How are Practices Made to Vary? Managing Practice Adaptation in a Multinational Corporation

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Abstract

Research has shown that management practices are adapted and 'made to fit' the specific context into which they are adopted. Less attention has been paid to how organizations anticipate and purposefully influence the adaptation process. How do organizations manage the tension between allowing local adaptation of a management practice and retaining control over the practice? By studying the adaptation of a specialized quality management practice – ACE (Achieving Competitive Excellence) – in a multinational corporation in the aerospace industry, we examine how the organization manages the adaptation process at the corporate and subsidiary levels. We identified three strategies through which an organization balances the tension between standardization and variation – preserving the 'core' practice while allowing local adaptation at the subsidiary level: creating and certifying progressive achievement levels; setting discretionary and mandatory adaptation parameters; and differentially adapting to context-specific and systemic misfits. While previous studies have shown how and why practices vary as they diffuse, we show how practices may diffuse *because* they are engineered to vary for allowing a better fit with diverse contextual specificities.

Keywords
adaptation, adoption, aerospace, diffusion, lean, management innovation, multinational corporations, practices, quality management, standards

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Introduction

> The challenge is: How do you create a practice that is meaningful – that has enough structure and
> boundaries that it can't morph into different things but it is not so specific and tight that it doesn't add value
> to different types of organizations? They don't see the value-added (if too specific). Then they perceive it
> (the practice) as bureaucratic and it subsequently dies. So you need to have that fine balance between these
> two extremes. (ACE manager)

Recent years have attracted resurgent academic interest in innovative management practices that
play a crucial role in achieving and sustaining competitiveness at the firm, industry and the national
levels (Bloom & Van Reenen, 2010; Damanpour, Walker & Avellaneda, 2009; Mol & Birkinshaw,
2008; Volberda, Van Den Bosch & Heij, 2013). While the rationale behind organizational adoption
of innovative management practices is well researched (e.g. Abrahamson, 1991; Mazza & Alvarez,
2000; Mol & Birkinshaw, 2009; Sturdy, 2004), the subsequent implementation and *adaptation* of
these practices needs more attention (Bromley, Hwang & Powell, 2012; Gondo & Amis, 2013).
This is because management practices often do not spread 'as is' as per some earlier epidemiologi-
cal diffusion models (Garfield, 1980; Morris, 1993). Instead, practices are likely to be adapted
during diffusion – arguably a dynamic, contested and emergent process (Ansari, Fiss & Zajac,
2010; Drori, Höllerer, & Walgenbach, 2013; Fiss & Zajac, 2004; Sanders & Tuschke, 2007) – that
is 'temporally and contextually provisional' (Orlikowski, 2000).

Indeed, hardly any management practice qualifies as a 'one size fits all'. Practices frequently
get reconfigured during implementation to make them meaningful and suitable within specific
organizational contexts (Robertson, Swan, & Newell, 1996; Sahlin-Andersson, 1996; Strang &
Kim, 2004; Westphal, Gulati, & Shortell, 1997). Examples include TQM (David & Strang,
2006; Kennedy & Fiss, 2009), Six Sigma (Canato, Ravasi & Phillips, 2013; Parast, 2011),
manufacturing best practice programmes (Love & Cebon, 2008), telemedicine (Nicolini, 2010),
strategic planning (Bromley et al., 2012), self-managing teams (Vaccaro, Volberda & Van Den
Bosch, 2012), corporate social responsibility (Höllerer, 2013) and Responsible Investment
(Gond & Boxenbaum, 2013). Practice variation is thus likely to be the rule, rather than the
exception (Campbell, 2005; Mamman, 2002; O'Mahoney, 2007). As Gherardi and Nicolini
(2000) and Akrich, Callon and Latour (2002) note, to 'transfer is to transform' and 'to adopt is
to adapt'.

Recent work on the diffusion of management practices has revealed novel insights into how
practices are modified across networks, projects and geographies (Perez-Aleman, 2011) due to a
potential lack of technical, cultural or political 'fit' between the practice and its new local context
(e.g. Ansari et al., 2010; Canato et al., 2013; Fiss, Kennedy & Davis, 2012). While scholars have
examined diffusion and adaptation of practices at the field level (e.g. Bromley et al., 2012; Fiss
et al., 2012; Gond & Boxenbaum, 2013), there has been less research about adaptation *within*
organizations (Kostova & Roth, 2002). Adaptation within organizations may be a double-edged
sword. On the one hand, organizations seek to discourage 'undesired' adaptations of the sort that
damage the integrity of the management practice (Ansari et al., 2010). On the other hand, organiza-
tions strive to encourage 'beneficial' adaptations of the sort where 'imperfect imitation' increases
practice effectiveness (Posen, Lee & Yi, 2013) or facilitate innovation (Canato et al., 2013). How
do organizations manage this tension between maintaining the practice's integrity and allowing for
variation?

To address this question, we focus on the adaptation of practices at the intra-organizational
level. By studying the adaptation of the quality management practice ACE (Achieving Competitive
Excellence) in a multinational corporation in the aerospace industry, we examine how the adapta-
tion of the management practice is actively managed by the company.

We contribute in three ways. First, while previous studies have shown how and why practices vary as they diffuse, we show how practices may diffuse *because* they are enabled to vary in order to increase their zone of acceptance in diverse local contexts. Allowing adaptation in line with different contextual needs (Benders & Van Veen, 2001) increases acceptability and can promote more extensive implementation (Ansari et al., 2010). Second, we show how organizations maintain a balance between enabling and restricting the adaptation of practices by specifying, incentivizing and enforcing potentially beneficial adaptations, while discouraging undesired adaptations. Finally, while scholars have examined adaptation at the field level to show how adopters engage in 'contextualization work', to achieve a technical, cultural or political fit with a practice (Gond & Boxenbaum, 2013), we focus on the intra-organizational level. Specifically, we identify three strategies through which an organization balances the tension between keeping the practice homogeneous while also allowing local heterogeneity: (1) creating and certifying progressive achievement levels; (2) setting the discretionary and mandatory adaptation parameters; and (3) differentially adapting to context-specific and systemic misfits.

Next, we provide theoretical motivations, discuss our method and case, report our findings and derive propositions. We conclude with some contributions and implications of our work.

Theoretical Motivations

While scholars have long been interested in innovative management practices (e.g. Damanpour, 1987, 1991; Kimberly & Evanisko, 1981), recent years have seen surging interest (Damanpour & Aravind, 2011; Volberda et al., 2013). Some scholars have used the label 'management innovations', defined as 'the generation and implementation of a management practice, process, structure, or technique that is new to the state of the art and intended to further organizational goals', where 'new' can be entirely new to the world or new to the firm (Birkinshaw, Hamel & Mol, 2008, p. 829). Others have used the term 'organizational practices', defined as 'the shared knowledge and competence of the organization, [which] tend to be accepted and approved by the organization's employees and to be viewed as the taken-for-granted way of doing certain tasks' (Kostova, 1999, pp. 309–10). We use the term management practices more broadly to refer to symbolic and material activities that reflect changes in management work to set directions, make decisions, coordinate activities and motivate people and that involve a departure from traditional processes, practices, structures and techniques.

Regardless of the organizational motivation to adopt a management practice – technical, social or both – (Kennedy & Fiss, 2009), it can rarely be adopted by user organizations as an 'off-the-shelf' solution. Practices are likely to evolve during the implementation process, requiring domestication, reconfiguration and reconstitution to contextualize them within specific organizational environments (Canato et al., 2013; Robertson et al., 1996; Strang & Kim, 2004). While diffusion research provides valuable insights into the rationale behind organizational adoption of management practices (e.g. Abrahamson, 1991; Mol & Birkinshaw, 2009; Sturdy, 2004), we need to learn more about how these practices are adapted (Drori et al., 2013; Gondo & Amis, 2013; Gond & Boxenbaum, 2013).

Adaptation: definition, types and dimensions

Adaptation refers to the process by which an adopter tries to create a better 'fit' between a practice and the adopters' particular needs, where fit is 'the degree to which the characteristics of a practice are consistent with the (perceived) needs, objectives, and structure of an adopting organization' (Ansari et al., 2010, p. 68). Adaptation may lead to change in the practice but not in the

organization (practice adaptation or cooptation), change in the organization but not in the practice (organizational change), and change in both the organization and the practice (mutual adaptation) (Ansari et al., 2010; Canato et al., 2013; Lozeau, Langley, & Denis, 2002). Although there will always be some degree of mutual adaptation, our focus here is on the adaptation of the practice.

