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Developing Absorptive Capacity Theory for Public Service Organizations: Emerging UK Empirical Evidence

Michael J. R. Butler and Ewan Ferlie¹

Aston Business School, Aston University, Aston Triangle, Birmingham, B4 7ET, UK ¹King's Business School, 30 Aldwych, London, WC2B 4BG, UK

Corresponding author email: m.j.r.butler@aston.ac.uk

A strong public policy focus on high performance means that utilizing management knowledge effectively is at a premium for UK public service organizations. This study empirically examined two English public agencies to explore the inter-sectoral transfer of a strategic management model originally developed in the private sector – absorptive capacity – which is one way of conceptualizing an organizational competence in such knowledge mobilization. Two theoretical contributions are made. First, a new absorptive capacity framework for public service organizations is developed which recognizes the participation of public agency project teams during an innovation process proceeding over time with phases of co-creation, testing, metamorphosis and diffusion. Second, our novel framework modifies an early influential model of absorptive capacity. Counter to this model, we argue that realized absorptive capacity requires agency from skilled and embedded actors to turn ‘curbing routines’ into ‘enabling routines’ in all four stages. Project (middle) managers have flexibility in their roles to seize episodic moments of opportunity to innovate and achieve service delivery goals, and to build absorptive capacity capability. Absorptive capacity capability develops organically over time. Future research directions are discussed.

Introduction

A major debate in public management literature is whether strategic management models developed in the private firm can be transposed (Bryson, Berry and Yang, 2010) – or adapted (Vining, 2011) – to public agencies. New public management (NPM) reforms have made public agencies more ‘business like’ and turned some into performance-orientated ‘quasi firms’ (e.g. NHS Foundation Trusts), where private sector-

orientated strategy models may have better fit. Similar debates are taking place inside and outside the UK (Hansen and Jacobsen, 2016).

Bryson, Berry and Yang (2010) call for more research from a knowledge-based perspective in public agencies, to align the outside environment with internal practices. They emphasize the resource-based view (RBV), which sees the organization’s capacity to manage its intangible assets, including knowledge, as a ‘core competence’ (Barney, 1991; Barney and Clark, 2007; Bryson, Ackermann and Eden, 2007). Harvey *et al.* (2010b) argue that absorptive capacity (AC) research is pressing and relevant within public agencies, because it understands its performance level as influenced by competences in how the organization acquires, assimilates, transforms and exploits knowledge (Zahra and George, 2002).

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Zahra and George's (2002) influential early model of AC is particularly important, because, as Lane, Koka and Pathak (2006) conclude, it is one of few studies to advance the definition of AC, and the only one to indicate that both partner roles and internal knowledge-sharing and integration are critical. In addition, Lane, Koka and Pathak (2006) suggest that Zahra and George's (2002) model shifts AC research to a broader perspective, away from Cohen and Levinthal's (1990) narrower R&D definition. Emerging public agency research adopting AC draws on Zahra and George (2002) to explore the conditions leading to the adoption of new knowledge (Béliveau, 2013; Easterby-Smith *et al.*, 2008; Hodgkinson, Hughes and Hughes, 2012). The research question here is: Can Zahra and George's (2002) model be appropriately transferred to public agencies?

Our theory of AC is developed in an empirical study of two English public agencies. They sought to co-create and adopt a project management toolset to solve the same operational issue – as there was no available internal knowledge to address specific project-related problems that each agency had. We will incorporate the key concept of co-creation. Osborne, Radnor and Strokosch (2016, p. 642; Osborne and Brown, 2011; Osborne and Strokosch, 2013) emphasize that value is co-created when a public service is shaped by the user, because the user knows their own needs. The variant of co-creation adopted here is how service is produced within a system and the way an innovation combines with existing services to improve service delivery (Osborne, Radnor and Strokosch, 2016). The toolset co-creators and users are service professionals from Middle England Police and Middle England Local Education Partnership (LEP) (Sanders and Stappers, 2008).

This study makes two theoretical contributions. First, we propose a new absorptive capacity framework for public service organizations. The framework revises Zahra and George's (2002) early model, and modifies it for public agencies (Vining, 2011). Whereas Zahra and George (2002) focus on the acquisition of knowledge in an initial stage, this study suggests a more processual co-creation process linked to designing a new toolset which then reviews and transforms service delivery (Osborne, Radnor and Strokosch, 2016). Having created the toolset, in our stages two to four, it was tested and integrated within the

sponsoring project team, then shared with other projects in both agencies. Zahra and George's (2002) four dimensions of knowledge are changed from their categories of acquisition, assimilation, transformation and exploitation to our categories of co-creation, testing, metamorphosis and diffusion, which we suggest captures the development of AC capability over time.

Second, our framework recognizes the interplay of individual agency and organizational routines, where skilled and embedded actors counter 'curbing routines' with 'enabling routines', which helps them move from knowledge co-creation to diffusion (Easterby-Smith *et al.*, 2008; Safavi and Omidvar, 2016). We find that project managers are pivotal actors because they are less restrained by high-level political influence (Vining, 2011), and so can seize organizational opportunities to innovate and achieve service delivery goals (Easterby-Smith *et al.*, 2008; Radaelli and Sitton-Kent, 2016; Sydow, Lindkvist and DeFillippi, 2004).

This paper has the following structure. First, key AC literature is reviewed, highlighting a gap in its application to public agencies. Second, the design of an exploratory study that stimulated innovation in two public agencies in England is outlined. Third, empirical results are presented and discussed, as seen from an AC perspective. Finally, the contribution to wider AC theory from the empirical study is outlined, as are potential directions for future research.

Literature review

Absorptive capacity seen as a dynamic capability

There is an extensive AC literature. Lewin, Massini and Peeters (2011) identify over 10,000 publications citing the AC construct. However, Volberda, Foss and Lyles (2010) argue that AC's conceptual basis still remains unclear. Lane, Koka and Pathak (2006, p. 841) highlight what they see as the reification of AC, arguing that the AC concept meets the needs of researchers rather than focusing on 'delineating the constructs, theories, and methodologies shared by the community'. Nevertheless, they conclude that AC research 'has underscored its potential to be a major construct in organizational research' (Lane, Koka and Pathak, 2006, p. 859).

Cohen and Levinthal (1990, p. 128) provide a foundational definition of AC as the collective ability of a firm 'to recognize the value of new

information, assimilate it, and apply it to commercial ends'. This organizational level concept is positively related to higher performance (Cohen and Levinthal, 1990; Jones, 2006). Lane, Koka and Pathak (2006) critique Cohen and Levinthal's (1990) definition for being too narrowly associated with an R&D-related definition. Instead, Lane, Koka and Pathak (2006) suggest a refocusing on the idea of dynamic capabilities, which fundamentally shifts AC research towards a broader perspective. In their review of 289 AC papers, they highlight three that extend the definition of AC. Whereas Dyer and Singh (1998) and Lane and Lubatkin (1998) emphasize the importance of how an organization engages with its external partners, Zahra and George (2002) agree with this, but add that internal knowledge-sharing and integration is also critical.

Zahra and George (2002) reconceptualize AC within the dynamic capabilities view of the firm where knowledge enhances competitive advantage and further, a firm's AC co-evolves with its knowledge environment (Lane, Koka and Pathak, 2006; Van den Bosch, Volberda and de Boer, 1999; Zahra and George, 2002). They distinguish between two dimensions of potential AC (acquisition and assimilation) and two of realized AC (transformation and exploitation). Acquisition is defined (Zahra and George, 2002, p. 189) as a 'capability to identify and acquire externally related knowledge that is critical to its operations'. Acquisition follows an activation trigger to set AC in motion, such as a performance failure or market turbulence (Lichtenthaler, 2009). Assimilation refers to (p. 189) 'the firm's routines and processes that allow it to analyse, process, interpret and understand the information obtained from external sources'. Social integration mechanisms reduce the gap between potential and realized AC because they distribute information about the new knowledge. Transformation (p. 190) indicates 'the firm's capability to develop and refine the routines that facilitate combining existing knowledge and the newly acquired and assimilated knowledge'. The final 'exploitation' stage refers to the payoff or the ability (pp. 190–191) 'to refine, extend or leverage existing competences or create new ones'.

Sun and Anderson (2010) extend Zahra and George's (2002) model by suggesting that firm-based factors, including socio-psychological processes of learning, influence each AC dimension. In the acquisition dimension, the corresponding

learning capability represents the mental models of individuals in opportunity-finding groups. During assimilation, the learning capability refers to the supportive environment of team composition and dialogue in teamwork. In the transformation dimension, the learning capability refers to the group/organizational level, when ambidextrous leaders combining both transactional and transformative leadership styles experiment with a new-shared understanding that keeps useful routines and practices but alters redundant ones. During exploitation, the learning capability institutionalizes new-shared understanding throughout the organization, by leadership action and committing resources.

Other scholars explore the interrelationship between two of Zahra and George's (2002) components: routines and processes, and broader managerial roles. Lane, Koka and Pathak (2006) emphasize the importance of having active managers supported by processes that recognize, assimilate and apply new external knowledge. Volberda, Foss and Lyles (2010) suggest that future research should cover the role of managerial agency in building AC and how AC is understood within inter-organizational networks (see Noblet, Simon and Parent, 2011) and social systems (Parent, Roy and St-Jacques, 2007).

Here we adopt Volberda, Foss and Lyles' (2010) suggestion by testing Zahra and George's (2002) finding that AC only begins to be realized in the transformation dimension. Following Lane, Koka and Pathak (2006), we ask: Can an organization's combinative capabilities also change in Zahra and George's (2002) other three dimensions through the role of active managers supported by enabling routines?

