, cultural and organizational contexts. In practice, they cannot be too prescriptive and specific as so much depends on the local standards, norms and values (Markus *et al.*, 2000). Thus, to the extent that an ERP MNC template fails to fill specific gaps for each subsidiary, the organization has to rely on locally implemented adjustments to enable the global IS to function locally. Consequently, the use of IS global solutions may eventually drive users to adopt *workaround* practices that place greater reliance on users' discretion even though giving such discretion may not be the initial intention of HQ when rolling out IS at subsidiaries (Sia *et al.*, 2002).

Workarounds

Some scholars discuss how IS are enacted through self-orchestrated interactions among users, technologies and institutional properties rather than dictated by organizational policies or managerial intentions (Orlikowski, 1992; DeSanctis & Poole, 1994; Barki *et al.*, 2007). More

specifically, there have been some recent studies on workarounds in the IS literature (Alvarez, 2008; Azad & King, 2008; Ignatiadis & Nandhakumar, 2009; Allen *et al.*, 2013).

Azad & King (2008) adopt an institutional framework to discuss how workaround practices suggest a decoupling between the top-down instructions of managers and the bottom-up influences of daily practices. Ignatiadis & Nandhakumar (2009) examine the negative impact of these practices on organizational control. This study also indicates that workarounds can occur because of user ignorance of system functionality as well as uncertain user requirements during the implementation of the ERP system. Alvarez (2008) analyses how an enterprise system can be seen as having both deskilled and reskilled users. He details how users have developed creative workarounds that produce a sense of reskilling to counter the deskilling produced by the loss of control and power that results from the system. Allen *et al.* (2013) suggest a theory of workarounds that describes how and why workarounds are created. Allen *et al.* (2013, p. 1042) also suggest reasons for workarounds occurring. They are found 'when cumbersome processes seem too slow, when information required by idealized processes is not available, when technologies malfunction, when situational constraints or anomalies make it difficult to perform work activities, when personal goals conflict with organizational goals, and when people feel motivated to bypass or undermine processes or decision criteria mandated by corporate management, labor agreements, industrial standards, or government regulations'.

These practices have been identified in many different situations, and not only in the context of IS. They include non-compliance with management policies, inconsistent record keeping in bureaucracies and non-standard decision-making processes with customers (Halbesleben *et al.*, 2008; Koppel *et al.*, 2008). However, a number of scholars agree that such practices remain under-investigated and under-theorized (Pollock, 2005; Safadi & Faraj, 2010; Allen *et al.*, 2013). Given the recognized importance of users' individual and collective processes in the shaping of IS, we would expect that IS research would have accumulated dense and robust empirical accounts discussing such enactment mechanisms. However, previous research has generally focused on episodic events of IS in use, and we did not find rich empirical accounts covering a long period showing the details and dynamicity of these micro-level practices following the implementation phase of projects. Our research aims to fill this gap by examining IS workarounds developed in Chinese subsidiaries of a French MNC.

This research is the first study that uses AR to help reconcile the requirements of MNC HQ for standardized worldwide processes with local requirements expressed in workarounds as developed by users. It suggests a way to address a well-known dilemma, that is, the conflict between standardization and localization of information systems solutions. In the following section, we discuss our research approach and its relevance to our given context.

METHODOLOGY AND THEORETICAL FRAMEWORK

Coherent with the issues and opinions piece from Chiasson & Davidson (2005) 'Taking industry seriously in information systems research', this contribution puts at the centre of its attention a well-grounded organizational problem and seeks benefits from the collaboration between scholars and practitioners to address it. More than merely suggesting a list of recommendations

to help reconcile top-down and bottom-up interests, this contribution narrates an AR project where the first named author worked with practitioners to address the phenomenon reflected in our research question. Given the major organizational problem at stake and our will to provide concrete and actionable outputs to address it *in situ* with practitioners, AR was seen to be the most relevant research approach. We also wished to add to our theoretical understanding, and AR provides that as we will see in later sections as we reflected on our findings.

Research method: canonical action research

Action research is 'a vague concept but it has been defined as research that involves practical problem solving which has theoretical relevance' (Mumford, 2001, p. 12). However, even though it has been the subject of a special issue of *MIS Quarterly* (Baskerville & Myers, 2004) and Mathiassen *et al.* (2012) give a very thorough literature review, there are still comparatively few IS researchers who have used this method. We hope that this research helps to demonstrate further the relevance of this method to address both scientific and practitioner concerns.

Action research differs from case study research in that the action researcher is directly involved in the planned organizational change. Unlike the case study research approach, the action researcher is concerned with creating organizational change and simultaneously reflecting on the process to inform scholars' theoretical understanding. Based on the typology suggested by Chiasson *et al.* (2009), our research follows a problem solving-dominant approach that (p. 40) 'focuses predominantly on the generation and analysis of findings from problem-solving activities that emerged during a study. After the problem is solved, insights and data from the problem-solving activities are used to compare and contrast with existing knowledge, or to develop new theoretical knowledge in later-stage research activities. In many ways, problem-solving dominant approaches to mixing research and problem-solving activities are like a grounded-theoretical approach to AR, which emphasizes the participants' own ability and expertise, including the researchers', to address setting-specific issues'.

Thus, research outputs come from the fieldwork investigation and participation in problem-solving activities with practitioners. Based on another typology suggested by Chiasson *et al.* (2009) in the same article, our research follows a 'sequential approach' because the AR project discussed in this article is embedded in a larger research programme. In our case, AR is used as a complementary approach following a longitudinal case study by the first named author.

We selected CAR, among the dozen or so AR approaches identified in the literature (Avison *et al.*, 1999; Baskerville & Wood-Harper, 1996), as it is iterative, is collaborative and involves a focus on both organizational development and the generation of scientific knowledge (Davison *et al.*, 2004). To characterize CAR, we use the schema that Baskerville & Wood-Harper (1996) adopt using four key characteristics related to the following: (1) process model (iterative, reflective or linear); (2) structure (rigorous or fluid); (3) researcher involvement (collaborative, facilitative or experimental); and (4) primary goals (organizational development, system design, generation of scientific knowledge or training). Table 1 shows these specificities in the case of CAR.

Table 1. Canonical action research (CAR) specificities (adapted from Baskerville & Wood-Harper, 1996)

CAR specificities	
Process model	Iterative
Structure	Rigorous
Researcher involvement	Collaborative
Primary goals	Organizational development Generation of knowledge

Theoretical framework: the joint use of activity theory and business process management

A particularly strong feature of CAR in its latest description (Davison *et al.*, 2012) is its emphasis on the roles of theory. The authors stress the need to use instrumental and focal theories more explicitly to provide precise and efficient outputs for both practitioners and researchers. They suggest guidelines along with practical examples to formally incorporate these two types of theory, which complement one another. A focal theory is the theoretical cornerstone for action-oriented change in a CAR project. It is the intellectual basis influencing and guiding the research scope of the AR project. In contrast, instrumental theories ‘include any tools, processes, or models that theorize how work is done and how outcomes are achieved’ (Davison *et al.*, 2012, p. 766). Therefore, focal theory and instrumental theory complement one another in CAR with the former helping to understand an organizational problem and the latter helping to remedy it.

In the CAR project described here, we used an original combination of activity theory (Engeström, 1999) as focal theory and BPM (Becker *et al.*, 2000; Sadiq *et al.*, 2007) as instrumental theory. Before looking at the CAR methodology as a whole, we briefly introduce the two theories that we adopted. We discuss them in more depth later when we look at their use in practice to illustrate how we dealt with workarounds in the CAR project.

Activity theory is a cross-disciplinary framework for analysing different forms of human practice as development or dynamic processes. This suggests a multi-layer focus on actors’ intentionality, historical background and context, and collective actions. It is based on the writings of Russian cultural–historical psychology founded by Vygotsky and Leont’ev during the 1920s.¹ The last major development of this theoretical framework was discussed in detail by Engeström (1999). It has been used by IS researchers for studying the human–computer interface (Nardi, 1996; Bedny & Karwowski, 2003), knowledge management systems (Blackler *et al.*, 2000) and computer-supported cooperative work (Kuutti, 1991). It also provides a useful perspective to look at practice dynamics in organizations (Jarzabkowski, 2005). A recent contribution (Allen *et al.*, 2013) discusses the potential of activity theory for theorizing technology-mediated organizational change. Consistent with our stance, the authors discuss the contributions of this theoretical framework by locating technology (in a broad sense) within ‘activity systems’ and

¹The original works of Vygotsky and Leont’ev were published in the 1920s, in Russian. However, complete translations in English were available at the end of the 1970s. To cite a few, we refer to Leont’ev (1978) and Vygotsky (1978).

theorize change through contradictions and congruencies within those systems. Cole & Engeström (1993) explain that in activity systems, 'equilibrium is an exception and tensions, disturbances, and local innovations are the rule and the engine of change' (p. 8). Engeström & Miettinen (1999) emphasize that 'contradictions are the motive force of change and development' (p. 9). Engeström (1999) also details how contradictions can lead to innovation and transformation within an activity system: 'As the contradictions of an activity system are aggravated, some individual participants begin to question and deviate from its established norms. In some cases, this escalates into collaborative envisioning and a deliberate collective change effort. An expansive transformation is accomplished when the object and motive of the activity are reconceptualized to embrace a radically wider horizon of possibilities than in the previous mode of the activity' (p. 137). Therefore, by using activity theory as focal theory, we are able to analyse the roots of the unexpected ERP work practices, as consequences of contradictions (between top-down and bottom-up interests) and experiencing activities.