Adaptation can be seen in terms of *fidelity (similarity)* and *extensiveness* (Ansari et al., 2010; Fiss et al., 2012). Fidelity relates to whether the practice that is being implemented and adapted resembles or deviates *in kind* from the features of the previous version of the practice (true or distant) and is related to the scope and meaning of the practice. Meaning can be changed through 'hybridization', where adopters combine a practice with local elements (Pieterse, 1994), or through 're-invention', where adopters actively change the meaning of the practice (Rogers, 1995; Yuan, Fulk, & Monge, 2007). Extensiveness assesses the *degree* of implementation compared to the previous version of the practice. Less extensive implementation refers to 'decoupling' or surface-level adoption, where implementation is symbolic rather than substantive (e.g. Boxenbaum & Jonsson, 2008; Bromley et al., 2012). A related concept is 'selective emulation', where adopters choose not to implement certain conflicting features of the practice (Westney, 1987).

Sources of misfits and practice adaptation

Technical, cultural and political incompatibilities or misfits trigger different patterns of adaptation among adopters (Ansari et al., 2010; Sturdy, 2004). Technical fit refers to the degree to which the characteristics of a practice are compatible with the technological base, and the sophistication level of the systems already in use by potential adopters. Cultural fit refers to the degree to which a practice is compatible with the cultural values of adopters (Canato et al., 2013; Detert, Schroeder & Mauriel, 2000; Klein & Sorra, 1996; Newman & Nollen, 1996). Political fit refers to the degree to which a practice is compatible with the interests, power structures and agendas of individuals and dominant coalitions in an organization (Carlile, 2004; Eisenhardt & Zbaracki, 1992).

Adaptations in management practices may emerge at different levels of analysis, namely national, industry (inter-organizational) and firm (intra-organizational). Several studies have examined the adaptation of practices at the national and inter-organizational levels (e.g. Frenkel, 2005; Perez-Aleman, 2011; Strang & Kim, 2004; Zbaracki, 1998). For instance, Fiss et al. (2012) identified several strategies of practice variation during the implementation of 'golden parachute' contracts, a controversial corporate governance practice that diffused widely across firms during the hostile takeover wave of the 1980s. Similarly, Gond and Boxenbaum (2013) explain how adopters engage in different types of 'contextualization work' in adapting socially responsible investment practices in France and Quebec. Fewer studies, however, have examined variations during the implementation of practices *within* organizations, especially in multinational corporations (Ghoshal & Bartlett, 1988; Kostova & Roth, 2002; Saka, 2004). As Gondo and Amis (2013, p. 230, emphasis original) note, 'Our understanding of what happens *within* organizations when new practices are adopted remains at a distinctly nascent stage.'

Intra-organizational adaptation

Practices are modified intra-organizationally as they penetrate the 'semi impermeable organizational membrane' (Canato et al., 2013; Dooreward & van Bijsterweld, 2001). Subsidiaries may differ in the degree of fit between the practice and organizational context as they confront and intermingle with the practice. On the one hand, MNCs have hierarchical control over practice adoption and diffusion. Subsidiaries are not independent entities and the corporate parent may mandate subsidiaries into adopting the practice, often referred to as 'coercive isomorphism'

(DiMaggio & Powell, 1991; Westney, 1993). On the other hand, since foreign subsidiaries operate in host environments with distinct institutional profiles, subsidiary managers strive to attend to host country requirements while also conforming to the corporate mandate (Kostova & Roth, 2002). In addition, MNCs have complex internal environments, with cultural differences, language barriers and inter-unit power struggles that may require local adaptation of a practice (Kostova, Roth & Dacin, 2008).

Corporate parents' attempts to enforce compliance and prevent adaptation may lead to decoupling (low extensiveness), where organizations adopt the practice superficially for ceremonial reasons (Boxenbaum & Jonsson, 2008; Meyer & Rowan, 1977). Weber, Davis and Lounsbury (2009) found that decoupling is more likely if coercion was the diffusion mechanism. Similarly, Lozeau et al. (2002) argued that, if coerced to adopt, organizations will tend to respond ceremonially by 'loose coupling' between the practice and the organization. Thus, to accommodate local needs, create buy-in and promote innovation, MNCs may consider giving their subsidiaries some latitude in modifying practices.

Adaptation may be a double-edged sword and both too much and too little adaptation may be undesired (see Pierce & Aguinis, 2013). If organizations overly restrict subsidiary autonomy and the latitude to adapt, adoption may be less extensive (decoupling) (e.g. Boxenbaum & Jonsson, 2008) and even encounter active resistance (e.g. Eisenhardt & Zbaracki, 1992). Also, since practice adaptations may generate creative problem-solving that benefits the organization (e.g. Czarniawska & Sevón, 1996), restricting adaptation may lead to the suppression of potentially valuable local innovations (e.g. Boxenbaum & Battilana, 2005). In contrast, if organizations tolerate or encourage subsidiaries to freely adapt management practices, the adapted practices may lose their core essence.

Research question: How do organizations manage the tension between standardization and variation in management practices as they diffuse across different subsidiaries?

Methods

We analysed how the adaptation of a management practice is managed in a multinational organization. We chose to study the adoption and adaptation of the management practice 'Achieving Competitive Excellence' (ACE) at Hamilton Sundstrand (HS), a multi-sector business unit of the US conglomerate United Technologies Corporation (UTC), for three reasons. First, ACE is an innovative management practice integral to UTC's performance model (UTC, 2013) and credited to have significantly contributed to productivity and revenue gains (Roth, 2010). Unlike Six Sigma, ACE is a proprietary quality management practice and provides a unique case to trace the evolution of a practice in a multinational corporation. Second, we chose to focus on HS, rather than the business unit where the practice originated, Pratt & Whitney, because we wanted to understand how a practice gets adapted as it travels from one business unit to the other. As a geographically dispersed organization with subsidiaries across the United States, Asia and Europe, HS was well suited to revealing the dynamics of intra-organizational practice adoption and adaptation. Third, since HS is a diversified technology and innovation-driven manufacturing company, and relies on localized innovations that require both flexibility and autonomy, it allowed us to closely observe the tension between standardization and variation.

Research context

ACE. Achieving Competitive Excellence (ACE) is a proprietary quality management system developed by UTC – the parent company of HS – for improving and sustaining quality and productivity throughout its five business units, encompassing 900 local sites and 220,000 employees. ACE seeks

to improve quality and customer satisfaction, while increasing efficiency and reducing waste. Internal estimates suggested that extensive implementation of the practice would, on average, generate 35% sales increase, 60% inventory reduction and 35% improvement in customer satisfaction (Roth, 2010). As of 2010, ACE consisted of 12 tools classified into three categories – 'decision making', 'problem solving' and 'process improvement and waste elimination'. But rather than just a set of tools, ACE has been termed the company's 'operating system' (UTC, 2013) comprising a distinct philosophy based on the teaching of the Japanese quality adviser Yuzuru Ito. In contrast to complex formulas associated with quality management practices such as Six Sigma, ACE aims at production line workers who learn the quality process in a 'matter of days' (UTC, 2013).

Hamilton Sundstrand. Hamilton Sundstrand (HS) is a business unit of United Technologies Corporation (NYSE: UTX). With sales of $5.6 billion in 2010 and $6.2 billion in 2012, HS is among the world's largest suppliers of technologically advanced aerospace and industrial products. The company designs, manufactures and services aerospace systems and provides integrated system solutions for commercial and military aircraft. HS, headquartered in the US, has 18,000 employees across 20 countries in North America, Asia and Europe and 56 subsidiaries with over 150 sites. In 2012, HS was merged with another acquisition, Goodrich, into UTC Aerospace Systems, that has grown to 40,000 employees, $12 billion of sales and 177 sites. We use the term 'corporate level' to refer to HS headquarters, that along with the corporate-wide ACE Council is the key locus of decision-making in the organization.

Data collection

The primary data sources were interviews and documentary analysis. Interviews allow for an in-depth understanding of some of the motives behind practice adaptations (Yin, 2009). We interviewed managers and employees of HS identified through purposeful sampling (Patton, 2002) to acquire rich information on changes in the practice that occurred during implementation across subsidiaries in the US ($n = 3$), Europe ($n = 4$) and Asia ($n = 3$). Interviewees were selected on the basis of their degree of involvement with the management practice, levels of expertise, hierarchical position and length of employment. Most interviewees had been with the organization from the initial introduction of ACE and could provide a rich chronological account of the evolution of the practice. After the first round of interviewing, we conducted follow-up interviews with UTC's global ACE director and an external expert to invite comments on our nascent findings. In total, twelve semi-structured interviews were conducted. In addition, we had numerous informal electronic and face-to-face exchanges with quality managers throughout HS and UTC.

