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Mark Easterby-Smith, Manuel Graça, Elena Antonacopoulou and Jason Ferdinand

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What is This?

Mark Easterby-Smith
Lancaster University, UK

Manuel Graça
University of Porto, Portugal

Elena Antonacopoulou
University of Liverpool, UK

Jason Ferdinand
University of Liverpool, UK

Absorptive Capacity: A Process Perspective

Abstract   *Absorptive capacity is regarded as an important factor in both corporate innovation and general competitive advantage. The concept was initially developed largely from reviews of the literature and has subsequently been extended by empirical studies, although some people suggest that progress since 1990 has been disappointing. This article argues that this limited development results from the dominance of quantitative studies which have failed to develop insights into the processes of absorptive capacity, and builds on recent qualitative studies which have successfully opened up new perspectives. Using case studies drawn from three different sectors, the article argues that a process perspective on absorptive capacity should include the role of power in the way knowledge is absorbed by organizations, and provide better understanding of the nature of boundaries within and around organizations.* **Key Words:** *absorptive capacity; boundaries; dynamic capabilities; organizational learning; politics*

Absorptive capacity refers to the ability to locate new ideas and to incorporate them into an organization's processes, and this is widely seen as a major contributor to organizational performance (Cohen and Levinthal, 1990; Zahra and George, 2002). Theoretically, it is located between the fields of dynamic capability (Teece et al., 1997; Zollo and Winter, 2002), organizational learning (Akgun et al., 2003; Easterby-Smith, 1997) and knowledge management (Chiva and Allegre,

2005; Oshri et al., 2006). On the one hand, it draws attention to the need to appreciate and acquire knowledge from the external environment, especially from acquisitions and other inter-organizational relations; on the other hand, it focuses on internal processes of learning from past experience and current actions.

Research to date has been dominated by quantitative studies which have inferred the attributes and dynamics of absorptive capacity across significant numbers of organizations, and recent work has included studies of innovation networks (Adams et al., 2006; Hagedoorn et al., 2006; Phene et al., 2006) and knowledge transfer within alliances (Kim and Inkpen, 2005; Zhao et al., 2005). However, few studies have examined the internal processes of absorptive capacity (Jansen et al., 2005). This article builds on recent studies (Jones, 2006; Zahra and George, 2002) that have started to adopt a process perspective. We start with a review of the literature which identifies weaknesses and gaps in the current concept of absorptive capacity. Through analysis of our data we confirm some features of current thinking and add two important features, power and boundaries, which have largely been neglected by past scholars; we finish with a discussion of the wider implications for theory. The distinctive contribution of the article, therefore, lies in the further development of a process perspective on absorptive capacity through the use of qualitative case studies.

Research into Absorptive Capacity

Cohen and Levinthal (1989: 569–70) first coined the term 'absorptive capacity', defining it as: 'the firm's ability to identify, assimilate and exploit knowledge from the environment'. In their heavily cited article from the following year, Cohen and Levinthal (1990), summarize insights from individual learning theory which are then translated into the organizational context. In particular, they note the principle that prior knowledge tends to enhance subsequent learning because memory is associative. At the organizational level, they see the acquisition of new knowledge as being mediated by individual gatekeepers and boundary-spanners, ideally distributed around the organization and possessing diverse expertise and contacts. Moreover, the diversity of internal perspectives is important because excessive homogeneity of internal views can lead to resistance to external ideas.

Over the last two decades, the idea has been revisited both conceptually and em-pirically by a large number of authors. In their comprehensive review of the literature, Lane et al. (2006) provide two main critiques of the way the construct has developed since 1989. First, the majority of the citations to Cohen and Levinthal (1990) are passing references, with little or no discussion of absorptive capacity. Of the 289 articles in leading peer-reviewed journals which they analysed, just 64 discuss the concept fully, and only four make a significant attempt to extend the concept. Their analysis of inter-citations between the articles shows that the majority do not cite each other at all, and only six articles averaged more than one inter-citation per annum. They conclude that developments of the construct have been neither cumulative nor coherent, resulting in reification, where it becomes a taken-for-granted concept that no longer gets examined closely or critically.

Their second criticism follows from the observation of reification. Cohen and Levinthal focused their empirical work around research and development (R&D), although their conceptual discussion of absorptive capacity was broader, covering individual cognitive factors as well as other organizational processes such as the 'not-invented-here syndrome'. However, the R&D focus has come to dominate the subsequent literature, and in the view of Lane et al. (2006), this provides a technological emphasis at the expense of process-oriented knowledge such as managerial techniques, marketing knowledge and manufacturing know-how.

We agree with the latter point, but suggest an alternative explanation of the 'reification' observation. The examples given in Lane et al. (2006) appear to be quantitative studies, and it is therefore possible that the lack of development of the concept of absorptive capacity results from the dominant use of research methods which are more appropriate for testing, rather than developing, theory. If so, then new ideas and perspectives are far more likely to be added if qualitative methods are used to examine absorptive capacity. Furthermore, although they suggest that future studies should explore absorptive capacity in non-R&D contexts, they make no mention of different industrial sectors, or the possibility that absorptive capacity would be of interest within the public sector. These features provide opportunities which we attempt to exploit in the current article: by adopting qualitative rather than quantitative methods; and by examining absorptive capacity in diverse organizational contexts.