As a complement to activity theory looking at micro-practices, contradictions and experiencing activities that led to workarounds, we adopted a BPM approach (Becker *et al.*, 2000; Sadiq *et al.*, 2007; Chavan & Lal 2012) as instrumental theory. This was appropriate because redesigning business processes was found to be necessary to overcome the ERP workaround practices that were developed by the users at the Chinese joint ventures, identified in the case study research earlier and analysed as part of the CAR project during the diagnosis phase and through the use of activity theory.

Business process management is a management approach focused on aligning all aspects of an organization based on an analysis, monitoring and maintenance of its business processes. It aims to promote business effectiveness and efficiency while striving for flexibility and integration given company contingencies (human resources, technology in use, etc.). BPM attempts to improve processes continuously. It can therefore be described as a process optimization approach. In principle, BPM helps organizations to be efficient, effective and capable of change (compared with functionally focused and traditional hierarchical management). The latter characteristic, 'capable of change', was seen as crucial. This enabled changes to be made to the local workarounds developed within Chinese subsidiaries. Additionally, BPM provides concrete guidelines to analyse, monitor and evaluate the outcomes of change interventions. Again, we discuss the approach in more detail later and show how the use of this instrumental theory as well as the focal theory helps to follow the stages of the AR cycle.

Data analysis

Research settings

In 2005, a French MNC in the nuclear power industry, established in more than 40 countries with 70 000 employees, started to configure its own ERP solution (based on SAP R/3) to be deployed among all company units. As discussed in the introduction, the French HQ opted for a 'global strategy' (Madapusi & D'Souza, 2005) that aims to standardize data and processes and apply common rules. This requirement was particularly apparent within the finance sector as the company needed to 'see' the global financial picture, which was previously unavailable. The initiative as a whole would, it was argued at HQ, leverage existing IT investment, replace

non-integrated legacy systems that were costly to support and maintain, improve the quality of information and develop a core IS solution in emerging countries that could be seen as a template for integrating new markets, such as China. As a consequence of this strategy, the company implemented its ERP template in 89 units, comprising 21 countries and around 3250 users. This represents about 70% of the company's subsidiaries.

This research project focuses only on the Chinese units using the global ERP template, which represent 12 units (split into 38 plants) and 670 users. Prior to this AR project, the first author ran a case study over more than 3 years (2007–2011) at the Chinese joint ventures. This study revealed the existence of important workarounds, such as the three practices detailed in the section on Focus on How Three Exemplar Workarounds Were Addressed. These informal and unexpected practices deviated from the ERP template that the company wished to implement globally.

When this situation was revealed to senior management at HQ by the researcher, there was some shock and surprise expressed, as it was obvious to them that some of the objectives of the ERP system could not now be met, especially the quest for information transparency over all the foreign subsidiaries. Given the expertise that the first author acquired during the longitudinal case study, both parties (the first named author representing academic interests on the one side and practitioners including managers on the other) agreed to extend this research programme with an additional AR phase. This consisted of a 1-year CAR project at the Chinese subsidiaries to investigate how the HQ's requirements for standardized processes using the ERP could be reconciled with local requirements.

A team of eight people was assigned to this AR project on a part-time basis, with an assignment of 12 h/week for each person. Three were functional experts, three were ERP technical experts and two others were the joint project leaders. All were full-time employees from the Asia Pacific region, except the first author who remained independent and unpaid and attached formally only to his academic institution. All the practitioners were based in the Shanghai area (where the local Asia Pacific head office was located). The functional and ERP technical experts were selected given the identified workarounds and their experience with both the global ERP template and the local specificities of Chinese subsidiaries, although none of the eight people themselves were involved in creating the workarounds. Table 2 gives profiles of the AR team, functional and technical expertise, and experience with the ERP system. There were two project leaders: Emma,² a practitioner acting as Asia Pacific ERP manager, and the academic action researcher.

The 1-year commitment to the AR project was agreed by both the company and the researcher. The company was going through great organizational turbulence because an acquisition process was launched in the same period that concerned about 60% of the Chinese business activities (three out of five business units) and HQ needed to find appropriate solutions to the workarounds urgently. Further, this suited the timing constraints of the researcher who had to complete his PhD degree the following year. Because of the number of factories in China to visit, the part-time commitment of the team members and the complexity of

²Following the Chinese habit, we have used Anglo-Saxon names for the interviewees (although names have been changed for confidentiality reasons).

Table 2. Profiles of canonical action research team members

Name and position	Area of expertise	Experience with system at the time of the study's initiation
First author – project leader	Academic who has studied the diffusion of the global enterprise resource planning (ERP) template and its adoption in Chinese subsidiaries since 2007	5 years (since 2007)
Emma – Asia Pacific ERP Manager – project leader	Finance and management control expert (FI/CO in SAP terminology), was previously chief financial officer of two units in the Shanghai area	6 years (since the first rollout on pilot units)
John – team leader consultant	FI/CO	6 years (since the first rollout on pilot units)
Terrey – functional consultant	Sales and distribution, and material management	4 years
Tommy – functional consultant	Project system	3 years
Frank – programmer	Programming (ABAP – the SAP programming language)	6 years (since the first rollout on pilot units)
Lisa – programmer	Programming (ABAP)	3 years
Terry – business intelligence (BI) database consultant	Database design and BI tools	6 years (since the first rollout on pilot units)

analysing and implementing the solutions, only one process cycle was completed. However, as Davison *et al.* (2012) demonstrate that limiting an investigation to a single cycle does not in principle affect the validity of a CAR project as long as it respects the phases and principles of CAR (Susman & Evered 1978; Davison *et al.*, 2004). The implications of this single-cycle AR are discussed further in Discussion section.

A 1-year, one-cycle CAR project

The basic AR cycle, taken from Susman & Evered (1978) and followed in CAR, consists of the five steps of diagnosis, action planning, intervention, evaluation and reflection. Although in practice we expect iterations between each of the five steps, we draw a unidirectional arrow between each in Figure 1. There is a dotted arrow between reflection and diagnosis to denote the possibility of starting another cycle. In our work, only one cycle was completed to project end, as was the case in the two projects discussed by Davison *et al.* (2012). In Figure 1, we show nine links between the focal theory and instrumental theory and the various steps of the cycle. Eight were specified by Davison *et al.* (2012), and we have added a ninth link between the instrumental theory (BPM) and the intervention step that was not present in the original version. This addition is detailed in the Discussion section of the paper.

The cycle started in April 2010 and was completed in March 2011. We now present the specifics of each step in our context.