   We also collected archival data, including publicly available information; UTC's annual reports from 1998 to 2011, shareowner letters, websites of UTC, HS and HS local subsidiaries, press releases and newspaper articles. We studied independent and comparative case studies and academic reports on the evolution of ACE within the corporation, including the development of different ACE versions over time (e.g., Hutton, 2004; Roth, 2010).

Data analysis

Our analysis proceeded in four steps. First, we chronologically traced the development of the management practice pioneered by UTC's business unit, Pratt & Whitney. We analysed how it was introduced in HS and diffused globally across HS subsidiaries and sites. We used 'temporal bracketing' (Langley, 1999) to identify key moments in the diffusion of the practice and centrally orchestrated changes, such as the corporate-wide relaunch of ACE in 2004. Second, we coded and

compared the sections in the data associated with whether, how and why the management practice was adapted (Miles & Huberman, 1994). As is typical with interpretive research, we cycled iteratively between data and concepts (Locke, 2011; Strauss & Corbin, 1990). Through the use of 'pattern matching' (Miles & Huberman, 1994), we categorized adaptations according to geographical location and types of misfit – 'political,' 'technical' and 'cultural' (Ansari et al., 2010; Oliver, 1992; Sturdy, 2004). We then traced and catalogued instances for how adaptations contributed to the continuous evolution of the management practice. A common theme that emerged was what respondents described as a tension between 'standardization and local autonomy'. Our third step was to seek explanations for differentiated responses to varying types of practice adaptation. We found that responses depended on whether local variations were perceived as acceptable or even beneficial to performance. For example, the different achievement levels we identified (bronze, silver and gold) indicated variation with regard to practice implementation. Similarly, we distinguished between assessment criteria that were described as non-negotiable or negotiable when assessed as 'not relevant' for the specific recipient unit. We refer to the former as mandatory and the latter as discretionary. We grouped different management interventions into aggregated conceptual categories. We then identified three strategies of how the organization managed practice adaptations. Finally, we developed broader-level propositions and a model of managing practice adaptation.

Findings

Historical development of ACE

From the mid-1980s onwards, industry pressures, especially from Japanese companies entering the American market, prompted HS's parent company UTC to revisit its strategic orientation and focus more on quality and processes. Moreover, large competitors such as Honeywell and General Electric had adopted quality management practices such as Six Sigma, initially developed by Motorola. This created additional pressures on UTC to position itself as a legitimate competitor (Mazza & Alvarez, 2000). After two failed initial adoptions of generic versions, Q+ and kaizen, in 1991, UTC's former chairman and CEO George David invited the Japanese quality adviser Yuzuro Ito to join UTC in the quest to develop a specialized quality management practice for UTC's products and services. Japanese-style quality management was seen as the solution to reverse the prevailing American production mentality focused on scale and standardized products, and to bring back the focus on *processes*, rather than products (Womack & Jones, 1996). The new management practice, termed ACE, was a fusion of two lean methodologies: 'Quality First' introduced by Yuzuru Ito and 'Flow (Productivity) First' from the Toyota Production System introduced by the consultancy Shingijutsu. ACE also incorporated methodologies from existing quality management practices: kaizen (continuous improvement) and 3P (production, preparation, process). A pilot version was introduced at UTC division, Pratt & Whitney, at the end of 1996 that focused on the design, manufacture and repair of aircraft engines.

In 1998, the presidents of UTC's business units agreed to adopt the quality management practice. Once initial flaws in the system were identified and eliminated, ACE was introduced throughout the organization, including HS. To facilitate adoption and extend the teachings of Yuzuro Ito, UTC launched the 'Ito University' where executives, managers and designated ACE experts from local sites were educated on ACE's basic concepts and implementation expectations. The first Ito University session was held in Connecticut, USA, followed by sessions in Asia and Europe. The attendance of UTC's CEO and business unit presidents reinforced the importance of ACE throughout the organization. To extend the teachings and guide the
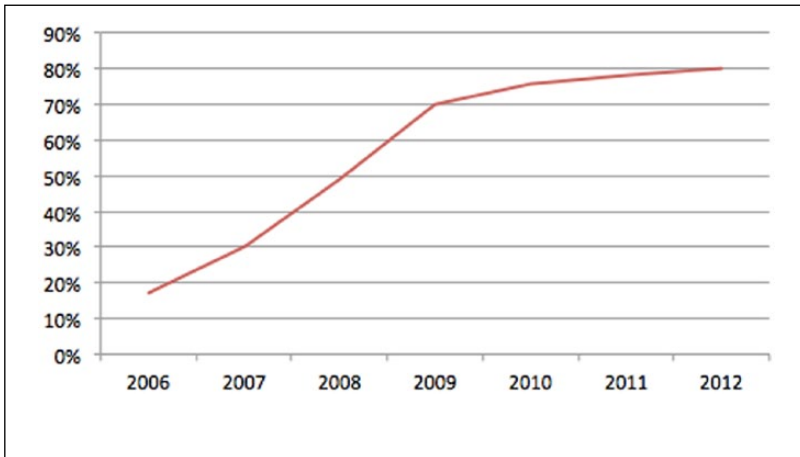
Figure 1. Total ACE Gold and Silver Sites (UTC globally).

implementation of ACE throughout all business units, UTC established an ACE Council composed of representatives from each business unit.

ACE was introduced to HS global subsidiaries in 1999. The earliest adopters were US-based subsidiaries in early 1999, followed by Europe and Asia-based subsidiaries. An ACE team was entrusted with implementing the system throughout the different sites. The team's main task was to generate awareness and train employees. Intermediate adopters in Europe were introduced to ACE through US-based early adopters. A Dutch representative noted: 'Our people went [to US-based locations] to see how it was used there, they trained us, and during the implementation, their side came to us to get us through those first few days.' Despite a speedy introduction, more extensive implementation of the practice remained slow-moving and only accelerated globally when the corporate leadership made ACE a key priority. In 2007, subsidiaries were encouraged to advance in their implementation of ACE when UTC president & COO Louis Chênevert publicly committed to analysts that 70% of UTC's sites would reach ACE highest achievement levels by 2011. Figure 1 illustrates the diffusion of ACE throughout UTC, which is largely reflective of the rates of practice diffusion in HS. While in 2006 only 17% of all sites throughout UTC's five business units had reached ACE gold or silver status, this figure stood at 80% by 2012.

Table 1 provides a historical overview of the development of ACE and its adoption in HS.

Balancing standardization and variation

Need for standardization and practice alignment. The ACE 'operating system' was aimed at standardizing and centralizing processes across HS subsidiaries and their production sites to implement a coherent strategy throughout the organization. Greater alignment was deemed necessary following wide-ranging agreement that the organization had become too fragmented as a result of the headquarters' acquisition strategy. HS subsidiaries ranged from space systems developed for NASA or the US military to oil coolers for motorsport in Britain and turbine wheels in Singapore. A US manager recalled:

> The absence of a common company goal has really had an effect on what previously might have been a good relationship or perception in the marketplace, or not as good as it could have been. It was starting to have an impact on what customers thought.

Table 1. Development of ACE.

Year	Event
1994	Yuzuru Ito works as quality advisor to UTC's CEO George David to develop a specialized quality management practice
1992–1996	A new quality management practice is developed based on existing kaizen (Shingijutsu 1991), Toyota (Lean) Production System, Process Control and Yuzuru Ito's quality philosophy
1996	*The new practice pilot is introduced to UTC business unit Pratt & Whitney*
	7 ACE tools
	New 5S (sort, straighten, shine, standardize and sustain) – visual workplace / process certification / standard work / total productive maintenance / set-up reduction / QCPC (quality clinic process charting)/ relentless root cause analysis (RRCA) / mistake proofing
July 1998	After 3 months of negotiation, all of UTC's business units agree to adopt ACE. An ACE Council is established to review, manage and improve company-wide adoption
1998	**10 ACE tools** *with focus on cells*
	New 6S – visual workplace process management / process certification / standard work / total productive maintenance / set-up reduction / market feedback analysis (MFA) / QCPC (quality clinic process charting) / relentless root cause analysis (RRCA) / mistake proofing / passport
1998	Ito University is launched to train employees on ACE
1999	Hamilton-Sundstrand is formed from the merger of UTC business unit Hamilton Standard with newly acquired Sundstrand Corporation
1999	ACE is introduced to Hamilton Sundstrand.
2001	ACE Council acknowledging efforts were falling short of expectations. Performance gaps are analysed. Outcome; employees are not educated well enough to maximize the potential of ACE
2004	Relaunch of ACE with *a site-level focus* in combination with the creation of 'a manufacturing centric approach'. value stream management and production preparation process (3P) added to ACE
2001–2003	Strategic plan to deepen implementation of ACE is developed, including greater standardization of ACE
2004	Good practice benchmarking is added to ACE.
May 2006	Less than 3% (= 26) of UTC's total sites are ACE gold sites: ACE Council identifies ACE barriers
March 2007	UTC chairman & CEO Louis Chênevert publicly committing to 70% ACE silver and gold sites by 2009 (of a total of 900 sites)
2007	ACE supplier gold programme launched
2008	**12 ACE tools**
	Process improvement and waste elimination
	1. 5S – visual workplace / 2. value stream management / 3. process control & certification / 4. standard work / 5. production preparation process (3P) / 6. total productive maintenance / 7. set-up reduction
	Problem solving
	8. Market feedback analysis (MFA) / 9. QCPC (quality clinic process charting) /10. relentless root cause analysis (RRCA) / 11. mistake proofing
	Decision making
	12. Passport process
February 2009	UTC Chairman & CEO Louis Chênevert publicly committing to 70% of UTC key supplier certifications by 2011
2012	80% UTC total ACE gold and silver sites
2012	UTC Aerospace Systems is formed by combining Hamilton Sundstrand and Goodrich
2013	*Launch of 13th ACE tool containing stronger element around 'Lean'*