Conceptualizing AC in terms of routines emphasizes organizational processes which recognize the value of new knowledge and convert it into learning outcomes, rectifying weak prior knowledge (Hughes *et al.*, 2014; Lane and Lubatkin, 1998). Zahra and George (2002, p. 197) suggest that such an understanding opens up 'the black box of the sustainability of competitive advantage'. This study distinguishes between enabling and curbing routines and views them as a continuum (Hughes *et al.*, 2014; Lane and Lubatkin, 1998). Following Eisenhardt and Martin (2000) and Lane, Koka and Pathak (2006), an enabling routine is seen as a fundamental activity within knowledge processes, facilitating

innovation and integrating knowledge. In contrast, a curbing routine hinders innovation. Zahra, Priem and Rasheed (2005) see a 'curb' as useful when exploring how to block top management opportunistic behaviour. 'Curbing' in this study refers to an organization acquiring knowledge through partner organizations (Koza and Lewin, 1998), but being unable to translate it into learning outcomes (Hughes *et al.*, 2014).

Absorptive capacity and UK public agency settings

Our first extension of Zahra and George's (2002) work lies in exploring whether AC theory can also be applied to public agencies (Harvey *et al.*, 2010a, 2010b). Harvey *et al.* (2010b) suggest that AC theory can indeed be applied here as successive UK NPM reforms have created a public policy focus on agency performance, with severe penalties for poor performance, including top-down interventions. This performance focus mimics the market pressures found in firms. Harvey *et al.* (2010a, 2010b) add that UK public agencies often have a flawed response to publicly available information about their poor performance levels, suggesting that they have weak knowledge acquisition and processing capacity (Denhardt, Denhardt and Aristigueta, 2002; Osborne and Strokosch, 2013). Harvey *et al.* (2010b, p. 93) suggest intellectual challenges for a future research agenda:

- (i) building AC theory within the context of public agency settings;
- (ii) undertaking participative research in this domain with public managers; and
- (iii) exploring what an AC prism implies analytically within looser multi-agency public service networks rather than in a single-agency setting.

Recent public agency research uses Zahra and George's (2002) tension between potential and realized AC to reveal conditions that could lead to adopting new knowledge (Béliveau, 2013; Easterby-Smith *et al.*, 2008; Hodgkinson, Hughes and Hughes, 2012). Easterby-Smith *et al.* (2008, p. 485) and Béliveau (2013) address the problematic issue of 'the lack of development of the concept of absorptive capacity' by using qualitative methods, offsetting prior emphasis on quantitative studies (used by Hodgkinson, Hughes and Hughes, 2012).

Easterby-Smith *et al.* (2008) focus on key internal processes aiding the movement of knowledge within a UK health sector case study, specifically Zahra and George's (2002) activation triggers such as internal crises and social integration mechanisms promoting greater employee interaction within knowledge management systems. They link these AC processes to power dynamics and organizational boundary crossing. Systematic power is the establishment of procedures by senior managers to gather internal and external information to inform strategic decision-making and respond to activation triggers, whilst episodic power used by the CEO influenced senior clinicians about new knowledge implementation.

Internationally (Canada) and again within healthcare, Béliveau (2013, p. 1349; Nonaka and Takeuchi, 1995) highlights the importance of middle manager capacity to create knowledge and transfer it across the organization. Like Easterby-Smith *et al.* (2008; Zahra and George, 2002), Béliveau (2013) emphasizes the importance of socialization mechanisms to address an organizational need (the activation trigger). Middle managers needed to be interested in the new knowledge to disseminate it, so much so that they might exhibit behavioural exemplarity (being a role model for new knowledge). They also worked closely with key employees so that they too were supportive of the change.

Hodgkinson, Hughes and Hughes (2012) examine the role of AC in moderating the relationship between market responsiveness and customer performance for UK public leisure providers, by examining how AC operates as a filtering mechanism to retain relevant knowledge during the transition from potential to realized AC (Zahra and George, 2002). They found that AC is strengthened for public sector internal providers, but not for private sector external providers.

To extend this exploratory research, an important research question for us is: Can Zahra and George's (2002) AC model be appropriately transferred to public agencies? The concept of co-creation needs to be incorporated, because the two English public agencies studied were involved in creating and adopting a project management toolset to solve operational issues. Though co-creation has not yet been explicitly linked with AC, both Zahra and George (2002) and Osborne, Radnor and Strokosch (2016) recognize that an organization has strategic choices and multiple

pathways for change and innovation. While Zahra and George (2002) define knowledge acquisition within the firm as the capability to identify and acquire related knowledge, Osborne, Radnor and Strokosch (2016, p. 644) emphasize in the public agency context that value is often co-created ‘*by the iterative interactions of service users and service professionals with public service systems*’.

Following Payne, Storbacka and Frow (2008), this study selects the preferred term ‘co-creation’ because the alternative concept of ‘co-production’ is tainted by a goods-dominant rather than a service-dominant logic. Given that a public service is shaped by the user (Mulgan, 2006), at the point of service delivery, value is also co-created by the experience and impact of the service (Horne and Shirley, 2009). Osborne, Radnor and Strokosch (2016) identify four co-creation concepts and the variant selected here is how service is produced within a system and the way an innovation combines with existing services to improve service delivery. This is because the toolset co-creators and users are service professionals from the two public agencies (Sanders and Stappers, 2008). Such an approach is conceptually distinguished from the narrower focus on the translation of management knowledge by ‘understanding how ideas move within and across organizations’ (Spyridonidis *et al.*, 2016, p. 232).

After this co-creation idea, Mulgan (2006) identifies three further stages to social innovation processes, which may or may not be consecutive. The co-created idea needs testing in practice; once the idea proves itself, it then needs support to grow, and the idea may take a different form to that envisaged by the pioneer. Compared to Zahra and George (2002), Mulgan’s (2006, p. 160) stages are less linear and emphasize the ‘close involvement of people with the strongest understanding of needs’.

We now have the theoretical framework for analysing AC in public agencies. First, the framework highlights the importance and relevance of Zahra and George’s (2002) conceptual model, notably how active managers supported by enabling routines convert potential AC to realized AC in the transformation dimension. We adopt Volberda, Foss and Lyles’ (2010) suggestion that to realize AC, it may happen in all AC dimensions. Second, extending recent public agency research which explores the tension between potential and realized AC, we incorporate the concept of co-creation as a means of producing new knowledge (Osborne,

Radnor and Strokosch, 2016). We then follow Mulgan (2006) to identify three further stages to social innovation.

Study design

Overall design

Our research question guided the study design. As noted, Harvey *et al.* (2010b) suggest that participative research alongside public policy-makers and managers can help build AC capability. Our study design collected data longitudinally through an action research case study approach combining ‘problem solving with research in a way that is appropriate to the circumstances of the research to provide both academic rigour and practical relevance’ (Huxham and Vangen, 2003; McManners, 2016, p. 204). Organizational participants with the researcher here help bring about change (Harris, 2008).

The specific action undertaken was the co-creation and adoption of a management toolset to solve a common operational issue, given that there was no available internal knowledge to address specific project problems experienced relative to team relationships. This theme reveals a social innovation process in action (Mulgan, 2006), moving from potential to realized AC (Zahra and George, 2002). The Actor Analysis Toolset developed (from now on referred to as the toolset) generated maps of current and future working relationships within a project team (www.thetransformationproject.co.uk/management-toolsets-the-actor-analysis-toolset.html). A ‘Current State Map’ started by identifying human and non-human actors involved in a proposed project. Non-human actors include organizational structures, relationships and processes. The relationships between the actors are portrayed in a map. A plan is devised to move from the current state into a ‘Desired State Map’. This set of actions seeks to successfully deliver the project, by converting resistant actors into proactive ones.

Guided by McManners (2016), action research can be underpinned by a case study design also informed by theory (Eden and Huxham, 2002; Eisenhardt, 1989; Pettigrew, 1990). Specifically, Huxham and Vangen (2005) suggest the analytic establishment of a joint working path. The path in this study involved four stages that emerged through reflection on the data collected.

These stages also allowed any correspondence with Zahra and George's (2002) four AC dimensions to be investigated. In the first stage, the toolset was co-created with academics working alongside project managers (see Harvey *et al.*, 2011; Jacobson, Butterill and Goering, 2004; Osborne, Radnor and Strokosch, 2016; Pettigrew, 2011; Taylor-Phillips *et al.*, 2014). In stage two, project managers tested the toolset. In stage three, metamorphosis took place as the toolset became integrated. In stage four, the toolset was diffused beyond the initial project due to the success in stage three. The AC-related outcomes of interest reported are the performance outcomes realized by the two case studies mentioned in the Results section.

Purposeful case selection

Purposive sampling was used to identify organizations willing to participate in co-creating and using the toolset (Easterby-Smith, Thorpe and Jackson, 2008). This exploratory study is based on multiple parties of project managers who belonged to various UK organizations (seven in total), sectors (public and private) and sizes (from a boutique digital advertising agency to multinational organizations). Middle England Police and Middle England LEP are focused on here because they were the only adopters of the toolset in this cohort of organizations. This sampling also enabled AC to be investigated in public agency settings (Harvey *et al.*, 2010b). Following Pettigrew (1990), the case studies have both commonalities and differences. In addition to being pioneers in toolset application, they are both in the same sector (public) and the same region (the English West Midlands).