Diagnosis. The entry point of this diagnostic process, and the AR project as a whole, came from a longitudinal case study that identified alternative ERP work practices to the ones prescribed by the global procedures and formats embedded within the company ERP template. Sixty-four workarounds were identified (Anon, forthcoming). The workarounds observed at the company were of three main types: (i) *data adjustments*, where users were 'cheating' the ERP system by entering data that they knew were inaccurate or that did not

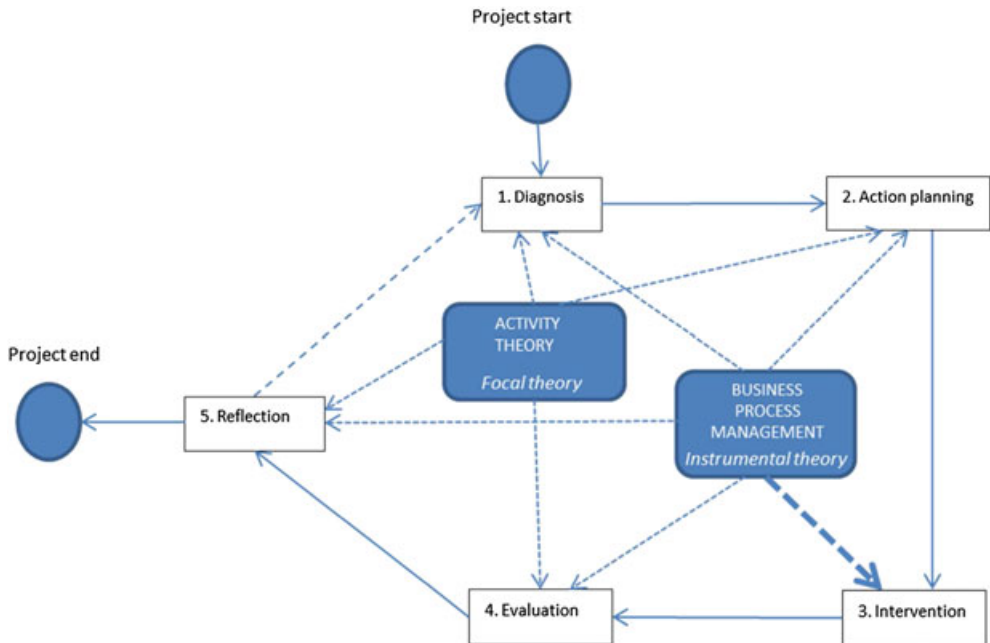


Figure 1. Canonical action research process model (modified from Davison *et al.*, 2012).

reflect the data codification imposed by the system but nevertheless were important for local use; (ii) *process adjustments*, where users were modifying organizational procedures to overcome misfits through the use of empty fields for each screen and designing additional procedures that fitted their requirements; and (iii) *parallel-system adjustments*, where users were making use of legacy systems and other means and were obliged to enter data to both the ERP system and other systems in order to be able to fulfil local requirements. Table 3 represents these workarounds classified by SAP functional modules and types of workaround.

An immediate concern expressed by the HQ experts following this initial diagnosis was about the lack of transparency and visibility over Chinese subsidiary operations caused by these workarounds. By discovering how Chinese users bypassed global procedures, they questioned the reliability of the global monitoring and reporting system as a whole.

It is difficult to get a precise evaluation of the impact of these practices on our system but it certainly does have an important one! We need to react ASAP before it becomes common practice. [Thomas, HQ chief financial officer]

But as observed and pointed out by the action researcher at the time, these workarounds were already common practice!

Action planning. Discussions following the diagnosis phase eventually led HQ to consider ways of embracing workaround practices rather than risk failure through alternative reactions. Therefore, based on a formal agreement, both parties (composed of global solution ERP

Table 3. Workarounds identified

Enterprise resource planning functional modules	Types of workarounds
Finance	16 data adjustments 7 process adjustments 1 parallel-system adjustment
Management control	3 data adjustments 4 process adjustments 3 parallel-system adjustments
Sales and distribution	5 data adjustments 3 process adjustments 3 parallel-system adjustments
Materials management	5 data adjustments 3 process adjustments 3 parallel-system adjustments
Project system	6 data adjustments 2 process adjustments

managers on the one side and the academic researcher on the other) agreed on the mission statement for the AR project to be explicitly and publicly diffused to the whole Chinese ERP user community. The following list summarizes the commitments taken by both parties while signing this mission statement:

- There will be an in-depth analysis of each workaround identified in the diagnosis phase to achieve a greater understanding of the Chinese business specificities.
- Following the understanding and assessment of Chinese business specificities, the CAR team will lead actions to decide whether to make workaround practices official or prevent them.
- A new ERP user hierarchy aligned with the current skills of local users will be developed and maintained.
- A communication campaign, oriented to facilitate the local Chinese procedures and build a work team spirit, will be implemented, aimed at enabling users to follow the localized procedures that will be standardized (some based on the local workarounds or others prevented).

Intervention. At this stage, key champion users were identified to help the researcher work with managers to decide on whether to formalize the workarounds already in use at some subsidiaries or prevent them being used in the future. The project team performed a detailed review of each workaround. This included its description, information about the Chinese units of the MNC from which the workaround under review was observed, a description of the functional modules of the system involved, a description of the business processes involved for each workaround, their impacts on other transactions and their reporting and, finally, the solution suggested, which summarizes the solution proposed by the functional experts. This was basically about whether to formalize the workaround or develop an alternative solution appropriate to both global and local users.

Evaluation. This phase required a comparison of pre-intervention and post-intervention states. It included an evaluation of the number of workarounds still in practice, the

formalization of others, the feedback from the key champion users and efforts to communicate and train users about the decisions made. A number of these practices were eventually formalized (21 in total), while others were prevented by imposing validation processes (28 in total), and yet others still remain as informal workarounds (15 in total).

Qualitatively, the outcome seems positive. For example, the reaction of John, the Asia Pacific CIO, was as follows:

Since our experts are now sensitive to users' past informal practices we are able to track the potential discrepancies on the global system but also assist users by offering ad hoc training sessions to fit their lack of knowledge and anticipate the development of new customization needs.

Reflection. A first reflection, shared by both parties, addressed the contract duration. This proved sufficient to address the major workarounds identified. It is true that the planned actions may have been performed better with a longer intervention period that could have ideally led to a second cycle. The 'intervention' phase (which lasted 9 months) was a little too tight to perform all planned actions given the number of units and users involved. Further, most of the 15 informal workarounds remaining could have been formalized or prevented. Again, additional training sessions with key champion users, along with better communications more generally, could have helped the formal building of a community of users. However, as we saw in John's reflections, the ability to identify and track workarounds and to solve the main problems by formalizing the high-impact workarounds and preventing others was seen as a satisfactory outcome by the CIO and other managers as well as the team members.

A second reflection concerned our use of theory in practice. We found that activity theory and BPM provided interesting and relevant guidelines to enlighten our research intervention at the company. However, while BPM was directly applicable and practitioners found it useful, we had more difficulty to communicate and diffuse activity theory principles. It seems that while most of the CAR team members grasped the importance of taking into account the historical, social and political contexts of the company in China to understand and analyse the origins of the initial contradictions between French HQ and Chinese local interests, few really grasped activity theory concepts sufficiently to understand activity systems analysis. Nevertheless, as this is an analysis technique that we used to find out what practitioners had performed, it was crucial only that the researcher understood the focal theory and then checked with practitioners that the processes implied were indeed accurate representations of the workarounds. However, practitioners' understanding of BPM was crucial as it concerned concrete decisions about designing solutions to the workarounds, which were then implemented by the researcher and practitioners jointly.

FOCUS ON HOW THREE EXEMPLAR WORKAROUNDS WERE ADDRESSED

We now discuss how workarounds (classified as data adjustments, process adjustments or parallel-system adjustments) were addressed by the CAR project. We have selected three

representative workarounds (one of each type) and provide for each a discussion about the Chinese context, the initial 'to-be' process, the workaround itself and how the AR project helped to reconcile both bottom-up and local interests with the help of activity theory as focal theory and business process modelling as instrumental theory.

A parallel-system workaround to handle Chinese value-added tax specificities

The discussion of this workaround concerns issues related to the specificities of the Chinese taxation system, with a focus on the calculation of value-added tax (VAT). Before looking at the workaround itself, we provide some contextual information. We do this for all three workarounds discussed.

Taxes provide the most important revenue source for the government of the People's Republic of China. Tax is a key economic player of macro-economic regulation and greatly affects China's economic and social development. Taxation is frequently used as a tool by Chinese state authorities to accelerate economic and social initiatives. In practice, tax incentive policies, tax rates and calculation methodologies change frequently (with little warning). Furthermore, tax rates may also vary based on the specific industry or local jurisdiction in which a company operates.

In order to declare and collect taxes, Chinese authorities have launched a 'major fiscal reform project called the Golden Tax project which mandates the use of specific sophisticated information technologies to improve compliance with China's VAT laws' (Winn & Zhang, 2010, p. 1). The development of this Golden Tax system requires the use of specific software considered as an 'e-invoicing' system. It aims to allow central control by the tax authorities to reduce fraud.

However, in the context of MNCs established in China through joint ventures, addressing both Golden Tax regulations and ERP global 'to-be' processes can lead to difficulties. Companies with HQ in the European Union have to use a VAT identification number following a legal codification format based on European regulations. Each company has its own VAT number and commits to using this unique code to declare VAT taxes at a worldwide level. The way of processing VAT in the ERP system was set up based on both this European codification format and its calculation rules.