In addition to concerns about customer perceptions, inconsistent processes had led to an ineffective and inefficient use of organizational resources. The expanding geographic scope across the US, Asia, and Europe added additional pressure on the organization to adopt a management practice that would allow standardization of its operations. A unified quality standard was, therefore, deemed central to creating synergies and improving communication among subsidiaries across industrial sectors and geographical borders.

Need for variation and flexible adaptation. A frequent data theme encountered was the need to balance corporate standardization and local-level autonomy. Giving subsidiaries some latitude to take local ownership of ACE was regarded as necessary for building organizational and individual commitment to ACE. A US-based manager emphasized the importance of 'not losing sight of the tension between standardization, empowerment and engagement'. Based on the founder's philosophy, improvement was sought through people's development and active participation, described as the 'spirit of ACE'. A manager stated:

> You need to standardize, but you need to make people part of the decision. People become discouraged because the staff already has too much to do. It is very, very important to retain the empowerment aspect and some flexibility …, because otherwise you lose the whole thing.

This flexibility in the application of ACE was important, given the diversity of HS subsidiaries that operated in a dynamic, technology-driven business environment. 'Technology improvements constantly redefine world-class performance and customer expectations', as UTC CEO explained (Roth, 2010, p. 45), and thus called for a flexible approach to encourage rather than hinder local innovations and performance improvements. As one ACE manager noted, implementation would require 'striking a fine balance between some structure and the flexibility of allowing the local folks to use it as they see necessary'.

Technical, cultural and political misfits

Despite centrally devised ACE assessment criteria, in practice, local sites tended to tailor the mix of tools and methods to the needs of their specific context. These adaptations helped to implement ACE throughout HS. As a result, however, ACE practice components changed significantly during subsequent adoptions. We differentiated these changes along political, technical and cultural adaptations of the practice (Ansari et al., 2010).

Table 2 summarizes the depth of adoption and sources of adaptation or ACE across sites in the United States, Europe and Asia.

Political misfits. When ACE was first proposed as a corporate-wide programme, most business unit presidents were against the centralization of decision-making and loss of local autonomy. ACE required shifts in strategic goals, creating divergent interests and conflict (Eisenhardt & Zbaracki, 1992). But ACE was mostly perceived as a top-down directive that told division presidents and their senior managers what to do. An article in *Businessweek* (2004) stated: 'Senior management at the operation – and their superiors back at headquarters – had essentially pooh-poohed ACE in favour of just churning out more air conditioners and heating units.' The centralization of strategy moved decision-making to the corporate level. However, this reduced local management authority. Local managers struggled to align their process improvements with the centrally mandated practice. A European manager noted: 'Small facilities wanted to move forward and create best practices, but due to a shift in the decision-making power; they were lost as to how they contribute to the HS organization as a whole.'

Table 2. Sources of Adaptations in ACE.

Site location	United States	Europe	Asia
Depth of adoption			
Extensive-ness	Moderate extensiveness	High extensiveness	Moderate–low extensiveness
Fidelity	High–moderate fidelity	Moderate fidelity	High–moderate fidelity
Sources of adaptations			
Political	Political resistance by trade unions due to additional work-related tasks and fear of downsizing	Management resistance to diminishing of local autonomy	Political support for quality enhancement programmes by local governments
	Perceived absence of a common goal	Employee initial resistance to standardization. After results were presented, employees were convinced	Employees more job-dependent and held HS in high esteem
Technical	Sites have large number of employees. Difficulties to achieve training, skills and development for all employees	Sites coped with complexity. Misfits with technologies and systems already in use	Local sites struggled with the complexity of concepts and tools due to generally limited levels of education, experience, and training of staff ACE was perceived as a rigid structure and no attempts, bottom-up, were made to adapt the practice. However, aspects of ACE that did not seem relevant were simply avoided
Cultural	Employees regarded the practice as homegrown. However, practice required major transformation in organizational culture from product- to process-centric	Employees respected the fundamental concepts of ACE and embraced the 'spirit of ACE', but questioned the US-centric aspects. They believed in taking ownership, rather than simply doing what they are told. They thereby implemented ACE the way they saw fit	Employees believed in the appropriateness of the practice, and did not challenge the need for disciplined standard work

Many sites were thus reluctant to accept increased standardization that ACE prescribed. Among employees, their attitude towards quality management systems was negative due to two prior failed implementations of external quality management practices, kaizen and Q+. There was little motivation among employees to put time and effort into another management 'fad'. When a practice is perceived as simply a management fad (Abrahamson, 1991), employees tend to question the real value of the practice. As one interviewee recalls:

> In the beginning, there was definite protest against this type of standardization. Everybody was required to do things in one way and not always in the way they were used to. But the task of those who work with the system is to convince people that in the beginning it will be a little more work, but in the end it will provide you with a much more efficient process.

In its efforts to promote ACE's adoption, corporate headquarters encouraged subsidiaries to take greater ownership of the practice. This resulted in modifications to ACE as each subsidiary developed its own implementation approach. Modifications facilitated adoption since ACE was not only a set of tools, but also a philosophy meant to foster a customer-focused and quality improvement culture. 'Previously they were really chasing sales. This has changed, and besides sales we are now looking at operational excellence', an interviewee explained. This required active employee participation and commitment. In fact, lack of practice ownership was cited as a key reason for the failure of previous management practices (Q+ and kaizen) at UTC. A manager who had been involved in the development of ACE emphasized the need for local ownership.

> We had bought Q-Plus from Amoco and it never was ours. We knew that we could not just unplug Toyota's TPS method and put it in. That was Toyota's and it had to be Toyota's. We had to utilize best practices but make them ours. If it's not something we develop, design, foster, and care for along the way, we are not going to be successful. (Roth, 2010, p. 25)

Allowing adaptations helped HS overcome political obstacles to ACE's implementation. The need for adaptation may also be affected by the regulatory environment of a subsidiary (Kostova, 1999). US-based sites faced national issues concerning trade unions that generally disliked the additional work required for implementing ACE. In Singapore, in contrast, ACE benefited from the supportive influence of the national government. As a Singapore manager noted, the government perceived the introduction of ACE as a natural next step in preparing employees' minds for the enforcement of other government policies.

Technical misfits. ACE had been developed for a slow-moving industry, while HS operated in the rapidly changing aerospace industry. In response to indications of misfits due to the differing pace of the industry, ACE underwent a series of transformations during implementation, particularly in European sites. When a team of European delegates were sent to Asian subsidiaries to introduce ACE and educate staff, local sites were thought to benefit from the latest version of ACE. However, some of the adaptations made by European counterparts did not fit Asian subsidiaries' requirements. Moreover, local staff struggled with technical complexity. A manager noted: 'ACE involves some complex concepts and that could have been a challenge to some of the staff. We are generally dealing with technicians; the level of education is not at a masters degree level.' Another example of technical misfit was the introduction of an ERP (enterprise resource planning) system, which was installed throughout HS sites to centralize data and support information-sharing. However, initially designed to accommodate US-based firms, the ERP system created incompatibilities overseas with respect to currency exchanges and customs regulations. Thus, adaptations were needed to allow ERP to be used by non-US subsidiaries.