There are also differences between the two case studies. Middle England Police is an exemplar of a non-market organization, whilst Middle England LEP is a hybrid form set up as a partnership between many stakeholders including both public and private organizations (Harvey *et al.*, 2010b). The particular project studied in Middle England Police is at the middle management level, located in the Automatic Number Plate Recognition (ANPR) Department; in Middle England LEP, the project selected is at the strategic coordination level and relates to the Building Schools for the Future (BSF) programme (Radaelli and Sitton-Kent, 2016). The project partners proposed the projects.

Data collection

The five workshops, three conferences and internal project meetings produced by these two sites were videoed and their content transcribed. A 'Knowledge Transfer Executive' (KTE) recorded notes during site visits, supplemented by collecting relevant documentary materials. The KTE was a former Jaguar Land Rover project manager, and his specialist knowledge and key skills gave him credibility to collaborate with the two public agencies. He could translate their work experiences into the toolset because they spoke a similar practice language, avoiding academic theory and establishing mutual trust. In turn, the project managers are characterized by their willingness to experiment with new ideas, investing time in the toolset.

Table 1 summarizes when the interviews were conducted in the two agencies and divides the data collection into five phases. Studies one and two focused on knowledge co-creation, testing and integration with Middle England Police and Middle England LEP, respectively. Studies three and four captured the subsequent knowledge diffusion across the two agencies. The two retrospective interviews formed study five. Interview duration varied. In Middle England Police, each interview lasted about an hour, but in Middle England LEP, the average interview was slightly shorter as teachers found it hard to release time. The interviewees were involved directly in the research, including the project manager, their team and the people using the project's services. We also added further names through 'snowballing'.

The interviews used semi-structured 'pro formas' addressing specific topics agreed with the project managers and so differed. Nevertheless, the questions gathered material on the career of the innovation. The interviews were triangulated with the transcripts of the workshops, conferences and internal project meetings, the notes from site visits and documentary materials. An interim report presented to the then Deputy Chief Constable of Middle England Police provided research participant feedback, as did quality checks with the key interviewees.

Data analysis

An inductive approach was adopted (Miles and Hubermann, 1994) to develop emergent themes

Table 1. Case study selection

Public service organization	Year 1 2009–2010	Year 2 2010–2011	Year 3 2012	Total
Middle England Police	<i>Study 1:</i> Knowledge co-creation, testing and integration – ANPR Department 11 interviews	<i>Study 3:</i> Knowledge diffusion – innovation spread to two other departments 13 interviews (11 new, 2 reflection interviews with staff already interviewed in year 1, due to better access)	<i>Study 5a:</i> Retrospective analysis 1 interview (overall reflection interview)	25 interviews
Middle England LEP	<i>Study 2:</i> Knowledge co-creation, testing and integration – BSF project 9 interviews	<i>Study 4:</i> Knowledge diffusion – innovation spread to a teacher training social network 6 interviews (all new)	<i>Study 5b:</i> Retrospective analysis 1 interview (overall reflection interview)	16 interviews
Grand total	20 interviews	19 interviews	2 interviews	41 interviews

Note: Interviewees in studies 3 and 4 mainly differed from studies 1 and 2. Variability is important to capture the range of activities that happened across the data collection sites. Retrospective and reflection interviews illuminate patterns and allow theorizing (Pettigrew, 2012).

and categories, but linked to the theoretical framework (see Appendix) (Eisenhardt, 1989). Analysis progressed over three stages. First, the research assistants with the first author constructed rich narratives of the knowledge exchange processes (Langley, 1999). Two research assistants in year one independently analysed their data, then the thick descriptions were shared between themselves and the first author, facilitating the critique of emergent themes and categories (Evered and Louis, 1981). Years two and three repeated the process, involving the cross-checking of findings from previous interview rounds (Jarzabkowski and Balogun, 2009). The interview transcripts for each study were analysed by the relevant research assistant, and codes were derived from the research questions asked in each study (Table 1).

In the second stage, the chronology of events was used to surface theory (Golden-Biddle and Locke, 1997). This type of process research involves the dynamic study of organizational behaviours within their contexts that unfolds over time (Pettigrew, 1997). Toolset diffusion was assessed by how far knowledge of the innovation had crossed two organizational boundaries (Easterby-Smith *et al.*, 2008): had knowledge of the toolset spread beyond the innovation champions, the project managers in Middle England Police and Middle England LEP, and had it spread beyond the initial project teams to elsewhere in the orga-

nizations? A retrospective analysis of all the interview transcripts coded for innovation diffusion.

In the last stage, the absorptive capacity framework for public service organizations was developed. AC theory was retrospectively applied to the analysis and interpretation of the research findings. The second author joined the project to help with the re-theorization of the data (Yin, 1994). This case study was then produced, which provides the results of a thematic analysis conducted across the five studies.

Results

The End of Award Report (Anonymous, 2013) for the sponsoring research council reveals the initial analysis of the outcomes. Whereas studies conducted with firms may measure AC through R&D investment or patents (Zahra and George, 2002), this study used a more relevant outcome of interest for its context, namely, performance outcomes realized (Lane, Koka and Pathak, 2006).

Variable impact was found in Middle England Police and Middle England LEP, although assessed in different ways. Middle England Police measured objective performance outcomes. The toolset was used to secure internal resources to purchase and install two ANPR systems. Resistant actors preventing the allocation of resources

were converted to proactive ones. ANPR identifies vehicles of interest to the police, and the data is used as evidence in solving crimes by tracking the location and movement of vehicles and people. Identification is achieved by a vehicle passing an installed and activated camera, which alerts system headquarters. This triggers a further response, a patrol car stopping the vehicle.

Between 2010 and 2012, the first ANPR scheme identified 646,172 vehicles of interest to police, while the second ANPR scheme identified a further 423,285 vehicles. The ANPR Manager considers these numbers a success, because the two schemes did not exist prior to the use of the toolset and so there is no prior data. The schemes provided strong evidence in high-profile cases including murder, rape, wounding, major fraud, theft and armed robberies.

Middle England LEP was not able to measure objective performance outcomes because the UK coalition government (2010–2015) closed the national scheme funding the project, Building Schools for the Future, mid-way through the study (Department for Education, 2012). However, there are qualitative statements from project members that evidence success, for example: ‘And a lot of people felt that they had already invested time and it was great so far...’ (Performance Manager). Middle England LEP wanted to purchase the intellectual property of the toolset, endorsing its perceived monetary value and potential contribution to enhancing future performance.

Re-analysing the results identified a common sequence of four stages in both sites (Figure 1, horizontal axis) (Yin, 1994). Zahra and George’s (2002) AC model with a sequence of four stages was initially used to help explain innovation diffusion. Exploring how potential AC was realized over time and across projects in these two agencies induced further theory, focusing on routines and processes that actors and organizations use.

Figure 1 shows the different paths that Middle England Police (solid line) and Middle England LEP (dotted line) took, and the nodes (diamonds and squares) indicate the tension between curbing and enabling routines and the role of actors (described in the next section). By highlighting this tension, we can model how the sites understand and also overcome institutional barriers to building AC (Harvey *et al.*, 2010a). Only Middle England Police was able to sustain momentum by

diffusing the toolset innovation across three projects (Figure 1, vertical axis).

Next, we present the case data and outline how Zahra and George’s (2002) AC model needs to be modified in the public sector context (Vining, 2011). To reveal the wider UK and international potential of the data, this study’s results are presented alongside emerging public agency AC research (Béliveau, 2013; Easterby-Smith *et al.*, 2008; Hodgkinson, Hughes and Hughes, 2012). The data illustrates the contribution to AC theory – that is, realized AC organically develops in the two public agencies. The AC stages also provide empirical evidence for Osborne, Radnor and Strokosch’s (2016) emphasis that value is co-created by the iterative interactions of stakeholders with public service systems.

Building AC capability: Four stages in toolset co-creation and adoption

Stage 1: Knowledge co-creation. Zahra and George (2002) define acquisition as a firm’s capability to identify and acquire knowledge critical to its operations. By working with the transformation project, Middle England Police and Middle England LEP went beyond such knowledge acquisition by also being involved in both toolset co-creation and adoption (Osborne, Radnor and Strokosch, 2016).

Table 2 reveals that both organizations faced the same operational issue, namely, no available internal knowledge about how to address specific project problems due to poor leadership and lack of shared understanding. Zahra and George (2002) call this an activation trigger. In Middle England Police, in 2009, the ANPR Department’s internal reputation was low, so it could not secure internal resources to implement two ANPR systems. At senior levels, the situation was interpreted as poor leadership. A contributory factor was the lack of consensus about strategic goals. The ANPR Manager worked with the transformation project to achieve significant organizational change.

Middle England LEP, in 2009, could not process issues within the strategic team that had developed over time. The working environment was characterized by high project complexity, which needed an effective team to manage the BSF project. Weak shared understanding amongst the strategic team had compromised corporate communications.