Functional and technical consultants at the French HQ were aware of the Chinese taxation system even though the initial ERP design of the solution did not cover these specificities: 'Of course we know about taxation in China, at least the broad principles. But given the timeline allocated for the localization of the Chinese solution, we did not have enough resources to customize the system. And it changes every six months! Unless calculation rules are fixed, I do not see how we could implement this in the system' (Antony, ERP solution manager).

Indeed, the Chinese taxation system is different (compared with the European Union) but also highly volatile and complex because it may also vary locally (there are 33 provinces in China, and each local taxation bureau may impose its own regulations). Even though the company installed a SAP China country version for all its Chinese units, VAT business processes embedded within the company ERP template proved unable to cover all situations because it remained too generic. From the users' point of view, the limitations were due to the 'ERP system', whereas, as the researcher discovered, this was more to do with restrictions of the global

ERP template imposed by the MNC HQ. As a consequence, workarounds of the type 'parallel-system' processes and calculations were identified:

The China country solution we should use is just too generic. It includes five condition types and that's it. All our exceptions cannot be handled within the system. Nancy is spending half her time calculating tax revenues and reporting to the local office. But never using SAP, just Excel, Excel and Excel. [Jason, finance manager]

Given the restrictions of the ERP solution and the lack of automatic data links between the ERP and the Golden Tax interface system, Chinese ERP users were found to do most tax calculation processes outside the ERP system by using spreadsheets and loading the required figures manually. The only inputs they provide to the ERP system are carried out to report tax revenue declarations for local, regional and global financial managers. As a consequence of this parallel-system workaround, there was no feasible control of the calculation processes within the ERP system, as only the result of the calculation is stored within the system:

We still have to rely on our accountants. It terrifies CEAP³ managers since they cannot show any traceability and validation processes in the ERP system to Headquarters if there is any problem. And unfortunately such problems occur regularly. [Emma, China finance manager]

This VAT calculation workaround was one of the most worrying practices for the ERP global team. HQ managers were concerned by this lack of traceability in the calculation processes and about the volatility of the Chinese rules. Therefore, special attention was given to address it, as expressed during a meeting by Thomas, ERP solution manager for finance and controlling modules: We knew that local accountants were performing things on their own, it is like that everywhere, including in this building. Some are acceptable and comprehensive but this one about the Chinese VAT scares me. We absolutely need to do something. We need to gain complete visibility of these calculation processes.

What follows is a description of the roles of both focal and instrumental theories to address this workaround. We first provide our interpretation of the VAT workaround through the lens of activity theory suggesting a look at daily micro-practices. Second, we discuss actions made during the CAR project with the help of BPM as a method to formalize, model and visualize ongoing workarounds and new business practices that were specified as a result.

Using activity theory terminology (*in parenthesis*) to analyse this parallel-system workaround practice led us to the following interpretation. The objective (*object*) of the workaround was to design and use a flexible tool for VAT calculation to answer changing policies and regulations occurring locally. For this purpose, local accountants (*subjects*) designed spreadsheet files (*tools*), to compute the monthly amount of VAT for declaration to the Golden Tax system. The design of the spreadsheet file followed the calculation rules imposed by Chinese authorities. Clearly, the design and use of a spreadsheet was seen by the local units as a great tool to process VAT calculation rules. It resulted from the expertise and sharing practices of Chinese local

³CEAP stands for China East Asia Pacific. It is one of the five geographic regions designed by the company to report business activities.

accountants. The flexibility of a spreadsheet system was highly appreciated compared with the inflexibility and incompleteness of the global template. All the local accountants of the Chinese units had sufficient skills to adapt VAT calculation rules if necessary to fit regional tax specificities. Progressively, the use of a spreadsheet for VAT calculation became a shared and collective parallel-system workaround practice among all Chinese units (*outcome*). (Figure 2)

As a reaction to the discovery of this parallel-system practice, the CAR team decided to formalize it, and the BPM approach helped. We now look at the role of BPM for intervention.

Given the high volatility and complexity of the calculation rules, the spreadsheet file developed by local accountants was seen as an appropriate way to overcome the inflexibility and incompleteness of the ERP template. However, the CAR team, in agreement with regional and HQ managers, wished to keep track of these VAT calculation processes, in order to control them when necessary. We used the BPM method and philosophy to visualize, model and test what could be the most efficient process that would satisfy both local and global needs. As a result, we designed a business process that aimed at setting the rules of this calculation process (Figure 3) by adding a validation step from the unit manager before reporting to both ERP and Golden Tax systems. In addition to the formalization of the VAT calculation process, ERP consultants at HQ added a functionality to upload a spreadsheet file in the ERP system to keep details of the calculation process while reporting the final amount. It seems to have been a good solution:

That's great, now we can unpack every single VAT amount that is reported to the tax office. Whatever the calculation rules or method used, we can understand and justify it to HQ. [Emma, China finance manager]

The solution found by the CAR team satisfied both audiences, that is, the local users in China and the HQ managers. The use of a spreadsheet file was officially recognized as a valid process and formalized. This allows both HQ and local users to keep track of the calculation details. It is now seen as a hybrid solution that offers flexibility and traceability, two necessary and complementary characteristics that enable joint bottom-up and top-down solutions to workarounds.

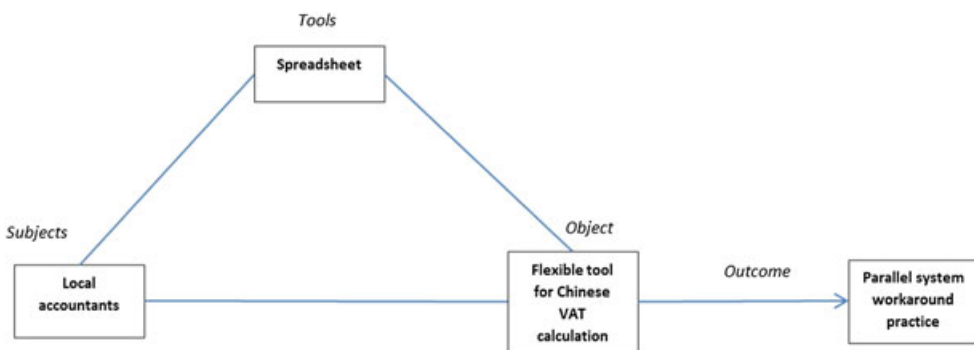


Figure 2. Activity system to handle Chinese value-added tax (VAT) specificities.

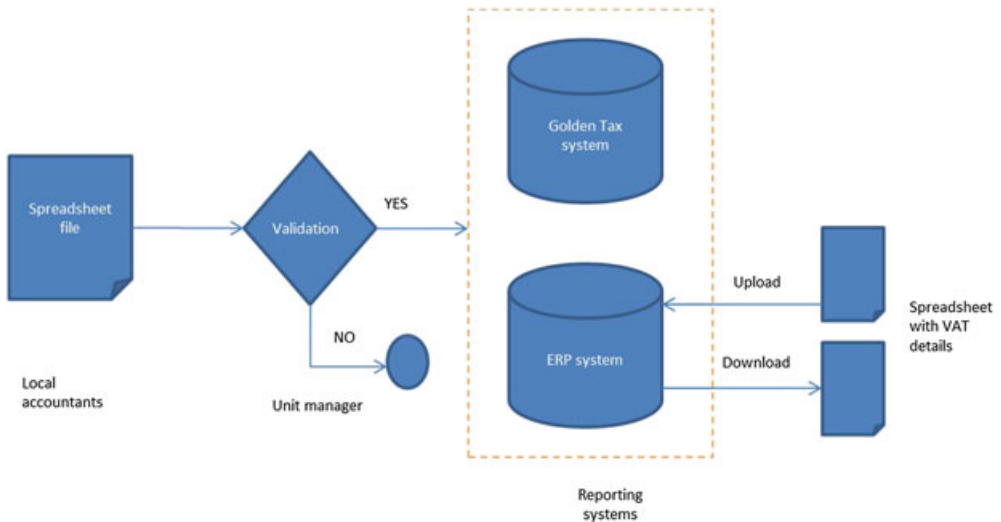


Figure 3. Monthly value-added tax calculation process following canonical action research intervention.

A data adjustment workaround where statistical key figures do not follow headquarter rules

As an example of a data adjustment workaround, we discuss the use of statistical key figures (SKF) for cost allocation. It is a common method used by controllers when analysing and reporting structural cost.