Cultural misfits. While ACE tools, methods and assessment criteria had been standardized, ACE was implemented by each site in different ways. One major challenge was that ACE required the involvement of everyone, from site managers to production line workers. In large US-based sites, organizational size made it more difficult to encourage all employees to adopt the 'spirit of ACE' needed for extensive implementation of ACE. One manager stated: 'One needs a critical mass of

people in a large organization to [change culture]. One or two people who have that religious conversion experience cannot drive all the change.'

The smaller size of European adopters allowed a deeper understanding of the management practice among all employees. However, low fidelity adaptations often occurred in European subsidiaries as employees were used to making autonomous decisions with regard to how the practice related to their operations. As a Dutch manager recalled, 'the Dutch typically tend to challenge everything'. In response, local sites typically adapted the practice in scope and meaning where they saw fit, as another Dutch manager noted: 'We add our own flavour to [ACE]. The way we have adapted to ACE, and ACE has adapted to us is a better result and fits our culture.'

European respondents emphasized that 'some of the concepts may have been a little bit foreign' to their local cultural context. To justify why they did not implement ACE in the 'same way', respondents referred to the US-centric cultural flavour of the system that did not fit European norms and values. Asian sites were described as having the greatest cultural fit with the required standardization of processes. As an interviewee noted: '[Sites in Asia are] the best at implementation because their culture is highly disciplined and they are used to 'standard' work' of quality management practices.'

However, similar to US sites, Asian sites employed large numbers of employees. Conveying the message proved challenging and ACE came to be seen as complex and ambiguous. Despite a general willingness to comply with centrally prescribed standards, adoption in Asian subsidiaries lacked extensiveness and tended to emphasize symbolic aspects of the practice. This was also attributed to Asian sites being characterized by 'passive acceptance' of the management practice, reflecting 'conviction' rather than true 'conversion'. Employees could be forced to comply with requirements when they were linked to explicit performance measurements on which they were evaluated by their superiors. However, the ultimate aim of ACE was to motivate employees to adopt its 'spirit', not only because they were evaluated on the basis of implementing ACE, but because they believed that ACE was 'the right thing to do'. This suggests that when adopters implement the practice passively or without adequate reflexivity, it may result in less extensive adoption (Gondo & Amis, 2013).

Managing practice adaptation

Rather than requiring rigid adherence, ACE tools were meant to be flexible in their use. Initially, practice adaptations were not only tolerated but even promoted to help different business units and their subsidiaries adopt ACE and assume greater ownership (such as by using different logos). From 2003 onwards, however, UTC grew less tolerant of modifications to ACE across its businesses comprising over 900 sites, as it was seen to impede ACE's wider impact. Adaptation began to be more tightly coordinated by the ACE Council and Ito University. These bodies connected people across multiple business units and provided a forum to facilitate and capture learning, thereby providing the infrastructure to cumulate experiences and to integrate them into the central tools and methodologies of ACE.

First, the ACE Council, consisting of UTC business unit leaders, played an instrumental role in managing adaptation and alignment. It was responsible for defining ACE standards for certifying qualifying, bronze, silver and gold levels as well as overseeing the development of ACE materials and training curriculum. It had regular one-day meetings drawing on experiences in different divisions to discuss progress and to test new ideas or practices that, if successful, could be promoted across UTC (Roth, 2010). Second, Ito University provided the 'learning infrastructure', where employees from geographically dispersed sites not only received ACE training, but could also exchange ideas and feedback from their local sites. At the end of 2009, over 30,000 UTC

employees were taking one of the 120 unique three-day courses in 22 different countries to gain specialist certification at three levels – associate, practitioner and master (Roth, 2010). We identified three interrelated strategies of how practice adaptations were managed by the organization.

Strategy 1: Creating differentiating achievement levels – bronze, silver and gold. Inspired by the 1996 Atlanta Olympics, the ACE Council introduced differentiated bronze, silver and gold achievement levels to reduce complexity, acknowledge continuous progress and motivate adoption. Initially, the highest level of process maturity was defined as 'certified and standardized', which aimed at ensuring a consistent degree of quality. However, this uniform level failed to account for differences in subsidiary capabilities and risked overwhelming adopters with the complexities of the practice. Differentiation according to achievement levels facilitated practice implementation for first-time adopters, while encouraging them to implement the practice more extensively by making differences in adoption levels – and comparisons among sites – visible. An ACE manager explained:

> It was created to recognize the fact that it is unreasonable to expect an organization to pick up a new concept or practice that is as complex as this from not knowing anything about it to all of a sudden being an expert in this. So this really is recognition that this is a journey. It is not an all or nothing, 0 or 1. It is something that you have to take time, slowly implement it, see the value of it, get better at it, and then take the next step. I think there was recognition that in order to really become good, it takes time.

Reducing complexity also minimized undesirable adaptations that could arise from inexperience or insufficient training. 'If you allow variation with novices, there will probably be methodological errors and they are unlikely to achieve the results', an ACE expert noted.

Entry levels (qualifying and bronze) reduced practice complexity to increase cognitive understanding, allowing employees to get familiarized with the practice. The qualifying level provided a performance baseline of training and awareness that encouraged local sites to get acquainted with ACE's basic tools and build positive experiences in the continuing 'ACE journey'. To move from qualifying to bronze level, an organization needed to show and sustain improvements in its performance targets. For example, a production cell needed to perform 9 out of 12 activities. The idea was that, once employees had learnt the ACE basics and seen improvements, they could draw on their experience base to progress to more sophisticated ACE tools and methods in increasingly complex situations. An ACE manager explained:

> We recognize that change takes many years, it doesn't happen overnight. And we're willing to make that investment, take incremental steps. If you take huge steps, you may see the benefit quickly, but it's not sustainable.

To move from bronze to silver, organizations needed to show their commitment to stretching performance goals and to sustain performance improvements. For example, a production cell needed to perform 12 out of 16 activities. Finally, to be certified as ACE gold, sites needed to provide highest performing levels over 12 consecutive months. An ACE manager noted:

> We really strive for putting processes in place that are repeatable and sustainable; so that once you get there we know you will stay there. So you can start focusing on bigger and better things, rather than continuing to deal with short-term issues, and firefighting that takes you away from longer-term visions and development programmes, products and services necessary for company growth.

As best-in-class, they also had to demonstrate their ability to create innovative tools that continuously improved performance. At gold level, adopters were expected to have reached a higher

level of maturity to make more informed variations 'because they understand what they're doing actually achieves the results that are intended', an ACE expert explained.

Different achievement levels created competitive dynamics and 'escalating commitments' (Ghemawat, 1991) that encouraged sites to improve their ACE performance and move up to the next achievement level. To incentivize performance, ACE achievements were linked with bonus payments. Moreover, the ACE Council created a web-based system that allowed managers to view and compare ACE status by business units, subsidiaries, sites or applications area and view trends in each category. This internal comparability created transparency and encouraged leaders to promote ACE throughout their sites. An ACE manager explained:

> At first there was a push. 'How are we getting people to do that?' Now, it becomes very competitive, where sites really want to achieve higher levels of ACE (silver and gold). People often get formally rewarded to get to higher levels of ACE. However, it is not mandatory, and we leave it to the discretion of the division as to whether or not they want to make a formal reward to leaders or recognize and reward individuals. But even if these don't exist, we find that the pure competitive nature continues to drive these organizations to want to get to higher and higher levels.

Certification criteria and standards for each ACE certification level were developed and updated by the ACE Council. To encourage continuous improvement even among the highest-performing sites, the criteria for being awarded an achievement level such as gold were dynamic to meet shifting customer expectations associated with that level. One manager noted that gold certification did not mean contentment but continuous improvement: 'It will become a challenge for ACE to keep shifting the standards, higher and higher. What used to be "gold" standard is not enough anymore.' Another manager noted that sustained improvement would soon need to be recognized with a 'platinum' standard in order to enable high performing sites to stand out.

Strategy 2: Identifying mandatory and discretionary practice attributes. The second strategy that we identified to manage practice adaptation was to define which practice attributes were mandatory versus those which could be negotiated at the local level. Some basic attributes were considered mandatory with no allowance for adaptations. An ACE expert explained, 'what is least acceptable is variation around metrics' to assess performance. While the use of specific performance metrics was mandatory, adopters had latitude in adapting ACE tools as long as they could show that their adaptations led to consistently improved performance. The idea was not to make the tools an end in themselves but to enable desired performance outcomes. When ACE requirements were seen to undermine the overall aim to increase organizational efficiency and innovation, adaptations were accommodated.