We also build on two further articles which have started to develop a process view of absorptive capacity. Zahra and George (2002) develop a model which concentrates on the *internal* processes of absorptive capacity, adding two main refinements to the original concept proposed by Cohen and Levinthal (1989, 1990). First, they distinguish between potential absorptive capacity, which includes acquisition and assimilation capabilities, and realized absorptive capacity, which includes transformation and exploitation capabilities. Second, they specify and elaborate on internal processes, such as activation triggers and social integration mechanisms which aid the movement of knowledge within the firm. Activation triggers may include both internal crises and external market changes; and social integration mechanisms can include social structures that promote greater employee interaction and knowledge management systems.

The second article is the empirical study by Jones (2006), which adds an agency perspective to the structural concerns of Zahra and George (2002). It is a longitudinal qualitative study about the introduction of new techniques and methods into a medium-sized British company faced with the need to respond to radical changes in the market. Jones demonstrates how newly recruited managers played gatekeeper roles, importing new ideas from outside. It was through the proactive agency of these individuals that the boundary between the organization and its environment was spanned. The article is therefore important because it provides concrete examples of the political processes of absorptive capacity, to which Cohen and Levinthal (1990) provide brief reference.

We summarize in Table 1 how these recent articles have added to the original concept proposed by Cohen and Levinthal (1990).

Table 1   Key concepts of absorptive capacity

Concept	Authors
Recognize, assimilate and use external knowledge	Cohen and Levinthal (1990)
Relevance of internal knowledge base	Cohen and Levinthal (1990)
Boundary spanning and gatekeeping	Cohen and Levinthal (1990)
Activation triggers	Zahra and George (2002)
Social integration mechanisms	Zahra and George (2002)
Individual agency	Jones (2006)

Research Design

Our research design draws on data from three separate organizations, each in a different industry. These studies formed part of a wider research project on dynamic capabilities, which used multiple sub-cases and stories about aspects of innovation, knowledge flows, organizational change and strategic learning. They were also longitudinal studies because we gathered 'live' data by tracking the evolution of major changes and innovations between 2003 and 2005 (and to some extent we are continuing to follow the stories at the time of writing), and this is set into the context of having personal contacts with key managers in each of the organizations going back many years, generally more than half the life of the current organization. This provided a historical perspective, enabling us to see how priorities and issues rise and fall.

The rationale for restricting the sample to three organizations was that we wanted to examine in some depth the flow and application of new ideas over time. At the same time, the organizations were located in different industries because we wanted to broaden the model through examining absorptive capacity processes in very different organizational contexts. The three organizations are, in increasing order of size, an Internet business (WebCo), a hospital trust (HealthCo) and a multinational chemical company (ChemCo). The first two are UK organizations; the third has headquarters in continental Europe, although our research site was a plant based in the UK. We provide more information on each one later.

Data collection was mainly through semi-structured interviews, supplemented by documentary sources, observation of meetings, organizational systems and production processes (Table 2). We observed three formal meetings in HealthCo, plus a number of informal interactions in the workplace because we were given relative freedom to roam around the organization. In the two private organizations security was much tighter: our movements were more constrained, with interviews taking place in designated rooms, and plant tours only under supervision. Periodically, we met with one or two of our key contacts in each organization to share our emergent impressions, to check the accuracy of data and to identify further areas of investigation. Each of these meetings was recorded. The initial sampling of informants included senior management and members of two operational groups.

Almost all interviews were conducted by at least two of the authors; they were semi-structured using a checklist of questions about change, flexibility, new

Table 2 Fieldwork details

	WebCo	HealthCo	ChemCo
No. employees	200	2500	600 (20,000 in wider organization)
Interviews	18 (4 senior managers; 7 middle managers/ supervisors; 7 sales/ technical specialists)	31 (11 senior managers/ clinicians; 7 matrons/ middle managers; 13 nurses/sisters)	23 (7 senior managers 12 middle/junior managers 4 technicians/ operatives)
Other data	Website, audited accounts; newspapers	Audit data and group observations	Regular contact since 1984 with other parts of the company
Data collection	2003–2006	2003–2005	2003–2006

innovations and the sources of new ideas. We focused both on internal and external sources of information, and on the processes leading to the adoption and implementation of particular ideas. Interviews were recorded and transcribed, and preliminary analysis was conducted by reading the interview transcripts in hard copy. Illustrative quotes were identified by searching transcripts which had been saved in NVivo and were coded using broad categories, roughly paragraph-by-paragraph rather than line-by-line, because our focus was on reconstructing broad organizational stories rather than specific discourse.

Because our analytic focus was on events and stories, it was 'grounded' in the sense that themes were identified in an open way from the data. But we did not follow the full process of grounded theory, including theoretical sampling (Locke, 2001), because we did not have unrestricted access to informants. Within each organization, we followed specific stories—for example, innovations, changes, debates and failures—which appeared to be relevant to our theoretical objectives. We did not start with the notion of testing a predetermined theoretical model, but became more able to appreciate the significance of Cohen and Levinthal (1989, 1990) as we interpreted the data. We also found that we developed insights post hoc from the case data based on Jones (2006) and Lane et al. (2006), which were published after our fieldwork was completed.