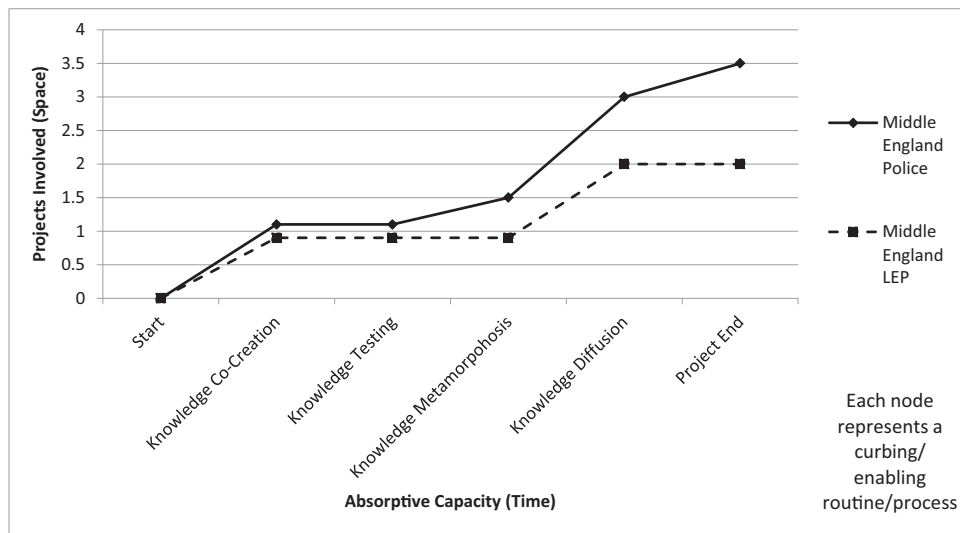


Figure 1. Toolset (innovation) diffusion

The toolset was created during the project workshops. An iterative process followed, until a stable version of the toolset and a supporting workbook were agreed. Middle England LEP adopted the toolset after monitoring the success of Middle England Police, which gave them confidence. Because Middle England Police were quickly adopting the toolset, Figure 1 places their line above that for Middle England LEP.

AC capability mechanisms. The project managers from Middle England Police and Middle England LEP actively participated in an inter-organizational opportunity group to co-create the toolset (Sun and Anderson, 2010). The group was a cross-functional interface which used the external resources of the transformation project (Jansen, Van den Bosch and Volberda, 2005). The external group supported the project managers in reconfiguring internal knowledge exploration processes (Lichtenthaler and Lichtenthaler, 2009).

Easterby-Smith *et al.* (2008) observe that AC can be a political act in which self-interested actors take advantage of moments in time to enact change; for example, the project managers from both public agencies seized the opportunity to collaborate with the recently funded transformation project. Middle England Police was consistently open to new ideas (Béliveau, 2013; Hodgkinson, Hughes and Hughes, 2012), having worked with the university team in a previous project and so formed relationships (Easterby-Smith *et al.*,

2008). Co-creation took place at the lower and operational level of Vining's (2011) hierarchy of 'politicality', where the project managers have the flexibility to meet service delivery goals in their preferred way.

Stage 2: knowledge testing. Zahra and George (2002) define assimilation as the firm's routines and processes that allow it to analyse, process, interpret and understand the information obtained. In this study, the co-created knowledge needed testing to ensure that the new toolset worked (Mulgan, 2006). As in the last stage, an enabling routine now counters a curbing routine; for example, Table 3 reveals that the project managers in Middle England Police and Middle England LEP feared university researchers would regularly be theoretical and not allow dialogue. From the start of the transformation project, the researchers were careful to avoid academic discourse and encourage debate in the workshops to maintain actor commitment.

In Middle England Police, as first adopter of the toolset, the ANPR Manager introduced various interrelated support activities: tight target setting, one-to-one coaching and investing time to learn about the product. Figure 1 maintains the line for Middle England Police being above that for Middle England LEP. The ANPR Manager created a short deadline for the completion of toolset testing so that he could meet his ANPR targets: project implementation in July 2010. The KTE individually and extensively coached the ANPR Manager.

Table 2. Knowledge co-creation

Actors	Routines and processes	Exemplifying quotations
Middle England Police	2009: No available internal knowledge to secure internal resources to implement two ANPR projects Situation described as: -poor leadership -lack of consensus about strategic goals	Poor leadership: ‘In the case of ANPR there was a lack of ownership and there was a lack of strategic vision’ (IT Contracts Manager) Lack of consensus: ‘People have got an end goal in mind and they are clear on what it is, but they won’t necessarily be the same end goal as their other colleagues have got and the more end goals you’ve got the more different directions your change will go’ (Corporate Programme Manager)
<i>Transformation project</i>	September 2009: ANPR Manager used external resources and joined the transformation project, West Midlands Business School, UK	
Middle England LEP	2009: No available internal knowledge to solve process issues in strategic team which had developed over time Situation described as: -high degree of project complexity - lack of shared understanding	High complexity: ‘Everybody recognizes that previous behaviours have created barriers in relationships and we needed to know how we might move that forward’ (Principal Transforming Education Manager) Lack of understanding: ‘They have come to realize that better and earlier engagement with their partners would mean better success for the project. They have come to acknowledge the project could do better’ (Transformation Manager)
<i>Transformation project</i>	September 2009: Strategic team used external resources – followed the lead of Middle England Police	

In Middle England LEP, the support activities focused on making the toolset more accessible to practitioners. Middle England LEP’s strategic team gave specific feedback to the research team about developing a user guide, which was subsequently written. This open and constructive relationship produced a learning community between the project partners.

AC capability mechanisms. The project managers in Middle England Police and Middle England LEP maintained that being part of external and internal supportive teams, which consisted of appropriate members and the teams, encouraged open dialogue (Sun and Anderson, 2010). Thus, Lewin, Massini and Peeters (2011) focus on the importance of ‘smart’ people, and Ferlie *et al.* (2005) stress the need for social interaction to generate trust and motivation to develop internal learning and change from externally oriented sources.

Easterby-Smith *et al.* (2008) and Hodgkinson, Hughes and Hughes (2012) highlight that public agencies rather than the private sector may be

more permeable to external knowledge; for example, because of pre-existing external professional links. Similarly, Middle England Police had professional links with the transformation project and so were able to move quickly to a deeper (pragmatic) level of engagement (Carlile, 2002, 2004), developing new practices through agreed set activities developed with local actors (Easterby-Smith *et al.*, 2008). In particular, the ANPR Manager applied the toolset, so showing it could work (Béliveau, 2013).

Stage 3: Knowledge metamorphosis. Zahra and George (2002) define transformation as a firm’s capability to develop and refine the routines that combine existing knowledge and the newly acquired and assimilated knowledge. It is a key stage in their model. Because of this project’s focus on co-creation (Osborne, Radnor and Strokosch, 2016), to embed the toolset post-testing within existing practice, it required knowledge metamorphosis rather than knowledge transformation. Transformation suggests a uniformly successful

Table 3. Knowledge testing

Actors	Routines and processes	Exemplifying quotations
Middle England Police	<p>September 2009: ANPR Manager feared the collaboration would be too academic</p> <p>October–November 2009: ANPR Manager implemented method of working and interrelated support mechanisms: -tight target setting -one-to-one coaching - investing time to learn about the product</p> <p>2009–2010: Toolset had to work to build confidence</p>	<p>Too academic: ‘I was incredibly worried that it [The Transformation Project] would be just theory and academia that would do little more than sort of further cloud any issues that we actually had, but by the second workshop, it was making sense to me’ (ANPR Manager, first interview)</p> <p>Targets: ‘I gave myself a target date of installation and project sign off at 31st July [2010] and I actually achieved it a week early’ (ANPR Manager, second interview)</p> <p>Coaching: ‘When I applied [the] toolset and when I drew the state map he [Knowledge Transfer Executive] came and sort of sat by me ... well we’ve just done that and it’s pants. Well it doesn’t work and it’s got to be changed and a lot of them were very minor changes, but those changes have happened dynamically. We have gone along and sort of developed the toolsets and I think now, they are exactly as I would want them to be’ (ANPR Manager, second interview)</p> <p>Time: ‘I invested half a day to come up with that state map. And it’s been my Bible for the last 6 months’ (ANPR Manager, second interview)</p> <p>Confidence: ‘The critical time was drawing the state map, I pinned it up on my wall, I looked at it, I had, in my head, I had a gap chart of things that needed to be done and when they needed to be done by ... that really was make or break time ... this has saved me so much time’ (ANPR Manager, first interview)</p>
Transformation project	<p>September 2009: Agreed a method of working and interrelated support mechanisms for ANPR Manager</p>	<p>Reassurance about approach: ‘If it’s for project managers, that immediately orientates the language we use when we describe concepts and ideas ... you don’t have to accept the language we’re using. If you find it more accessible and easier to use in your organization, use your own’ (Project Director, Workshop 1)</p>
Middle England LEP	<p>September 2009: Strategic team feared the collaboration would be too academic</p> <p>2009–2010: Strategic team implemented method of working, including giving specific feedback to research team about toolset improvement</p>	<p>Too academic: ‘If there is no sense of mutual recognition, as in a meeting where someone stands in the front to make a presentation which others have no opportunities to respond to, knowledge exchange becomes ineffective’ (Coordinator, Technology College)</p> <p>Feedback given: ‘Simplify the way it [the toolset] is written out. Maybe try to provide a user guide. Make it more flexible by automating some aspects, such that we can draw the map electronically’ (Performance Manager)</p> <p>Feedback taken: ‘Respect for the depth of knowledge, and generally a better awareness of the contribution of a research project to day-to-day work’ (Principal Transforming Education Manager)</p>
Transformation project	<p>September 2009: Agreed to trial the toolset and a method of working</p>	<p>See quotation for Middle England Police labelled above “Reassurance about approach”</p> <p>Trial the toolset: ‘From the project partners it was interesting to see how some of the others, Middle England Police for example, had transferred and applied that on a very small level using flip charts ... and gave us some confidence’ (Performance Manager)</p>