To illustrate how mandatory parameters were standardized for different ACE tools while allowing local negotiation in meeting these parameters, consider the example of QCPC (quality clinic process charting). This central ACE tool required sites to create a formal process for capturing inefficiencies or problems at work. QCPC was applicable to a wide range of processes and functions, from manufacturing to human resources. Yet, sites were not required to rigidly comply with every single aspect of the tool. An ACE manager explained how the QCPC tool was meant to work:

> Every single person, every single day, sits back and says 'today or this week I had two or three things go wrong that really shouldn't have gone wrong. Or if they didn't go wrong what are the things that would have made my job easier or benefitted customers?' So that's the tool. We don't go round and tell them, you gotta capture 1 a day, or 2 a day, or 5 a day. Each region, each culture does things a little differently. We say take the concept, show us you understand it and use it, but use it in a manner that makes sense in your

organization. So we give them the standard and the structure but we allow them flexibility to implement it in a way that they feel adds value to them.

At a Dutch site, for example, compliance required employees to spend excessive time on recording hundreds of measurements for analysing inefficiencies. ACE was then adapted, as a narrow focus on compliance undermined the overarching purpose of the practice. The creation of discretionary aspects aimed at empowering production line workers to take more responsibility for problem solving. As a European-based interviewee explained how they implemented ACE, 'we don't change the fundamentals … but we don't feel obliged or pressured to do it exactly the same way [as US-based sites]'.

However, the company needed to maintain a certain level of uniformity in ACE's implementation. An ACE manager noted that 'there is always that balance' and continued:

> You gotta give them [subsidiaries] some guidelines and standards around whatever it is you're trying to accomplish. So you need some limitations; otherwise it takes on a life of its own and then it will be different everywhere.

For example, cultural differences led sites in different countries to translate ACE training materials, but also to create unique, local logos. While the variation was initially tolerated to give adopters greater ownership of the practice, it was later deemed an obstacle to making ACE a unifying operating system. In 2005, the ACE Council decided to create a common ACE logo for all subsidiaries as a symbolic gesture of unity and coherence. UTC's vice president for quality and manufacturing explained ACE Graphic Guidelines in a memo:

> Over time we've seen a proliferation of images representing the program that didn't meet the ACE principles of a single culture, a primary set of tools, and the competency to implement the culture and the tools in everything we do.

The 'new ACE logo is more than just a design,' he continued, but 'represents unity and consistency' and is 'a visual symbol of the message that ACE is the single operating system across our global company.'

Strategy 3: Identifying context-specific and systemic misfits to develop a continually improving practice version. The management practice has changed considerably through a continuous learning loop that promoted improvements by addressing different types of misfit. We identified two different types of misfit, which resulted in differentiated corporate responses: context-specific and systemic misfits of the practice.

Context-specific misfits were those that related to idiosyncratic local conditions and did not invite centrally moderated adaptations to the practice itself. For example, French employees were less willing to work with an English interface. This misfit was locally resolved by replacing the English interface with a French interface.

Systemic misfits, in contrast, hindered the effectiveness of the practice largely independently from the specific context in which the practice was implemented. Such misfits were taken seriously by the ACE Council and efforts were made to identify root causes and potentially change the practice itself. The ACE Council provided what Roth (2010, p. 12) calls a 'learning architecture' for identifying systemic misfits, discussing necessary changes and adapting ACE tools based on continuous expertise provided by local plant managers and employees: 'What emerged from the middle and front lines of UTC's companies was integrated and codified by the ACE Council at corporate levels.' As a manager emphasized:

> Almost all of the changes typically bubble up from customers to divisions. When ACE Council staff are travelling around the world, and visiting all 800 sites, they are seeing things that are not working well or things that are working well… 'Hey, I have been to [specific site] and saw something really interesting,' so they would typically discuss these issues in this forum, and come up with recommendations of changes.

ACE therefore continually evolved through cumulative experience, ongoing feedback and improvisation. UTC's ACE director explained:

> The way this programme has worked and will continue to work is that it is not a stagnant programme. Every time we learn about new tools or new ideas or new ways of getting leadership and the people to adopt it. You know, it's got to be flexible. And it's got to be something that can absorb these new concepts so that it continues to do well.

While initially 'ACE was still Pratt & Whitney's program' (first UTC ACE director, cited in Roth, 2010, p. 28), over time ACE evolved from a pilot consisting of 7 tools in 1996 to a corporate-wide system consisting of 12 tools and a supporting infrastructure of the ACE Council and Ito University. An ACE manager reflected on how, throughout his 15 years of experience with ACE, the practice had changed through either internal or external learnings:

> One of the things we've learnt is that we're constantly upgrading it and changing it, and learning from either experiences that people in different divisions are having when things aren't going well so we have to change things, or they're going really well, so we'd want to multiply that, or we're learning things from outside organizations. So that we can bring that into ACE in a way that the entire organization can benefit from that.

The ACE Council was vital to allowing business units to take ownership of practice changes. An ACE manager noted:

> It is really important that every division is represented on that team, so even if the concept comes from the top down, we allow people in the organization to create what it should look like and get implemented in the way they would like to see it implemented. Once you have buy-in and consensus from the divisions, you know it is going to be successful. We'd rather take a little extra time to create that buy-in and consensus and help them to create the solutions so that in the end you know it will work.

Adaptation in response to systemic misfits is illustrated by the shift from focusing on individual cells to focusing on 'value stream thinking'. ACE had introduced the 'cell concept' to reorganize manufacturing processes more flexibly by restructuring production plants into semi-independent cells. But after intensive research and surveys starting in 2001, the ACE Council realized that the focus on individual cells neglected processes that spanned cells. Thus, positive results for an individual cell did not accumulate across cells and failed to be translated downstream to customers.

After a major revision process, a new version of ACE was launched in 2004 with a new site-level focus that incorporated 'value stream' thinking. 'That was another "a-ha" moment for us', as a manager (cited in Roth, 2010, p. 35) explained the need to come 'to the system view'. Under this approach, the focus for ACE shifted from individual cells to production sites. To qualify as an ACE gold site, all participating cells now needed to be certified gold in addition to achieving site performance requirements. In some cases, local subsidiaries resolved systemic misfits in innovative ways. These innovations were then carried over to other subsidiaries. An ACE expert explains:

> They [subsidiaries] varied the methodologies and adapted them to their specific situation to improve performance. And then some of these adaptations have gone back in terms of becoming best practices that are promoted in other sites. It is a larger corporate learning process.

To encourage learning from successful sites and diffuse best practices, 'benchmarking' was introduced. A manager noted: 'Benchmarking both internally and externally is part of the ACE process. … It is a fantastic way to transfer best practices and to standardize best practices.' Staff were sent to high-performing sites within HS, other UTC divisions and external companies in order to identify world-class performance and highest levels of 'competitive excellence'. An ACE expert emphasized that learning from high-performing peers 'builds enthusiasm' about the effectiveness of ACE. He further noted:

> Continuous improvement is based on looking at best practices within different divisions and who is successful, what are the key elements of what they've done and package that as training to put out for other sites to utilize and adopt.

Once the root causes of systemic misfits and best practice adaptations were identified, improved criteria were standardized and integrated into existing ACE tools and methods. Ito University courses, curricula and teaching materials were then upgraded to disseminate the learning throughout the organization.

A Model of Managing Practice Adaptation

In this section, we draw on the three strategies identified above to present a model of managing adaptation at the intra-organizational level. The model is illustrated in Figure 2.

The first and second strategies relate to how organizations manage adaptation as the practice is implemented at the local level. The third strategy relates to continuous improvement of the practice based on aggregate learning from local misfits and the innovations they may trigger. If localized innovations are perceived to be beneficial, corporate headquarters may become more receptive to
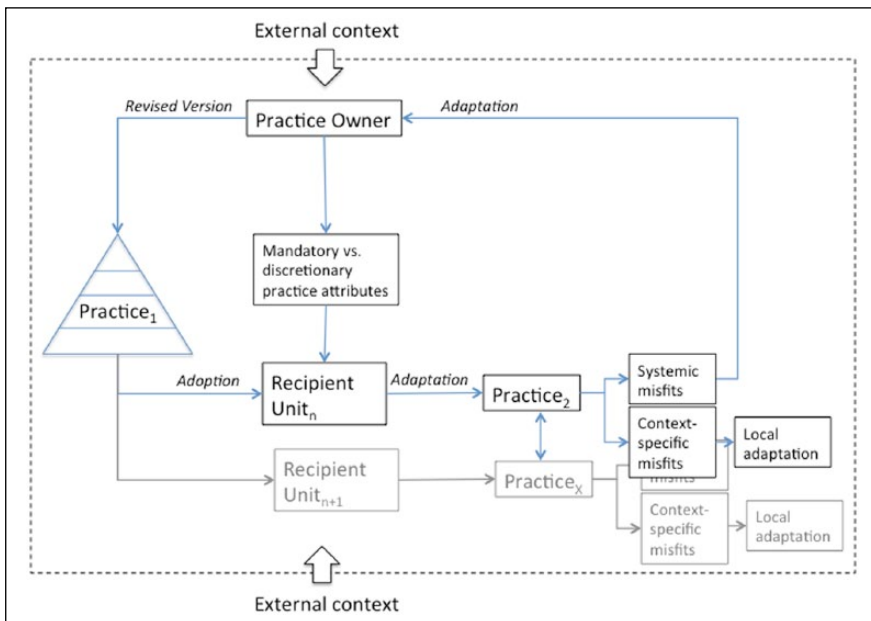

Figure 2. A Model of Managing Practice Adaptation.

these adaptations and willing to incorporate them into improving the overall practice. Based on each strategy we now derive broader theoretical arguments.