Setting up control policies in Chinese ventures is difficult because the original practices of Chinese state-owned enterprises are different from Western ones (O'Connor 2006) in that controlling policies in China were seen as unstructured, arbitrary and opaque. However, since the 'Open Door Policy' (a term that refers to the policy announced by Deng Xiaoping in 1978 to enable foreign businesses to set up in China), the situation is changing and is gradually evolving towards an appropriation of Western practices (O'Connor *et al.*, 2004). In many situations, these controlling processes and values are transmitted by the parent company to the subsidiaries affected by the parent's corporate culture. However, implementing management control processes is one thing, ensuring their effectiveness is another.

In management control, SKF are used as the basis (tracing factors) for making allocations (assessments/distributions) to analyse structural cost. They are statistical data such as number of employees per area and area in square metres. For example, if a unit has a monthly expense of CNY 50 000 in the cafeteria cost centre, management controllers could use SKF to allocate that 'cafeteria cost' per number of employees working in the different areas such as administrative and production areas. There are two different SKF allocation methods: total value or fixed value. Usually, controllers use fixed values in situations where the SKF does not change very often, as in the case of the number of employees, area and so on. Total values are used in situations where the value is expected to change regularly, as in the case of power use or water consumption.

At the company, while designing the global ERP system, HQ managers decided to use total values throughout (and not fixed values) because situations were supposed to be very different from one country to another and from one unit to another. But this implies that each controller of each subsidiary manually maintains the SKF of the unit. The standard process shown on the left side of Figure 4 illustrates the initial process designed by the French HQ. We discuss later how this business process led, in some situations, to a data adjustment workaround.

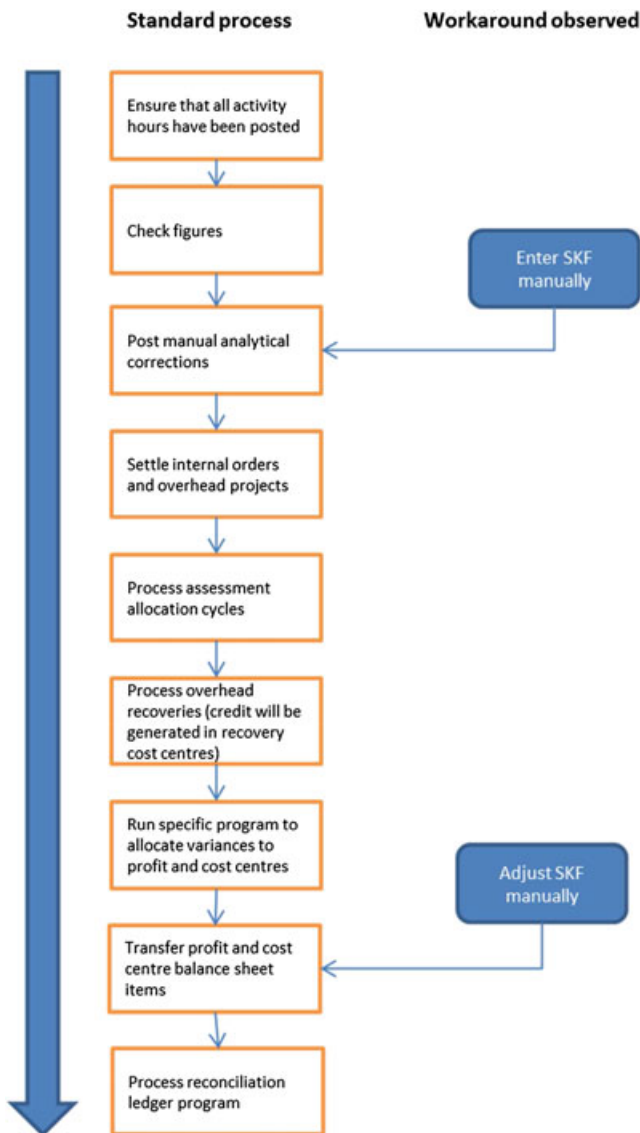


Figure 4. 'To-be' monthly closing process worked around by data adjustments. SKF, statistical key figure.

In Chinese units, it was found that during this CO (which stands for 'controlling', using SAP jargon) of the monthly closing process, some local controllers used the steps 'post-manual analytical corrections' and 'transfer profit and cost centre balance sheet items' (Figure 4) to change SKF coefficients in between different accounting periods to obtain 'more favourable' figures for their unit's structural cost. They did so to put them in a good light before processing the reconciliation ledger programme, the output of which was sent to the HQ and regional managers.

Thomas, controller of a Suzhou subsidiary, argued that these manual adjustments reflect better the real structural cost of his unit, which was recruiting new staff and extending buildings for new facilities and machines: Yes, I am changing these SKF coefficients for each period as the plant experiences permanent growth. Since 2008, we have hired 65 new people. It is the same for the building extension, since the plant now has a capacity of 35,000 square meters for production and warehouses, against 25,000 square meters in 2008. Not changing the SKF would give a misleading picture.

Thomas suggests that this data adjustment workaround practice is not resulting from an intention to hide or improve the structural cost of the subsidiary but to reflect the real situation better. The argument seems to make sense. However, in practice, it is more controversial because it depends largely on the SKF values being entered by the controller. Observations made during the prior longitudinal case study showed that this discretionary power given to the controllers to enter SKF coefficients manually has been misused.

The solution found in the CAR project to overcome this data adjustment practice was to reinforce the ERP system transaction/authorization procedure to prevent any change of the SKF coefficients after the budgeting process, realized twice a year. Furthermore, an update of any SKF coefficient now requires validation from the unit manager.

Using activity theory terminology to analyse this unexpected but common practice, we understood that the objective (*object*) of this data adjustment workaround was to display sound management of the structural cost, through the interpretation of the general ledger. For that purpose, unit controllers (*subjects*) regularly adjusted the SKF coefficients (*tool*) without informing HQ before reconciling the general ledger. By adjusting the SKF coefficient before any monthly closing process, unit controllers 'worked around' the standards. Unit controllers are aware that small adjustments of SKF coefficients can greatly affect the general ledger outputs. Thus, 'playing' or 'cheating' with the SKF coefficients became a shared and collective data adjustment workaround practice (*outcome*) among many Chinese controllers. (Figure 5)

Using BPM for intervention, in reaction to the discovery of this data adjustment practice, the CAR team decided (in agreement with French HQ and the regional managers) to prevent it. For that, the CAR team worked with functional experts from HQ and local units to redesign the budgeting process (Figure 6) in order to prevent any *a posteriori* and arbitrary changes of the SKF coefficients during the monthly closing process (Figure 4), unless validated by the subsidiary managers. It led to a number of trials to model, visualize and test what could be the best process to satisfy both interests and prevent any further 'misuse'. Figure 6 shows the final version of the process approved by the CAR team and the functional experts. This new procedure helped to prevent any arbitrary adjustment of SKF coefficients without being validated by the hierarchy (see step 4, performed outside SAP).

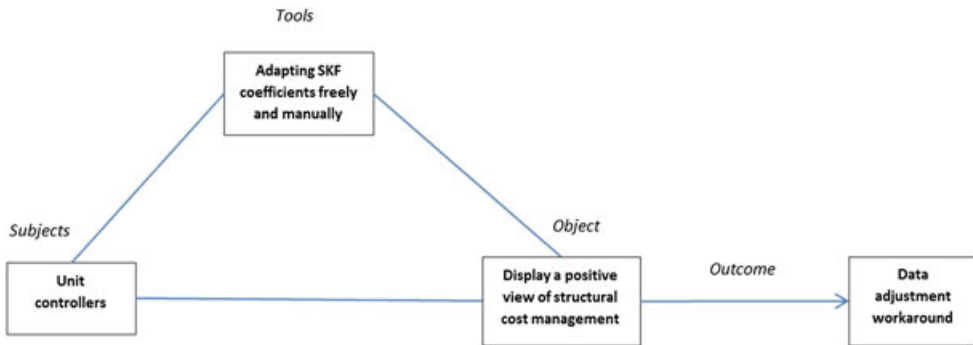


Figure 5. Activity system for data adjustment workaround. SKF, statistical key figure.