Table 4. Knowledge metamorphosis

Actors	Routines and processes	Exemplifying quotations
Middle England Police	All activities November–December 2009: ANPR Manager concerned that colleagues would not take the trouble to understand and adopt the toolset	Understand toolset: ‘This could be change for change sake. And therefore there would be resistance to it. If there are people having project management difficulties all over the place, then it’s clear that something isn’t working’ (ANPR Manager, first interview)
	Situation complicated by role of hierarchy within force (i.e. sergeants and PCs are operational, focused on catching criminals)	Hierarchy: ‘Sergeants and PCs are very operational, all they are bothered about really is catching the criminals and dealing with what comes day to day and they are very operationally focused ... Inspectors have a different role in that they tend to be more management’ (Deputy Chief Constable)
	ANPR Manager lobbied his team	Lobbying: ‘To some extent my unofficial deputy, John, it affects him. I explained it to him, what I was planning to do and how it works, which he found really interesting’ (ANPR Manager, second interview)
	Situation facilitated by spirit of meritocracy within force, which acts as a boundary spanner	Meritocracy: ‘We don’t really play on rank that much here, you know we don’t necessarily go on all the trimmings of rank and things ... it’s responsibility that’s important’ (Police Constable)
<i>Transformation project</i>	Support mechanisms in assimilation stage help secure success in this stage	Performance: ‘ANPR had quite a high success and looking over the individuals who are in that project was in itself a good result let alone rolling out the successes the project has had, so in that sense it’s been very very successful’ (Corporate Programme Manager)
Middle England LEP	All activities March–April 2010: Over-careful toolset deliberation	Over-careful: ‘We then looked at the power interest gridding of each of the actors. And this created a bit of a stumbling block; it took probably half an hour for each actor at first. Part of which was understanding the perspective of the actors, whether we should be rating somebody else as an actor or whether we should ask them for their perception of whether they were blockers, champions, supporters, indifferent’ (Performance Manager)
	Slower than expected progress	Slow progress: ‘We went straight into actor identification and we developed quite a long list of actors very quickly. I think within an hour we had identified 30, 40, 50 actors and the list was growing and growing so we had to cut it’ (Performance Manager)
	Situation complicated by cross-functional working within Middle England LEP	Cross-functional working: ‘What we need to be careful of is getting the right buy in and not pushing through the process rigidly to follow, being flexible to different people’s needs and understandings and perceptions of what we are trying to achieve’ (Performance Manager)
	Members of strategic team lobbied colleagues to continue	Lobbying: ‘And a lot of people felt that they had already invested time and it was great so far but they had other things to do, thanks can we move on. So we had to say “no, stop this is just the beginning, we haven’t got into the really good bit yet, it gets much better than that, this was just the first step”’ (Performance Manager)

(Continued)

Table 4. Knowledge metamorphosis

Actors	Routines and processes	Exemplifying quotations
	Effective discussions about strategy formulation: - vision - reflexivity - roles - impact	Vision: 'Effective where the people who facilitated the project have a clear vision of what needed to be, and they were able to communicate it' (Principal Transforming Education Manager) Reflexivity: 'We have been able to learn where people are coming from, while also letting them know where we are coming from' (Liaison, Middle England LEP and BSF) Roles: 'We also had looking at one particular actor what is their role in the project, and that threw up quite a lot of issues as to how well-defined people's roles are, and is that communicated to everyone, understands what they are there to do, what they are not there to do' (Performance Manager) Impact: 'It helps us focus attention on stakeholders who have the power to influence the scheme' (Development Manager)
<i>Transformation project</i>	Support mechanisms in assimilation stage help secure success in this stage	Performance: 'In the future we would be able to apply it to the project and do it sooner to help us plan and manage and prepare tactics for doing things. We can also avoid future complexities because now we have identified the various actors. It provides perspective, focus and saves time' (Coordinator, Technology College)

combining of the existing and new knowledge, however, this data indicates more variation (Teece, 1980). Table 4 reveals that Middle England Police and Middle England LEP had different problems in adapting their project routines. They found ways to overcome resistance, but a larger gap emerged between the two organizations in their AC pathway (Figure 1).

In Middle England Police, the toolset had to work or change would not happen. The ANPR Manager was concerned that his colleagues would not understand or adopt the toolset. To overcome resistance to the toolset, the ANPR Manager lobbied his team, beginning with his unofficial deputy. The spirit of meritocracy advocated by Middle England Police, which connects the different ranks within the force, facilitates such internal communication.

In contrast to Middle England Police, Middle England LEP applied the toolset more confidently, having learned from the ANPR Department. However, Middle England LEP's approach led to two emergent issues: over-careful deliberation about the toolset and slower than expected progress. Middle England LEP wanted to be clear about the methodology used, building on their collaborative organizational culture. Middle England

LEP invested much time to learn about the toolset and to identify actors and the power they held. The slow pace meant that members of the strategic team lobbied colleagues to continue. Nevertheless, there were positive outcomes: a clear vision is created here because the toolset encourages reflexive dialogue between project team members, and assumptions about people's roles were discussed at length, which enabled the team to explore the impact of each role.

AC capability mechanisms. Both project managers in Middle England Police and Middle England LEP promoted the toolset within their internal teams (Schleimer and Pedersen, 2013). The project managers experimented with new ideas, the toolset, to review existing routines and practices (Sun and Anderson, 2010). Although Eisenhardt and Martin (2000) identified cross-functional teams as an important element in AC, within the Middle England LEP, cross-functional working led to over-deliberation in toolset adoption and slower than expected progress.

Easterby-Smith *et al.* (2008, p. 497; supported by Béliveau, 2013) note that in their health case study there was a 'trade-off between internal and external boundaries: the weaker the external

boundaries, the stronger the internal boundaries'. Both Middle England Police and Middle England LEP faced similar issues. Hodgkinson, Hughes and Hughes (2012) indicate that communication channels can be built to overcome strong internal boundaries. The actors from Middle England Police and Middle England LEP had to work hard and lobby their colleagues to keep working towards transforming their services through the integration of the toolset with existing practices.

Stage 4: Knowledge diffusion. Zahra and George (2002) define exploitation as an organizational capability based on the routines that allow firms to refine existing competencies or to create new ones by incorporating acquired and transformed knowledge into their operations. This project wanted to see if the toolset could be diffused beyond the initial project team (Easterby-Smith *et al.*, 2008). In this stage, the different paces of AC that appeared in the metamorphosis stage were accelerated, with Middle England Police improving their performance due to the new knowledge acquired. Table 5 reveals that both Middle England Police and Middle England LEP, despite the success of the toolset, delayed future use, though eventually this did happen through further trialling in other internal projects (Figure 1).

In Middle England Police, in summer 2010, future use was delayed by considering whether it could be applied to bigger projects, and tighter budgets meant that the focus was on core policing not managerial innovation. Following further lobbying by the ANPR Manager, who stressed the success of the previous application, two other departments applied the toolset. Momentum was sustained by the incoming Deputy Chief Constable (2011–2014) endorsing the toolset in a knowledge impact video by the transformation project sponsor, which highlighted improved community safety between 2010 and 2012.

As with Middle England Police, despite the positive evaluation of the toolset, the cancellation of the BSF programme by central government in May 2010 (following a change in government) curtailed further toolset rollout. By October 2010, key members of Middle England LEP's strategic team from the private sector had left. The Coordinator (Technology College) now invited the transformation project to evaluate his teacher training social network – a project at the local level. Involvement with the transformation project ended after the evalu-

ation. The stronger longer-term impact from the toolset was with Middle England Police.

AC capability mechanisms. In Middle England Police, the Deputy Chief Constable (post 2011–2014) endorsed the toolset and suggested applying it further (Sun and Anderson, 2010). Knowledge diffusion was only possible because of the previous positive experience of using the toolset (Lewin, Massini and Peeters, 2011). The ANPR Manager, acting as a boundary spanner, engineered wider toolset diffusion (Raisch and Birkenshaw, 2008). The ANPR Manager appeared to have stronger and denser social connections to diffuse the toolset beyond his project to two more.

The actors in Easterby-Smith *et al.*'s (2008) case study enjoyed more success in knowledge spread, as AC became organization-wide. This was achieved by sharing internal developments and external insights through a weekly senior manager meeting and discussion forums within the hospital. In Béliveau's (2013) study, successful AC dissemination involved cascading the new knowledge downwards, from middle managers to clinical coordinators to clientele. In contrast, there was political resistance in Middle England Police from departmental managers outside ANPR, who initially opposed toolset diffusion. In Middle England LEP, policy change at the national level curtailed toolset diffusion (Vining, 2011).

In order to summarize the interplay of individual agency and organizational routines taking place during knowledge co-creation, testing, metamorphosis and diffusion, Table 6 captures the key curbing and enabling activities described in more detail in Tables 2–5. This is a cumulative process.

Additive theoretical contribution and concluding remarks

Our study explores the transfer of a strategic management model originally developed in the private sector to public agencies (Bryson, Berry and Yang, 2010). Could classic AC theory be used to explain the successful toolset diffusion in Middle England Police and more partial diffusion in Middle England LEP or does it need to be developed further (Damanpour and Schneider, 2008; Harvey *et al.*, 2010a, 2010b)? We suggest that we make two theoretical contributions to AC theory for public agencies.