For managing adaptation at the local level, the first strategy we identified was to introduce differentiated achievement levels (qualifying, bronze, silver and gold). This reflected higher levels of practice complexity in order to acknowledge and encourage ongoing progress and motivate implementation among different subsidiaries. For instance, the qualifying level encouraged entry, and bronze paved the path for sites to progressively move up to the next achievement level (silver and gold) during their 'ACE journey'. Prior work has shown that practice complexity – more practice components and higher ambiguity regarding the links between these components (Lillrank, 1995; Pelz, 1985) – may lead to intended or unintended variations arising from lack of understanding (e.g. Rogers, 1995; Tornatzky & Klein, 1982). Therefore, progressive achievement levels may promote overall implementation and broader diffusion. Another example is Six Sigma in 3M, where individual employees gain progressive qualifications from 'green belts' to 'black belts' and then join a central division that advises other units on Six Sigma (Canato et al., 2013).

Recipient units need to develop absorptive and retentive capabilities to adopt practices (Szulanski, 1996). Practice adoption entails establishing new routines, building a common understanding of certain practice components (Perez-Aleman, 2011) and creating situational knowing, all of which cannot be enforced through setting rules and enforcing goals (Nicolini, 2011). Adopters develop capabilities gradually through doing, experimenting and participating (Bechky, 2003; Gherardi & Nicolini, 2000, Orlikowski, 2002). If an organization enforces a uniform level of achievement for complex practices throughout its subsidiaries, it may not be able to accommodate subsidiary differences in terms of their capabilities and capacities. Introducing a complex practice 'full blown' may lead to undesirable adaptations in certain subsidiaries unable to handle higher complexity levels due to capability or knowledge deficits (Kostova & Roth, 2002). The difficulties arising from implementing practices full blown, especially in small companies, is well documented and a more staggered manner of adoption with 'tepid steps' rather than large 'change leaps' has been suggested (Henricks, 1992; Turesky & Connell, 2010).

As we saw in the case of ACE, creating progressive achievement levels allowed the practice to be implemented in line with the differential capability levels among subsidiaries. It cajoled reluctant employees into cooperation (when evidence of positive results of the practice became more visible) and mitigated their scepticism or resistance. Progressive achievement levels may reduce the likelihood of decoupling or defensive adaptation and lead to more extensive implementation over time. This leads to the following proposition.

> *Proposition 1: Creating differentiated achievement levels (rather than a uniform achievement level) in the design of a management practice is likely to lead to more extensive implementation of the practice.*

The second strategy we identified was setting *mandatory* and *discretionary* practice attributes with regard to local practice adaptation in order to manage the 'trade-off' between extensiveness and fidelity in adaptation. The trade-off results from the following tension. Some types of deviation from a practice template can increase the risk of failure (Winter et al., 2012). These aspects of a practice are considered 'core'. Their substantial adaptation 'in kind' is unacceptable and high fidelity is desired. However, enforcing high fidelity (low subsidiary autonomy for adaptation) may lead to decoupling (less extensive implementation) (Weber al., 2009), trigger cultural and political backlash, or even stifle learning and innovation (Benner & Tushman, 2003; Parast, 2011). For example, Six Sigma repressed entrepreneurship in 3M, where tolerance for mistakes and the

encouragement of initiative were considered key pillars of 3M's culture (Canato et al., 2013). 'Controlled' discretion to experiment at the local level may allow incremental innovations in the context of standardized practices (Wright, Sturdy, & Wylie, 2012). For some aspects, therefore, low fidelity adaptation may be tolerated or even encouraged. But allowing everything to be 'up for grabs' and giving *carte blanche* for substantive (low fidelity) modifications (high subsidiary autonomy) may lead to loss of the practice's integrity arising from multiple idiosyncratic versions. This may create coordination problems within the organization.

Defining the boundaries of adaptation by drawing a clear distinction between mandatory 'core' aspects of a practice and discretionary 'peripheral' aspects of a practice may enable an organization to preserve fidelity and prevent undesirable deviation. Setting clear signals about and channelling attention to core and critical aspects can limit local variation to less critical aspects. What is discretionary and mandatory may, however, change over time depending on the stage of practice diffusion. In our case, subsidiaries initially had the autonomy to adapt the ACE logo. Later, a single company-wide logo was mandated as a symbol of unity of purpose. While what is discretionary and mandatory would depend on the type of practice, its level of maturity and the context, defining these parameters can allow for more effective management of the extensiveness/fidelity trade-off. We therefore, propose:

> *Proposition 2: By defining and controlling discretionary aspects (allowing or encouraging adaptation) and mandatory aspects (restricting adaptation) of a practice, organizations are likely to more effectively manage the trade-off between extensiveness and fidelity of a management practice.*

The third strategy to manage adaptation that we identified at the corporate level was to discern and differentially adapt to *context-specific* (local) and *systemic* (company-wide) misfits based on cumulative experience, ongoing feedback and improvisation. Adaptations addressing context-specific misfits, such as language translations of communication interfaces and training materials, are related to idiosyncratic local conditions. Therefore, they do not warrant centrally moderated changes to the practice itself. Adaptations addressing systemic misfits, in contrast, influence overall practice effectiveness. For example, when subsidiary feedback revealed that performance improvements did not transfer across different elements of a functional unit, this systemic misfit was addressed by synchronizing activities across all participating cells to get them to the same achievement level. This subsidiary-led change fed into creating the next ACE version with a site-level instead of a cell-level focus. Thus, adaptations from local subsidiaries that were seen to have 'wider ramifications' for the company were integrated and codified at the corporate level, leading to modifications of the practice. However, other emergent adaptations seen as context-specific were not incorporated into the next version of the practice. Differentiating between practice adaptations and incorporating adaptations to systemic but not localized, idiosyncratic misfits can lead to an improved version of the practice for subsequent diffusion. We therefore propose:

> *Proposition 3: Incorporating adaptations to systemic misfits but not idiosyncratic (context-specific) misfits into a practice is likely to lead to continually improved versions of the practice for subsequent adoption and diffusion.*

Discussion

Innovative management practices, also referred to as management innovations, play a crucial role in the development of competitive advantage (Birkinshaw et al., 2008; Teece, 2007; Volberda et al.,

2013). By treating practice variation and heterogeneity as inseparable from the diffusion of practices and by examining how contested practices are modified during implementation, we connect with the debates surrounding innovative management practices and their changing nature. Adaptation during implementation is not unexpected given that adopters strive to change practices that 'fall short of ideals' (Rerup & Feldman, 2011), including quality management practices (Baird, Hu & Reeve, 2011; Zu, Robbins & Fredendall, 2010). In fact, attempts at preventing adaptation may even hinder practice diffusion (Alcouffe, Berland & Levant, 2008). We argue that adaptation may even be a necessary *condition* for diffusion rather than something that only happens during diffusion or as an outcome of diffusion.

Specifically, we focus on the way a management practice is differentially adapted at the intra-organizational level. Previous research, often at the inter-organizational or national levels, has shown that management practices are adapted and customized to 'fit' the site-specific context (Ansari et al., 2010). We advocate a better understanding of how organizations manage the adaptation process and how they strive to strike a balance between extensive and high fidelity implementation and local adaptation to accommodate context idiosyncrasies, such as technical systems, organizational culture and political landscapes.

Contributions

By examining how a diversified, multinational corporation manages the adaptation of a management practice, we make several contributions. First, we extend arguments about how practices vary as they diffuse (Ansari et al., 2010) and how their diffusion may actually be promoted by allowing sufficient space for particular types of adaptation. Specifically, we show how practices may diffuse *because* they are engineered to vary in diverse local contexts. Building in a degree of plasticity and allowing adaptation in line with different contextual specificities (Benders & Van Veen, 2001) can increase the zone of acceptance for the practice, reduce resistance and promote more extensive implementation (less decoupling).