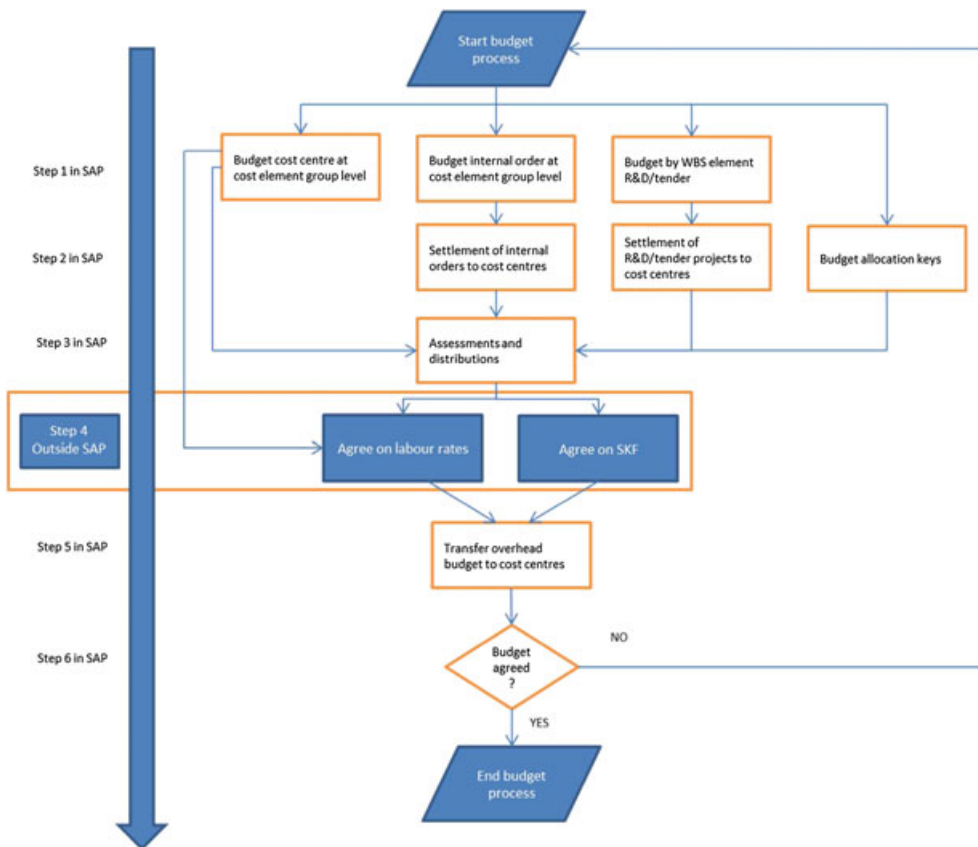


Figure 6. New budget process following canonical action research intervention. SKF, statistical key figure.

The solution developed by the CAR team addressed bottom-up practices and top-down requirements as it satisfies both local managers and HQ managers. From the HQ perspective, the new budget process aims to prevent any non-justified manipulation of SKF coefficients.

Adjustments now need prior validation from the unit manager. From the local perspective, this solution still allows SKF adjustment when necessary. With Chinese units evolving quickly (evidenced by Thomas), not enabling adjustments to SKF during the financial year would itself be misleading to HQ.

Process adjustment workaround relating to claims management for sales activities

The discussion of the following workaround concerns issues related to sales activities, in particular purchases and expenses to nurture relationships with potential customers.

In China, it is widely recognized that a salesperson must be able to forge strong business relationships and friendships with potential customers (Chen *et al.*, 2004; Marble & Lu, 2007). This emphasis on relationship building is part of the long sales process that requires patience and an on-the-ground presence. Drawing on personal networks is critical for doing business in China, where business relationships often transform into personal friendships and vice versa. This Chinese practice is commonly referred as 'Guanxi' (Davison *et al.*, 2013). In that context, salespeople are used to nurture such relationships through entertaining and gift giving. However, this traditional (and opaque) way of running sales activities in China is evolving gradually towards more transparent and rigorous processes, thanks to numerous 'anti-corruption' campaigns led by Chinese authorities and also global compliance programmes initiated by MNCs established in China. Given this context, the company aimed at using its global ERP system to track such expense claims as part of the initial ERP global 'to-be' processes. One reason is to prevent misbehaviour, as business expenses are sometimes associated with illegal gift giving, kickbacks or inappropriate entertaining activities (Lu & Bjorkman, 1997). In order to promote its guidelines, the company had set up a global compliance programme applicable to any staff member, as the following extract from a compliance report issued by the company in 2010 illustrates: 'Because of a highly competitive and culturally different operating environment, ensuring adherence to corporate ethics and compliance policies remains a concern for the company while doing business in China'.

One of the requirements of this programme is to control any expense claim related to sales activities for which the amount is superior to CNY 500 (approximately 40 euros in 2014). However, in China, this request 'principle' regularly met application difficulties. We illustrate such resistance by the two following quotes that characterize why salespeople did not wish to adhere to this new validation process:

I cannot wait to get the approval of my boss for buying a box of wine for my clients. It does not make sense. [John, salesman in Beijing]

It happens regularly that I spend a day or two with a client when we go to visit plants. There is no way that I can raise a budget request for all expenses I will make as I cannot anticipate everything ... I have a rough idea of how much I will spend with each of them but nothing precise. [Philip, salesman in Wuhan]

In practice, it was found that salespeople were actually working around the required 'request' process by avoiding it and going directly to the claims procedure. This shortcut was possible for

any item or order inferior to CNY 500. It meant that when salespeople needed to buy an item or service superior to this amount without waiting for the approval of the hierarchy, they asked the merchants to split the bill into chunks lower than CNY 500. For example, for a restaurant bill of CNY 2000, the salesperson would ask the restaurant cashier to create four distinct bills of CNY 500 (sometimes with different dates). This became a common practice to avoid the initial requisition process and being penalized (the highest penalty of which was not being reimbursed).

The CAR solution found for this workaround was to develop additional controls in the ERP system on the field values of the claim management process and also to reinforce the hierarchical validation system. One additional control was to make salespeople enter all their claims, whatever the amount. It was a way for the department manager to control the daily activities of the salespeople and to block the validation process if unjustified claims were made but also to unblock it if justified. It also aimed to give responsibilities to both salespeople and department managers, as the following account illustrates:

If I want to get some cash before I go for a business trip I need get James' approval (Sales department manager of Shanghai units). It requires me to plan everything beforehand, if not the system will be locked and I will not be able to claim any expenses afterwards ... Now, when I organize a 2–3 day trip to Wuhan, Lanzhou, and Chongqing to visit our plants with my key-accounts, I need to present a complete budget listing of all forecasted expenses: restaurants, visits, entertainment, etc. It is time-consuming but I can see the value of it. We agree with James beforehand what I can do and what I can't. It is much better knowing that than coming back to Shanghai and not being reimbursed! [John, key account sales manager]

Unravelling the 'claim management activity system' using activity theory (Figure 7) helped to analyse how users were organized to avoid the prior budget request process. The objective (*object*) of this process adjustment workaround was to bypass budget request validation without being penalized. For that, salespeople (*subjects*) adjusted their claims (*tool*) to make sure that their expenses were under the threshold (CNY <500) to avoid processing a prior request in the ERP system. By splitting expenses into smaller bills, salespeople worked around the

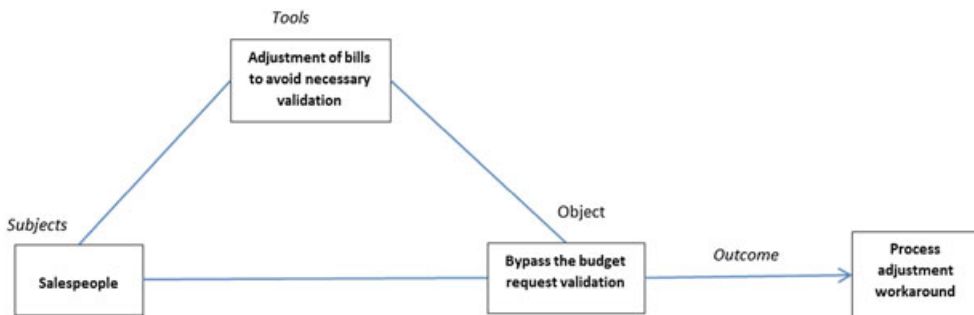


Figure 7. Activity system for process adjustment workaround.

compliance standards required by HQ. From our observations, it was a shared and collective process adjustment workaround (*outcome*) spread among many Chinese units.

The BPM approach helped to design alternatives to the initial claim management process. Because the budget request process was regularly bypassed by salespeople, the CAR team designed a new business process that added controls during the claims management system (Figure 8). The result is that the budget request process is now solely used to request advance cash (as discussed by John).

Users now have the right to enter any claim they make until the day of the transaction. This does not require them to initiate a budget request beforehand and gives them the discretion to judge whether or not an expense is going to be accepted by the department manager and unit manager. To help them in that discretion process, salespeople can refer to a list of expenditures approved by regional managers and updated every year. It aims to list all accepted items and services supported by the company for sales activities.