Table 5. Knowledge diffusion

Actors	Routines and processes	Exemplifying quotations
Middle England Police	Summer 2010: Despite success of toolset and ANPR projects, future use delayed: - can it be used in bigger projects? - tighter budgets means that focus is on core policing not managerial innovation	Size of project: 'I could see how it wouldn't be so easy to use on a much bigger project with far more actors, I can kind of understand that, but for me it's perfect' (ANPR Manager, second interview) Core policing: 'We're at the point now where we are looking at change as an entity alongside all the other priorities and saying how much of this do we need ... most of the people within Middle England Police who have been involved with it up until now are kind of going in separate directions and it [may] become a wider success in other organizations without necessarily becoming part of the culture within Middle England Police' (Corporate Programme Manager)
Transformation project	Autumn 2010: ANPR Manager discussed the toolset with colleagues in two other departments to encourage toolset rollout – successful intervention leading to the spread of The Transformation Project across Middle England Police	
Middle England LEP	Despite the success of the toolset, future use suddenly curtailed due to: - cancellation of BSF programme (May 2010) - key members of strategic team from private sector leave (by October 2010)	'The government has set out plans to overhaul capital investment in England's schools. As part of this, we have announced the end of the Building Schools for the Future (BSF) programme' (Department for Education, 2012)
Transformation project	Associate member of strategic team, a teacher, invited The Transformation Project to evaluate his teacher training social network	

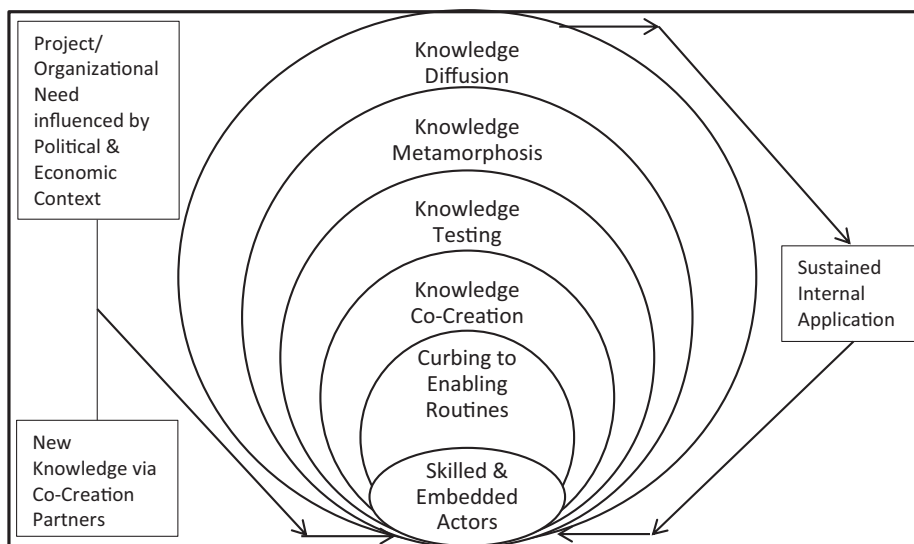


Figure 2. Absorptive capacity framework for public service organizations

First theoretical contribution – a new AC model

Like Lichtenthaler (2009), this study finds that high AC is associated with high performance when there is market-like turbulence, such as national government budget reductions (Kiefer et al., 2015; Vining, 2011). To capture how public agencies

innovate in response to these pressures, Zahra and George's (2002) AC model, which originated in the private sector, needs modifying to explain, in our case, the process of toolset diffusion across multiple public service parties (Middle England Police and Middle England LEP) (Vining, 2011). Figure 2 graphically represents a new model of an

Table 6. Realizing AC through actors, routines and processes

Knowledge co-creation (see Table 2)			Knowledge testing (see Table 3)		
<i>Middle England Police Curbing routine/process</i>	<i>Middle England LEP Curbing routine/process</i>	<i>Transformation project Enabling routine/process</i>	<i>Middle England Police Curbing routine/process</i>	<i>Middle England LEP Curbing routine/process</i>	<i>Transformation Project Enabling routine/process</i>
<ul style="list-style-type: none"> - Poor leadership - Lack of consensus 	<ul style="list-style-type: none"> - High complexity - Lack of understanding 	<ul style="list-style-type: none"> Middle England Police and Middle England LEP joined project 	<ul style="list-style-type: none"> Too academic <i>Enabling routine/process</i> - Targets - Coaching - Time - Confidence 	<ul style="list-style-type: none"> Too academic <i>Enabling routine/process</i> - Feedback given - Feedback taken 	<ul style="list-style-type: none"> - Reassurance about approach - Trial the toolset
<i>Middle England Police Curbing routine/process</i>	<i>Middle England LEP Curbing routine/process</i>	<i>Transformation Project Enabling routine/process</i>	<i>Middle England Police Curbing routine/process</i>	<i>Middle England LEP Curbing routine/process</i>	<i>Transformation Project Enabling routine/process</i>
<ul style="list-style-type: none"> - Understand toolset - Hierarchy 	<ul style="list-style-type: none"> - Over-careful - Slow progress - Cross-functional working 	<ul style="list-style-type: none"> Performance (i.e. toolset working) 	<ul style="list-style-type: none"> - Size of project - Core policing 	<ul style="list-style-type: none"> - Cancellation of BSF programme - Team from private sector leave 	<ul style="list-style-type: none"> Diffusion of toolset in Middle England Police and Middle England LEP
<i>Enabling routine/process</i>	<i>Enabling routine/process</i>				
<ul style="list-style-type: none"> - Lobbying - Meritocracy 	<ul style="list-style-type: none"> - Lobbying - Vision - Reflexivity - Roles - Impact 				
Knowledge metamorphosis (see Table 4)			Knowledge diffusion (see Table 5)		

absorptive capacity framework for public service organizations, extending Zahra and George’s (2002) work by identifying four new processes (Easterby-Smith et al., 2008).

The first new feature of this model refocuses attention away from the view that the overall environment determines the incentives for investing in AC (Cohen and Levinthal, 1990; Lane, Koka and Pathak, 2006; Van den Bosch, Volberda and de Boer, 1999) to the view that AC development in local public agencies is specifically influenced by major political and economic changes and pressures from national government (Damanpour and Schneider, 2008). Vining (2011) distinguishes between levels of political influence on local agencies. At the national level, the government axed the LEP programme, which meant that Middle England LEP, after initial and successful toolset adoption, suspended toolset application. At the

local level, Middle England Police allocated limited resources through internal competition. The ANPR Manager had already been unsuccessful several times, preventing the purchase and installation of ANPR infrastructure. To build a case to win, he concluded that external help was required, which led to new knowledge being co-created in the form of a toolset.

The second new feature in our model develops Zahra and George’s (2002) concept of an activation trigger to set AC in motion. In this study, richer detail is added to Zahra and George’s (2002, p. 194) observation that ‘some triggers may require a different type of knowledge that is not available within the firm or is not easily acquired on the market’. One different knowledge area found here is the toolset, because project managers from within and outside the public agencies co-created it (Osborne, Radnor and Strokosch,

2016). Bryson, Berry and Yang (2010; Butler, 2008, 2013) stress the role of cross-boundary groups in practice-based research – they share diverse views and create new knowledge. Key values underpin such groups within public agencies; for example, they productively participate in toolset development to address project needs (Taylor-Phillips *et al.*, 2014). This data suggests that co-creation needs incorporating within AC theory to address the specific circumstances that Zahra and George (2002) highlight.

The third and important new feature in our novel process model highlights the organic development of AC capability in the two public agencies over time. Our term ‘organic’ draws on Omidvar, Edler and Malik’s (2017) critique of AC literature, which they view as too static and firm-centred – it suggests there is a stock of knowledge to be exchanged between two firms. Instead, they find in practice a cumulative and less predictable convergence of prior and new knowledge that can lead to the creation of new products, such as our example of the toolset. Lane, Koka and Pathak (2006) also critique Zahra and George (2002, p. 855) for depicting AC ‘as a pipeline based on efficient knowledge exploitation’, which creates short-term thinking. To capture the long-term dynamism of AC, Zahra and George’s (2002) four dimensions of knowledge (acquisition, assimilation, transformation and exploitation) are here relabelled as co-creation, testing, metamorphosis and diffusion. Having created the toolset, the project managers, as skilled actors, tested and eventually diffused the new knowledge by applying the toolset to solve local and specific needs. Incrementally, curbing routines were challenged and converted to enabling routines (depicted in Figure 2 as concentric circles) (Omidvar, Edler and Malik, 2017). If the investment does not occur at this point, it will be hard to exploit in the future (Cohen and Levinthal, 1990; Harvey *et al.*, 2010a, 2010b; Lane, Koka and Pathak, 2006; Van den Bosch, Volberda and de Boer, 1999) – so there is path dependency (Butler and Allen, 2008).

The fourth new feature revises Zahra and George’s (2002) concept of AC being a competitive advantage in which knowledge is low in appropriability, being hard to imitate because of barriers to information disclosure. In this study of public agencies, there was sustained toolset application because new knowledge was shared between organizational partners (hence the arrow

leading back to the base of the concentric circles) (Osborne, Radnor and Strokosch, 2016).

Second theoretical contribution – AC is realized throughout the AC process

Zahra and George’s (2002) model emphasized organizational routines and strategic processes which exploit knowledge for value creation. The second theoretical contribution runs counter to Zahra and George’s (2002) argument in two ways. First, realized AC does not start in their knowledge transformation dimension (Zahra and George, 2002); instead, the process exists in all AC stages (co-creation, testing, metamorphosis and diffusion), in which curbing organizational routines need to be countered by enabling routines for AC to be realized. These are captured in the new absorptive capacity framework for public service organizations and Table 6.

Second, organizational routines and strategic processes are activated by skilled and embedded actors (project managers) who recognize problems, direct resources and reshape organizational structures and systems (Teece, 2007). Public agencies seem adept at this process (Hodgkinson, Hughes and Hughes, 2012), utilizing symbolic (Béliveau, 2013) and episodic (Easterby-Smith *et al.*, 2008) power. In particular, this study supports the AC research of Béliveau (2013) and builds on that of Easterby-Smith *et al.* (2008).