Second, we show how organizations maintain a delicate balance between standardizing practices and allowing local adaptation. They do so by specifying, incentivizing and enforcing certain types of compliance where adaptation is undesired, while also tolerating or encouraging local adaptation that is viewed as potentially beneficial for the organization. Maintaining an optimal balance between standardization and variation can be compared to what has been described as 'meta-standardization' in the context of sustainability standards (Reinecke, Manning & Von Hagen, 2012). Meta-standardization leads to convergence at the 'rules of the game' level (homogeneity), but also allows differentiation at the attributes level (heterogeneity), which enables parties to adapt practices as per local requirements.

Third, we shift conversation from the how and why of practice adaptation to its active management at the intra-organizational level. At the organization level, scholars have explained different patterns of adoption from 'active' to 'minimal' (Kostova & Roth, 2002). At the inter-organizational level, scholars have examined how adopters carry out 'contextualization work' – filtering, repurposing and coupling – to achieve a technical, cultural or political fit (Bromley et al., 2012; Gond & Boxenbaum, 2013). In contrast, we focus on how organizations may anticipate and influence local adaptations. We identified three strategies through which an organization balances the tension between standardization and variation of a management practice by engineering variation and accommodating contextual specificities through: (1) creating and certifying progressive achievement levels; (2) setting discretionary and mandatory adaptation parameters; and (3) differentially adapting to context-specific and systemic misfits.

Theoretical implications

First, our argument that practices may diffuse because they are engineered to vary, or that building in adaptability promotes practice diffusion, resonates with the notion of 'interpretive flexibility' (Bijker & Law, 1994). Leaving a practice sufficiently flexible can provide a 'toolbag of disparate elements into which anyone can dip and extract what they want' (Jones & Dugdale, 2002, p. 155). For management practices, this notion suggests that certain practices lend themselves to multiple interpretations and can be adapted to multiple agendas (Benders & Van Veen, 2001; Giroux, 2006). Allowing adopters to flexibly appropriate and adapt the practice can help reconcile competing interests and overcome political resistance to practice adoption (Becker, Messner, & Schäffer, 2013; Jones & Dugdale, 2002). Plasticity may also enhance the longevity of a practice by enabling it to accommodate changing interests and agendas (Heusinkveld, Benders, & Hillebrand, 2013).

Adaptation may promote practice diffusion and excessive emphasis on the 'purity' of practice may retard adoption and diffusion, as illustrated in the case of cost accounting methods (Alcouffe et al., 2008). Keeping a practice 'open' may, therefore, enable wider enrolment through allowing association with other ideas and practices as Qu, Cooper and Ezzamel (2010) demonstrated for the Balanced Scorecard (BSC). We suggest that even successful management practices may benefit from being constantly revisited, modified and adjusted to account for heterogeneous industry specificities and recipient contexts. Building adaptability into these practices can encourage adoption and more extensive implementation.

Second, our arguments have implications for how multinational organizations in complex institutional environments experience and respond to multiple and potentially contradictory institutional pressures (Greenwood, Raynard, Kodeih, Micelotta & Lounsbury, 2011; Kostova et al., 2008). This may lead to a dilemma between preserving the core identity of the practice (fidelity) and allowing flexibility that may promote adoption and diffusion. For example, multinationals strive to manage the paradoxical pressures between the global standardization of products, services and practices, and their local repackaging. This tension between global integration and local responsiveness has been described by some as 'glocalization' (Drori et al., 2013; Robertson, 1995; Rosenzweig & Singh, 1991; Westney, 1993). Managing this tension is an ongoing challenge for multinational enterprises across a range of functions (Wöcke, Bendixen & Rijamampianina, 2007). We suggest that organizations manage the dilemma between integration/differentiation, standardization/adaptation or homogeneity/heterogeneity through anticipating and actively engineering the practice adaptation process, as against simply responding to emergent adaptations arising from different kinds of misfits.

Managerial implications

First, our findings suggest the importance of being continually aware that relatively high or low levels of adaptation activities may lead to undesired outcomes. The 'too much-of-a-good-thing effect' (TMGT effect) is applicable to a broad range of phenomena in the field of management (Pierce & Aguinis, 2013). For instance, vertical integration and outsourcing can lead to detrimental outcomes when taken too far. Similarly, while diversification may reduce risk and increase efficiencies, too much diversification can hurt performance. Also, too much exploration (e.g. the pursuit and acquisition of new knowledge) can damage performance just like overreliance on exploitation (e.g. the use of past or incremental knowledge) (March, 1991). Finally, while open innovation has often been celebrated (e.g. Chesbrough, 2006), too much openness hurts performance (Laursen & Salter, 2006). As in these cases, adaptation may also have a curvilinear relationship with performance. Organizations strive to be ambidextrous (see Benner & Tushman, 2003)

and seek a balance between allowing too much adaptation that compromises the core practice, or too little adaptation that may lead to decoupling, resistance or the stifling of potentially beneficial localized innovations.

Second, in managing adaptations in management practices, an organization needs to tread a fine line between discretionary and mandatory practice attributes and between systemic and subsidiary-specific misfits. While this is not straightforward, doing so to improve the overall management practice would arguably improve 'fit' and lead to more extensive implementation. Misfits and subsequent adaptation of management practices, like other change processes, do not come without their costs – both financial and cognitive. Managers can, therefore, not only focus on improving practice fit, ex post, but also engineer its design, ex ante, in a manner that minimizes potential misfit. In addition to designing adaptability, creating buy-in for innovative management practices is critical as implementation is not just based on compliance or unreflective adoption, but is rather driven by commitment and conviction among subsidiary managers and employees.

Boundary conditions and future research avenues

We have argued for the active management of practice adaptation that may be desirable for promoting adoption and broader dissemination. However, in some cases, the imitation and replication of a successful organizational practice may be desirable (Szulanski, 1996; Szulanski & Winter, 2002). Chain organizations, such as McDonalds, Wal-Mart and IKEA, compete and grow in national and international markets often by replicating an accurate copy of the original successful template. In these cases, 'modifications turn out to be deleterious to performance, even when such attempts are deemed ex ante as sensible, promising, or desirable' and potentially harm the 'adapting units' (Winter, Szulanski, Ringov & Jensen, 2012, p. 673). However, this 'template logic' or a uniformity imperative may not hold in cases where more flexibility is required, such as non-standardized products and procedures. If the practice transferred is complex and involves a high degree of causal ambiguity about critical factors and their interaction (e.g. if knowledge is embodied in highly tacit human skills) (Szulanski, 1996), fidelity may be difficult to enforce. For organizations that produce specialized, custom-made goods and thus rely heavily on flexible procedures, a standardized quality management system reduces flexibility and may become an obstacle (Beck & Walgenbach, 2005). Also, causal ambiguity creates uncertainty about how critical factors might interact with recipient environments, and potentially increases the need for local adaptation. In addition, uniform practice templates are unlikely to accommodate the needs of highly diversified organizations that operate in multiple markets. Examples include GE, ranging from financial services to power generation, or Virgin Group, ranging from music to air travel.

While the use of a single exploratory case study has limitations, it allowed us to transparently explore how a management practice was adapted across subsidiaries and how the organization actively managed this adaptation process. We studied a proprietary practice developed and owned by the company to meet its specific needs and then adopted by its different business units and their subsidiaries. The degree of freedom to adapt is limited for quality management practices that are commercially available in the marketplace and thus externally controlled or certified, such as Six Sigma or ISO 9000. We nevertheless observed significant adaptations, even for a practice that was tailored for a company.

Future research can explore how adaptation patterns may differ between proprietarily developed and 'off the shelf' practices. Comparative case studies may provide further insights into the management and performance effects of adaptations to management practices. Organizations vary in the degree of influence and hierarchical control that the parent exercises over its subsidiaries to manage and control variation. Attention to the relationships and different kinds of

interdependencies between the parent and subsidiaries may thus provide further insights into the adaptation process. Also, once a practice matures and has 'proven its worth', there may be less reason to question it or to reinvent it. However, as adopters become more knowledgeable about the practice over time, they may be able to make more informed adaptations to the practice. Future research can examine how the maturity levels of the practice and of the adopters co-evolve and shape the adaptation process. Finally, while we focused on adaptations at the intra-organizational level, more research is needed on how adaptations are managed across organizational boundaries with regard to other stakeholders such as suppliers and customers.

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