This solution seems to enable a mutually acceptable compromise from bottom-up practices and top-down requirements. It gives responsibility and discretion to local salespeople about the claims they report in the system. But to be reimbursed by the company, they need to make sure that the purchased items or services comply with company policy. And if they require advance cash, they need to issue a budget request with a detailed description of their needs. Therefore, this new process allows HQ and regional managers to control and keep track of any claim issued by salespeople.

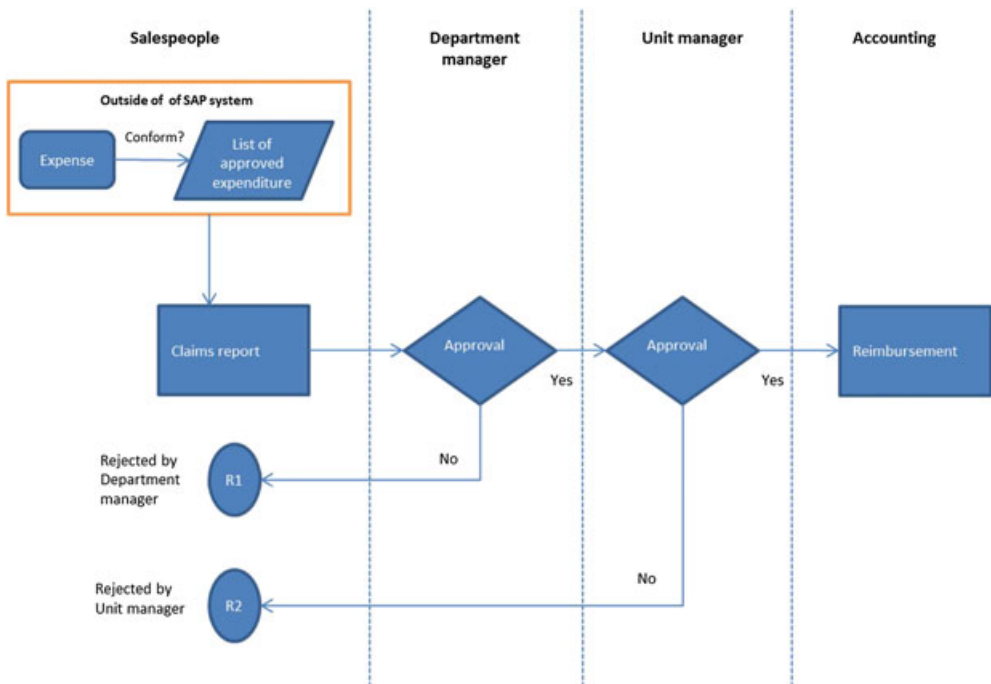


Figure 8. Claim management process following canonical action research intervention.

DISCUSSION

In this paper, we have shown how CAR has helped us deal with workarounds at the Chinese subsidiaries of an MNC and consequently how local and global requirements can be reconciled. The solutions developed by the CAR team to address the three workarounds discussed in the last section provide vivid examples of how CAR principles can be applied with the joint use of activity theory and BPM to solve an organizational problem. In the following paragraphs, we examine whether and how our AR complies with the five principles of CAR (Davison *et al.*, 2004, 2012). This enables us to reflect on and discuss the implications of our work more fully.

The principle of the researcher–client agreement

This seeks to ensure that researchers and practitioners develop a common understanding of the research project, its scope, focus, methods of investigation, methods of actions, assessment of the output and so on.

Following the longitudinal case study and a presentation of the researcher's findings, the researcher and company HQ management along with the CEAP ERP solution manager together agreed that a 1-year AR project was the most suitable way to deal with the problem of workarounds at the Chinese subsidiaries discovered during the time of the case study. The formalization of this AR project was seen by the researcher as an important factor in securing the involvement of managers in the project. The feedback given during and following the 3-year case study project was indeed important as it led to the researcher gaining the trust of management at HQ and at the Chinese subsidiaries for such commitment. Therefore, following the Avison *et al.* (2001) recommendations, each member of the CAR team (Table 2) signed an agreement specifying resource allocation and objectives. This was a necessary commitment to set up milestones and deliverables for the five major steps of the project given the time constraints. In practice, the formalization of this project led to an excellent working environment because it gave us sufficient legitimacy to interact with local users and monitor system practices but also to gain the necessary support from local managers. The AR was explicitly not seen as consultancy, reflecting the high status of research in the company. It is important because too often researchers doing AR on-site are considered as consultants, which gives them too few opportunities to bridge academic knowledge with practical concerns.

The period of 1 year in such a complex environment was agreed because of both company turbulence in a takeover period and the researcher's PhD timetable. Although the researcher was unpaid, the company agreed to cover his expenses. In line with the work of Davison *et al.* (2004), CAR guided the overall process such as proposing corrective actions for identified workarounds. The description of the research project, scope, focus, methods of investigation, methods of actions, periods that the researcher would spend at the Chinese subsidiaries and at HQ, assessment of the output and so on, all specified in the contract, were adhered to, with the mission statement itself diffused to the Chinese ERP user community. The only deviation from the contract occurred after the 1-year AR period when the researcher was asked to discuss and suggest solutions to some issues relating to the project, but this did not constitute a second AR cycle and enabled the researcher to continue a good relationship with the company under new ownership.

The principle of the cyclical process model

This highlights the importance of rigour by progressing through the five research phases in a sequential way: diagnosis, action planning, intervention, evaluation and reflection.

The choice of CAR among the different AR methods identified in the literature was based on its clear and rigorous framework composed of five steps and five principles (Davison *et al.*, 2004, 2012). Given the timeline constraints of the project and the inexperience of practitioners with AR, CAR was seen as an excellent 'structuring' approach that helped both researcher and practitioners guide this corrective action programme. For each of the five steps, the first author spent some time with the team to explain the stakes and objectives of that stage. Each team member was aware of their role as were the key champion users identified at the intervention stage. The use of activity theory and BPM also facilitated analysis of the workarounds and solution generation. Methods of investigation and actions and assessment of the output specified in the contract were clear and rigorously followed. Based on the time constraints discussed earlier, the CAR project consisted of a single cycle only. Along with our overall time constraints, this explains why we had to follow a unidirectional flow, although at some points, it would have been more appropriate to add some iteration. Although desirable and part of the CAR approach, only limited iterations could be achieved in the particular project. On reflection, a second cycle, or a longer 'intervention' phase, might well have helped to prevent the unofficial workarounds still present after this 1-year cycle. Avison *et al.* (2001) discuss 'political' problems that may impact on AR.

The principle of theory

This highlights the importance of using one or more theories to guide and/or focus the AR project but also to discuss the findings with regard to the previous literature.

Activity theory provided an appropriate lens to examine Chinese users' practices as it not only helped to describe workarounds but also questioned and identified prior contradictions that led to the development of these unexpected and informal practices. It also helped to question the consequences of these workarounds for the organization. This was made possible through the identification of the whole activity system and its object, subjects, tools and outcomes (Figures 2, 5 and 7). Our research demonstrates that an ERP system, like any activity system, is subject to change and dynamicity. In that sense, our study demonstrates that the (taken-for-granted) inflexibility of ERP systems can be worked around by non-expert people acting in unpredicted and unofficial ways. As a reflection gained from the use of activity theory as focal theory, we suggest representing workarounds as one element of a 'gearing system' (Figure 9).

As a complement to activity theory, BPM helped to unravel each workaround 'black-box' by monitoring and visualizing existing practices but also possible alternatives (Figures 4, 6 and 8). First, it helped to track the specificities of the existing workflow practices of each workaround. But thanks to the BPM approach, the CAR team not only tracked the ongoing practices but designed possible alternatives to reconcile both HQ and Chinese users' requirements. To summarize, one of our key contributions comes from the demonstration that workarounds, in the context of global ERP systems, can be addressed through the use of CAR and in our case through the joint use of activity theory and BPM.

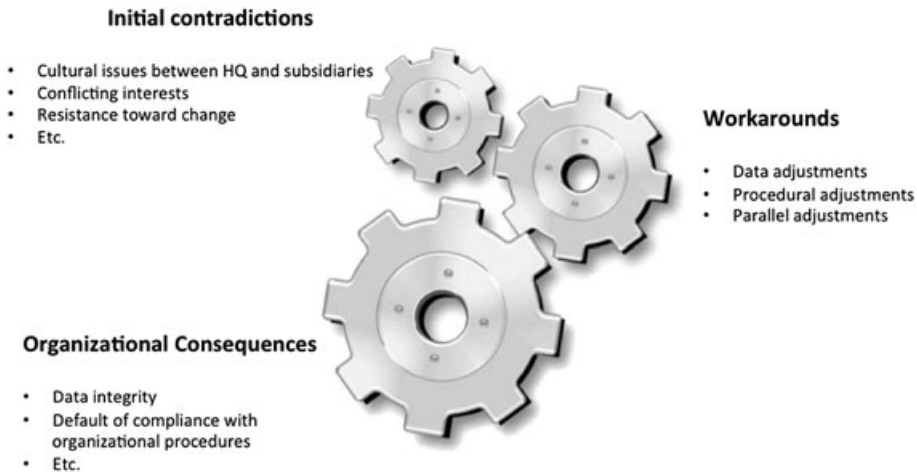


Figure 9. Workaround practices represented as part of a 'gearing system'.