Easterby-Smith *et al.* (2008) and Hodgkinson, Hughes and Hughes (2012) argue that external organizational boundaries are more permeable in public agencies. Easterby-Smith *et al.* (2008) highlight systematic procedures to interface with local politicians and funding authorities. In contrast, project managers from Middle England Police and Middle England LEP were able to alter project practice at a specific point in time, when the transformation project had just won funding to help organizations seeking to innovate in change (Easterby-Smith *et al.*, 2008). Easterby-Smith *et al.* (2008) found episodic power was used internally to enhance new knowledge diffusion.

Like Béliveau (2013; Huxham and Vangen, 2000), symbolic power was utilized by the project managers who became champions of the behaviours expected during the AC process and, as a consequence, were involved in changing their teams’ scripts (Johnson, Smith and Codling,

2000). Scripts are cognitive schema informing the behaviour and routines appropriate in particular institutional contexts (Barley and Tolbert, 1997). This is a recursive process of institutional innovation, conflict, stability and restabilization (Zietsma and Lawrence, 2010). At the project level, organizations can circumvent traditional barriers (boundaries) to innovation because they do not pose a threat to vested interests – as they are a low-cost experiment, probably of limited duration (DeFillippi, 2002; Easterby-Smith *et al.*, 2008; Sydow, Lindkvist and DeFillippi, 2004).

Practice contributions, study limitations and future research

There are also some practice contributions from our study about how public managers can successfully negotiate the tension between their choices and how they are constrained (Cornelissen and Durand, 2014; Damanpour and Schneider, 2008). This study has enhanced our clarity of understanding about the process of successful public agency co-creation, which to this point has few empirical examples (Osborne, Radnor and Strokosch, 2016). It has revealed the importance of individual and collective routines and processes linked to a new absorptive capacity framework for public service organizations (Figure 2), which outlines the transformation of a project need into new knowledge that can be utilized by projects external to the original network of partners (Table 6).

One limitation of our small-scale study is that it focuses on only two public agencies. The research design, however, increased external validity through academic heterogeneity (a team of researchers conducted the studies) and organizational diversity (two organizations were investigated longitudinally). Another limitation is that action research involves the researcher participating in the study (Harris, 2008). Here, action research is robustly underpinned by theory informing the research (the master frame here is AC) (Eden and Huxham, 2002).

Future testing of the research findings is linked to the theoretical contributions. First, can the new absorptive capacity framework for public service organizations be applied more widely to explain innovation diffusion in other public service contexts? This study focused on an English police force, a local education partnership and the

links to previous research in health and leisure, but other public services could be investigated and in international locations. Second, do future studies also find that realized AC starts in knowledge co-creation and then cumulatively builds in later stages (testing, metamorphosis and diffusion)? As Ferlie *et al.* (2005) highlight, it is important to clarify under what conditions innovations spread, given that there is a policy focus on performance, meaning that management knowledge is at a premium for public agencies.

Appendix: General data framework

Themes	Categories
Project implementation issues/problems	Co-creation
Project implementation solutions	
Communication between academics and practitioners	Knowledge testing
Supported trialling of toolset adoption	
Project manager activity to accelerate toolset adoption	Knowledge metamorphosis
Assessing toolset adoption performance	
Issues/problems with sharing new knowledge	Knowledge diffusion
Opportunities for sharing new knowledge	

References

- Anonymous (2013). 'The transformation project: transferring knowledge to transform project management practice', ESRC End of Award Report, res-189-25-0025. Swindon: ESRC.
- Barley, S. J. and P. S. Tolbert (1997). 'Institutionalization and structuration: studying the links between action and institution', *Organization Studies*, **18**, pp. 93–117.
- Barney, J. (1991). 'Firm resources and sustained competitive advantage', *Journal of Management*, **17**, pp. 99–120.
- Barney, J. B. and D. N. Clark (2007). *Resource-Based Theory: Creating and Sustaining Competitive Advantage*. Oxford: Oxford University Press.
- Béliveau, J. (2013). 'Middle managers' role in transferring person-centred management and care', *The Service Industries Journal*, **33**, pp. 1345–1362.
- Bryson, J. M., F. Ackermann and C. Eden (2007). 'Putting the resource-based view of strategy and distinctive competencies to work in public organizations', *Public Administration Review*, **67**, pp. 702–717.
- Bryson, J. M., F. S. Berry and K. Yang (2010). 'The state of public strategic management research: a selective literature review and set of future directions', *The American Review of Public Administration*, **40**, pp. 495–521.

- Butler, M. J. R. (2008). 'Neuromarketing and the perception of knowledge', *Journal of Consumer Behaviour*, **7**, pp. 415–419.
- Butler, M. J. R. (2013). 'Operationalizing interdisciplinary research – a model of co-production in organizational cognitive neuroscience', *Frontiers in Human Neuroscience*, <https://doi.org/10.3389/fnhum.2013.00720>.
- Butler, M. J. R. and P. Allen (2008). 'Understanding policy implementation processes as self-organizing systems', *Public Management Review*, **10**, pp. 421–440.
- Carlile, P. R. (2002). 'A pragmatic view of knowledge and boundaries: boundary objects in New Product Development', *Organization Science*, **13**, pp. 442–455.
- Carlile, P. R. (2004). 'Transferring, translating, and transforming performing: an integrative framework for managing knowledge across boundaries', *Organization Science*, **15**, pp. 555–568.
- Cohen, W. M. and D. A. Levinthal (1990). 'Absorptive capacity: a new perspective on learning and innovation', *Administrative Science Quarterly*, **35**, pp. 128–152.
- Cornelissen, J. P. and R. Durand (2014). 'Moving forward: developing theoretical contributions in management studies', *Journal of Management Studies*, **51**, pp. 995–1022.
- Damanpour, F. and M. Schneider (2008). 'Characteristics of innovation and innovation adoption in public organizations: assessing the role of managers', *Journal of Public Administration Research and Theory*, **19**, pp. 495–522.
- DeFillippi, R. J. (2002). 'Information technology and organizational models for project collaboration in the new economy', *Human Resource Planning*, **25**, pp. 7–18.
- Denhardt, R., J. Denhardt and M. Aristigueta (2002). *Managing Human Behaviour in Public and Nonprofit Organizations*. Thousand Oaks, CA: Sage.
- Department for Education (2012). *Building Schools for the Future (BSF)*. Available at <http://webarchive.nationalarchives.gov.uk/20130123124929/http://www.education.gov.uk/schools/adminandfinance/schoolscapital/funding/bsf/> [accessed 27 October 2015].
- Dyer, J. H. and H. Singh (1998). 'The relational view: cooperative strategy and sources of interorganizational competitive advantage', *Academy of Management Review*, **23**, pp. 660–679.
- Easterby-Smith, M., R. Thorpe and P. R. Jackson (2008). *Management Research*. London: Sage.
- Easterby-Smith, M., G. Manuel, E. Antonacopoulou and J. Ferdinand (2008). 'Absorptive capacity: a process perspective', *Management Learning*, **39**, pp. 1350–5076.
- Eden, C. and C. Huxham (2002). 'Action research'. In D. Partington (ed.), *Essential Skills for Management Research*, pp. 254–272. London: Sage.
- Eisenhardt, K. (1989). 'Building theories from case study research', *Academy of Management Review*, **14**, pp. 532–550.
- Eisenhardt, K. M. and J. A. Martin (2000). 'Dynamic capabilities: what are they?', *Strategic Management Journal*, **21**, pp. 1105–1121.
- Evered, R. and M. Louis (1981). 'Alternative perspectives in the organizational sciences: "inquiry from the inside" and "inquiry from the outside"', *Academy of Management Review*, **6**, pp. 385–396.
- Ferlie, E., L. Fitzgerald, M. Wood and C. Hawkins (2005). 'The (non) spread of innovations: the mediating role of professionals', *Academy of Management Journal*, **48**, pp. 117–134.
- Golden-Biddle, K. and K. Locke (1997). *Composing Qualitative Research*. Thousand Oaks, CA: Sage.
- Hansen, J. R. and C. B. Jacobsen (2016). 'Changing strategy processes and strategy content in public sector organizations? A longitudinal case study of NPM reforms' influence on strategic management', *British Journal of Management*, **27**, pp. 373–389.
- Harris, E. (2008). 'Action research'. In R. Thorpe and R. Holt (eds), *The SAGE Dictionary of Qualitative Management Research*, pp. 17–19. London: Sage.
- Harvey, G., P. Jas, K. Walshe and C. Skelcher (2010a). 'Absorptive capacity: how organizations assimilate and apply knowledge to improve performance'. In K. Walshe, G. Harvey and P. Jas (eds), *Connecting Knowledge and Performance in Public Services: From Knowing to Doing*, pp. 226–250. Cambridge: Cambridge University Press.
- Harvey, G., C. Skelcher, E. Spencer, P. Jas and K. Walshe (2010b). 'Absorptive capacity in a non-market environment', *Public Management Review*, **12**, pp. 77–97.
- Harvey, G., L. Fitzgerald, S. Fielden, A. McBride, H. Waterman, D. Bamford et al. (2011). 'The NIHR Collaboration for Leadership in Applied Health Research and Care (CLAHRC) for Greater Manchester: combining empirical, theoretical and experiential evidence to design and evaluate a large-scale implementation strategy', *Implementation Science*, <https://doi.org/10.1186/1748-5908-6-96>.
- Hodgkinson, I. R., P. Hughes and M. Hughes (2012). 'Absorptive capacity and market orientation in public service provision', *Journal of Strategic Marketing*, **20**, pp. 211–229.
- Horne, M. and T. Shirley (2009). *Co-production in Public Services*. London: Cabinet Office.
- Hughes, M., R. E. Morgan, R. D. Ireland and P. Hughes (2014). 'Social capital and learning advantages: a problem of absorptive capacity', *Strategic Entrepreneurship Journal*, **8**, pp. 214–233.
- Huxham, C. and S. Vangen (2000). 'Leadership in the shaping and implementation of collaboration agendas: how things happen in a (not quite) joined-up world', *Academy of Management Journal*, **43**, pp. 1159–1175.
- Huxham, C. and S. Vangen (2003). 'Researching organizational practice through action research: case studies and design choices', *Organizational Research Methods*, **6**, pp. 383–403.
- Huxham, C. and S. Vangen (2005). *Managing to Collaborate: The Theory and Practice of Collaborative Advantage*. Abingdon: Routledge.
- Jacobson, N., D. Butterill and P. Goering (2004). 'Organizational factors that influence university-based researchers' engagement in knowledge transfer activities', *Science Communication*, **25**, pp. 246–259.
- Jansen, J. J. P., F. A. J. Van den Bosch and H. W. Volberda (2005). 'Managing potential and realized absorptive capacity: how do organizational antecedents matter?', *Academy of Management Journal*, **48**, pp. 999–1015.
- Jarzabkowski, P. and J. Balogun (2009). 'The practice and process of delivering integration through strategic planning', *Journal of Management Studies*, **46**, pp. 1255–1288.
- Johnson, G., S. Smith and B. Codling (2000). 'Microprocesses of institutional change in the context of privatization', *Academy of Management Review*, **25**, pp. 572–580.
- Jones, O. (2006). 'Developing absorptive capacity in mature organizations: the change agent's role', *Management Learning*, **37**, pp. 355–376.
- Kiefer, T., J. Hartley, N. Conway and R. B. Briner (2015). 'Feeling the squeeze: public employees' experiences of cutback and innovation-related organizational changes following a

- national announcement of budget reductions', *Journal of Public Administration Research and Theory*, **25**, pp. 1279–1305.
- Koza, M. P. and A. Y. Lewin (1998). 'The co-evolution of strategic alliances', *Organization Science*, **9**, pp. 255–264.
- Lane, P. J. and M. Lubatkin (1998). 'Relative absorptive capacity and interorganizational learning', *Strategic Management Review*, **19**, pp. 461–477.
- Lane, P. J., B. R. Koka and S. Pathak (2006). 'The reification of absorptive capacity: a critical review and rejuvenation of the construct', *Academy of Management Review*, **31**, pp. 833–863.
- Langley, A. (1999). 'Strategies for theorizing from process data', *Academy of Management Review*, **24**, pp. 691–710.
- Lewin, A. Y., S. Massini and C. Peeters (2011). 'Microfoundations of internal and external absorptive capacity routines', *Organization Science*, **22**, pp. 81–98.
- Lichtenthaler, U. (2009). 'Absorptive capacity, environmental turbulence, and the complementarity of organizational learning processes', *Academy of Management Journal*, **52**, pp. 822–846.
- Lichtenthaler, U. and E. Lichtenthaler (2009). 'A capability-based framework for open innovation: complementing absorptive capacity', *Journal of Management Studies*, **46**, pp. 1315–1338.
- McManners, P. (2016). 'The action research case study approach: a methodology for complex challenges such as sustainability in aviation', *Action Research*, **14**, pp. 201–216.
- Miles, M. and A. Huberman (1994). *An Expanded Sourcebook Qualitative Data Analysis*. London: Sage.
- Mulgan, G. P. (2006). 'The process of social innovation', *Innovations*, Spring, pp. 145–162.
- Noblet, J.-P., E. Simon and R. Parent (2011). 'Absorptive capacity: a proposed operationalization', *Knowledge Management Research and Practice*, **9**, pp. 367–377.
- Nonaka, I. and H. Takeuchi (1995). *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*. New York: Oxford University Press.
- Omidvar, O., J. Edler and K. Malik (2017). 'Development of absorptive capacity over time and across boundaries: the case of R&D consortia', *Long Range Planning*, **50**, pp. 665–683.
- Osborne, S. and L. Brown (2011). 'Innovation, public policy and public services delivery in the UK: the word that would be king?', *Public Administration*, **89**, pp. 1335–1350.
- Osborne, S. P. and K. Strokosch (2013). 'It takes two to tango? Understanding the co-production of public services by integrating the services management and public administration perspectives', *British Journal of Management*, **24**, pp. S31–S47.
- Osborne, S. P., Z. Radnor and K. Strokosch (2016). 'Co-production and the co-creation of value in public services: a suitable case for treatment', *Public Management Review*, **18**, pp. 639–653.
- Parent, R., M. Roy and D. St-Jacques (2007). 'A systems-based dynamic knowledge transfer capacity model', *Journal of Knowledge Management*, **11**, pp. 81–93.
- Payne, A., K. Storbacka and P. Frow (2008). 'Managing the co-creation of value', *Journal of the Academy of Marketing Science*, **36**, pp. 83–96.
- Pettigrew, A. (1990). 'Longitudinal field research on change theory and practice', *Organization Science*, **1**, pp. 267–292.
- Pettigrew, A. (1997). 'What is processual analysis?', *Scandinavian Journal of Management*, **13**, pp. 337–348.
- Pettigrew, A. M. (2011). 'Scholarship with impact', *British Journal of Management*, **22**, pp. 347–354.
- Pettigrew, A. M. (2012). 'Context and action in the transformation of the firm: a reprise', *Journal of Management Studies*, **49**, pp. 1304–1328.
- Radaelli, G. and L. Sitton-Kent (2016). 'Middle managers and the translation of new ideas in organizations: a review of micro-practices and contingencies', *International Journal of Management Reviews*, **18**, pp. 311–332.
- Raisch, S. and J. Birkenshaw (2008). 'Organizational ambidexterity: antecedents, outcomes, and moderators', *Journal of Management*, **34**, pp. 375–409.
- Safavi, M. and O. Omidvar (2016). 'Resist or comply: the power dynamics of organizational routines during mergers', *British Journal of Management*, **27**, pp. 550–566.
- Sanders, E. B.-N. and P. J. Stappers (2008). 'Co-creation and the new landscape of design', *CoDesign*, **4**, pp. 5–18.
- Schleimer, S. C. and T. Pedersen (2013). 'The driving forces of subsidiary absorptive capacity', *Journal of Management Studies*, **50**, pp. 646–672.
- Spyridonidis, D., G. Currie, S. Heusinkveld, K. Strauss and A. Sturdy (2016). 'The translation of management knowledge: challenges, contributions and new directions', *International Journal of Management Reviews*, **18**, pp. 231–235.
- Sun, P. Y. T. and M. H. Anderson (2010). 'An examination of the relationship between absorptive capacity and organizational learning, and a proposed integration', *International Journal of Management Reviews*, **12**, pp. 130–150.
- Sydow, J., L. Lindkvist and R. DeFillippi (2004). 'Project-based organizations, embeddedness and repositories of knowledge: editorial', *Organization Studies*, **25**, pp. 1475–1489.
- Taylor-Phillips, S., A. Clarke, A. Grove, J. Swan, H. Parsons, E. Gkeredakis et al. (2014). 'Coproduction in commissioning decisions: is there an association with decision satisfaction for commissioners working in the NHS? A cross-sectional survey 2010/2011', *BMJ Open*, <https://doi.org/10.1136/bmjopen-2014-004810>.
- Teece, D. J. (1980). 'Economics of scope and the scope of the enterprise', *Journal of Economic Behavior and Organization*, **1**, pp. 223–247.
- Teece, D. J. (2007). 'Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance', *Strategic Management Journal*, **28**, pp. 1319–1350.
- Van den Bosch, F. A. J., H. W. Volberda and M. de Boer (1999). 'Coevolution of firm absorptive capacity and knowledge environment: organizational forms and combinative capabilities', *Organization Science*, **10**, pp. 551–568.
- Vining, A. R. (2011). 'Public agency external analysis using a modified "Five Forces" framework', *International Public Management Journal*, **14**, pp. 63–105.
- Volberda, H. W., N. J. Foss and M. A. Lyles (2010). 'Absorbing the concept of absorptive capacity: how to realize its potential in the organizational field', *Organization Science*, **21**, pp. 931–951.
- Yin, R. K. (1994). *Case Study Research: Design and Methods*, 2nd edn. Thousand Oaks, CA: Sage.
- Zahra, S. A. and G. George (2002). 'Absorptive capacity: a review, reconceptualization, and extension', *Academy of Management Review*, **27**, pp. 185–203.
- Zahra, S. A., R. L. Priem and A. A. Rasheed (2005). 'The antecedents and consequences of top management fraud', *Journal of Management*, **31**, pp. 803–828.

Zietsma, C. and T. B. Lawrence (2010). 'Institutional work in the transformation of an organizational field: the interplay of boundary work and practice work', *Administrative Science Quarterly*, **55**, pp. 189–221.

Michael Butler is Reader in Transformational Change and Founder/Director of 'The Transformation Project' (www.thetransformationproject.co.uk), Aston Business School, UK. He is passionate about understanding organizational change from a multidisciplinary perspective (institutional, biological and historical) and has published in leading management and organization journals. He has also co-written and co-edited three books. His engaged scholarship has been recognized (CMI and ESRC) and the OECD used his research to evaluate international policy implementation.

Ewan Ferlie is Professor of Public Services Management at King's Business School, London, UK. He has published widely on processes of organizational change and restructuring in public service settings, notably in healthcare and higher education. He is co-editor of the *Oxford Handbook of Public Management* and co-author of a new monograph on managed networks in healthcare, also published by Oxford University Press.