With regard to previous literature, we also highlight our proposed extension to the role of instrumental theory in CAR by linking our use of BPM with intervention (shown through the broad dotted line linking the two in Figure 1, not apparent in the Davison *et al.*, 2012, proposal) because we found that BPM guided intervention to our choice of actions. We propose this amendment to CAR for further use and evaluation of the approach.

We also highlight the way our AR led to a successful implementation of the global ERP system in China where previous studies, for example, Westrup and Liu (2008), suggest very limited success. We argue that the method with which change was achieved – CAR – had much to do with this success. Further, in general terms, we hope that adding to the body of IS literature on AR projects, which as Mathiassen *et al.* (2012) and others evidence is somewhat limited compared with that of many other qualitative research approaches as well as quantitative research, will, we hope, encourage other researchers to carry out this type of research that involves practical problem solving, which has theoretical relevance (Mumford, 2001).

The principle of change through action

This stipulates that interventions appropriate to the problem and the client organization should be designed and implemented.

We have shown how each of the three types of workaround (data, process and parallel system), through an example of each, was analysed through activity theory and the new design implemented using a BPM approach leading to new business practices. Some of the new practices were based on the workaround itself, as in the case of that to handle Chinese VAT specificities, whereas others, such as those to adjust the SKF relating to the monthly closing process and that to avoid going through a control system for claims management, were prevented by the new designs. Judged by the feedback given at the presentations by the researcher at company HQ and Chinese joint venture management, the work was successful, as 49 of the workarounds had been dealt with by either formalizing them or removing them through validation processes.

Following our intervention, the company initiated a worldwide communication campaign to outline the impact of the various workarounds on the overall ERP system. Our AR suggests that workarounds can indeed be successfully dealt with without compromising the global ERP system.

The principle of learning through reflection

This highlights the importance of drawing insights from the project and identifying implications for other situations and research contexts.

Clearly, we gained specific knowledge and reflected on the implications in both the particular organizational and academic environments about the behaviour of an MNC towards its Chinese subsidiaries, the expected gains and potential pitfalls of attempting to roll out a global template (specifically an ERP system) throughout the company, how workarounds come about and how they may disrupt expected outcomes, types of workaround and how they may be resolved. Although we are not suggesting such knowledge is necessarily generalizable, such knowledge can be useful to other researchers in similar situations. CAR proved a good way to gain this knowledge, and it has reflexivity as part of its cycle, 'in-built'.

Although we have emphasized the positives of doing AR in our discussion, there are drawbacks as well. Unlike some other research approaches, time estimates are difficult to make in AR. However, extending the time was not practicable in our instance for both the researcher, who was coming to the end of his PhD, and the company, as towards the end of the project period, it was undergoing a merger, which delayed decisions on new initiatives. AR takes place in the 'real world' where such events can alter research plans. Long-term involvement by researchers cannot be guaranteed. Another implication of the time limitation on the project was that we followed a unidirectional flow through Susman & Evered's (1978) five steps (Figure 1) rather than allow for more iteration, which might have led to improved solutions.

Again, the time limitations of this research prevented additional AR cycles. These could have resolved the informal workarounds remaining, fully tested the consequences of the first-cycle actions on the prevention and formalization of the workarounds, allowed further modifications if necessary and improved the communications and training processes. However, as Davison *et al.* (2012) make clear, one AR cycle is legitimate in CAR; indeed they performed only one cycle in the two cases discussed in that paper with limited success (see also Braa & Vidgen, 1999). Thus, despite these problems, CAR proved appropriate in this research as the researcher could intervene and improve the practical situation for the company and also make a contribution to research in information systems. AR also proved appropriate for understanding and improving the ERP in use. As we discussed earlier, most ERP research has centred on development and implementation concerns, whereas this study relates to post-implementation situations. As this paper illustrates, AR *can* be appropriate to IS research and *can also* be appropriate for PhD study.

Our CAR project was part of a sequential approach Chiasson *et al.* (2009), as it followed a 3-year longitudinal case study. AR following on from the case study was not originally planned, but the case study allowed an exhaustive understanding of the situation at Chinese joint ventures and thus greatly facilitated the diagnosis phase of our research project. It also helped to establish trust between the company HQ and the Chinese subsidiaries with the

Table 4. Practical and theoretical contributions gained from the canonical action research (CAR) project

Principles	Practical and theoretical insights gained from CAR project
Client–researcher agreement	The formalization of this action research project was a great way to secure the involvement of managers and their interest on the project. It was also a necessary commitment to set up milestones and deliverables for the five majors steps of the project given the same constraints.
Cyclical process model	Given the timeline constraints of the project and the inexperience of practitioners with action research, CAR was seen as an excellent ‘structuring’ approach that helped both researcher and practitioners guide this corrective action programme.
Theory	Activity theory provided an appropriate lens to examine Chinese users’ practices in the sense that it not only helped to describe workarounds but also questioned and identified prior contradictions that led to the development of these unexpected and informal practices. It also helped to question the consequences of these workarounds for the organization. Business process management (BPM) helped to unravel each workaround ‘black-box’ by monitoring and visualizing existing practices but also possible alternatives.
Change through action	Each workaround was analysed through activity theory, and the new design implemented using a BPM approach led to new business practices addressing better global and local requirements.
Learning through reflection	On reflection we learnt the following: How workarounds come about, how they may disrupt expected outcomes and how they may be resolved How to effect change through action research that dealt with problems indentified in a prior case study. That a second cycle or a longer ‘intervention’ phase, might have helped to prevent the unofficial workarounds still present after this 1-year cycle.

action researcher who was by then well known to both. This trust is necessary in such an intense project involving ‘outside’ researchers (Avison *et al.*, 2001). The previous case study revealed particular problems relating to workarounds that the company HQ were not aware of. Yet they needed addressing to avoid compromising global ERP rollout. The CAR project discussed earlier was the result. We were able to effect change through AR that dealt with problems identified in the case study. The researcher’s knowledge and expertise developed in the case study phase also made the success of the AR project more likely. The early diagnosis period in the AR cycle is often the longest in an AR project, and the information gained from the previous case study enabled the researcher to shorten this phase, and hence, this possibly explains why we were able to complete the project in 12 months. We would not advocate case study followed by CAR as a standard approach to qualitative research in information systems, but it did prove appropriate in this particular research, and we call for accounts of other similar experiences.

Based on the discussion of these five principles, we summarize in Table 4 our research contributions. It highlights concrete contributions that may help further AR studies handle similar situations.

CONCLUSION

Finally, we return to our main research question and provide a conclusion to this research. Our research following CAR principles has addressed the issue of how MNCs can successfully

move from globalized ERP strategies to hybridized solutions. Through the paper, we discuss how our AR project jointly designed and carried out by researchers and practitioners has addressed the informal and unexpected workarounds developed by remote users in reaction to the misfit observed between the global template and the local requirements of Chinese users. As an outcome, a number of these workarounds are now formalized (assimilated into the global template without loss to the standardization requirement), and validation processes have removed other workarounds without a failure to meet local requirements. These compromise solutions have therefore reconciled the top-down requirements of MNC HQ and local requirements expressed in a bottom-up fashion in the original workarounds, thus addressing our research question. Although some remain as informal workarounds, they were deemed less important, and given more time, these could also have been resolved in a similar manner. Although we have argued that AR can be appropriate for IS research and PhD work, clearly, the time dimension is a problem.

This suggests that the approach adopted in this research might be used in practice elsewhere to roll out a global ERP system successfully in China, where previous studies – as our literature review revealed – have shown a particular lack of success.

To conclude, our research demonstrates that workaround practices can be managed and embraced by organizations implementing ERP systems and should not always be considered as deviant activities. Our research also shows the value of combining theory at different conceptual levels to gain theoretically driven practical benefits for an organization. In so doing, we suggest a way of bridging the theory–practice gap that is commonly found in IS research. For this reason alone, we would like to see more action research published, but the intense nature of such research and the time required (particularly if it involves more than one cycle) are disincentives to researchers committing themselves to action research.

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