In this article we present one story from each of the three organizations that is relevant to absorptive capacity, followed by reflections on the theoretical implications of the story. Our presentation of stories and data is intended to provide insight into how factors such as politics and boundaries affect the way the organization absorbs and incorporates knowledge.

Three Stories

Story A: WebCo

The first story comes from a small but fast-growing Internet company located in the north of England, which conducted a series of corporate takeovers between 2003 and 2005. Because the company is small (about 200 employees) we were able to follow key managers and employees over a sustained period. Here we

provide a story with implications for absorptive capacity, which is primarily about learning from external acquisitions, since acquisitions have long been recognized as a potential source for learning and renewal, although they often fail to take advantage of these opportunities (Vermeulen and Barkema, 2001).

The company has evolved a policy of acquiring other IT companies that have run into financial difficulties, and 10 such takeovers took place over the three-year period of this study. The first purchase happened almost by chance and resulted in the acquisition of some very valuable equipment at a knock-down price, but only a handful of employees came with the purchase. The Chief Operating Officer (COO) reflecting back on the evolution of the company explained what had happened:

> Then there was the dot.com bust: people lost interest and confidence in that market. At some point [the CEO] heard that there was this fantastic data centre through some contacts in the City. 'Pronto' were selling off their assets, which had originally cost over £20 million, and we managed to get investment to buy that data centre for I think it was about £450 000 or something like that. It was amazing. It changed what we could do; we just had a different foundation. [A7]

The next three acquisitions followed the same pattern: the integration of technical assets and client bases into the current operation of the parent, generally without any staff commitments. Although the first acquisition is regarded as an 'accident' by senior managers, it led to a deliberate policy, driven by the CEO, of actively targeting potential takeovers, following the logic of 'asset stripping'.

The fifth acquisition, however, broke the pattern. This was a rather larger company, called Wizard, and nearer to the size of the parent company. It turned out that it not only possessed useful technical assets and a good customer base, but also had organizational processes which made it more effective in managing customer relations than the parent. Thus the parent had acquired, unwittingly, some new and potentially relevant knowledge about how to 'farm' existing customer accounts, and this suggested that they could become less reliant on direct sales (mainly cold calling), or 'hunting' for new customers. This led to a sharp conflict between some senior managers. The training manager, John, commented to us:

> There's certainly a very strong case for doing away with the hunters and only having farmers, and acquiring new customers in different ways. It makes things a lot easier yes because integration from Wizard and learning from their success is, I think, a very good reason really for looking at it and a very good basis for looking at it positively. [A8]

By contrast, the sales manager was a strong proponent of direct sales, and argued for maintenance of the current emphasis on 'hunters':

> I think real sales people, people who are strong and want to be in sales as a definite career choice, I think are primarily motivated financially. And all by success, by being seen to be the top man. And I don't agree—this is where John and I disagree—with some of the softer things that will incentivise people. [A9]

Shortly afterwards, the training manager persuaded senior management to give him the lead of a project team which would manage the acquisition and

integration process, concentrating on the harmonization of human resource procedures, and on the transfer of technical and process knowledge between the two organizations. First he obtained the support of senior management to adjust the sales procedures of WebCo to the Wizard practices: a number of key performers were brought across from Wizard to 'seed' their methods into the parent organization; the direct sales people and the customer service department were merged into a single sales force; and several of the direct sales agents, including the sales manager, left the company.

So this transformation was not achieved without some pain. The format of an integrative project team was then adopted and implemented for the next five acquisitions (all of which were smaller than Wizard), although after several months senior managers became less convinced about the value of the format, and within a year the training manager had also departed.

Reflections　From the viewpoint of absorptive capacity, the story indicates the complexity of transforming and exploiting ideas acquired from external sources. In the early stages of the acquisitions strategy, the external information obtained via the City contacts of the CEO was key, and there were no problems implementing these ideas because the CEO had the confidence of the Board and these acquisitions had minimal implications for the internal structure and procedures of the parent company. But when it came to exploiting ideas from the fifth acquisition, this had major implications for the working beliefs of managers, and more widely for organizational structure and personal careers. There was vigorous debate about whether these new procedures should be adopted. Although the ability to 'appreciate' external knowledge depended on internal knowledge and interests, the ability to implement it depended on historical debates and political agendas within the parent.

Overall, the case adds a process perspective to the way acquisitions can function as external knowledge sources, and a political dimension to the social integration mechanisms that convert potential into realized absorptive capacity. It also provides a direct illustration of the way that, 'frictions during implementation—may actually create long-tem benefits, because it may trigger learning and break rigidities in the acquiring firm' (Vermeulen and Barkema, 2001: 471). But the rise and fall of the integrative project team also illustrates the way that procedures can evolve from one context and then become standardized in a way which is subsequently judged to be unhelpful. This is what Miller (1993) terms progressive simplicity because it eventually reduces the ability of the organization to respond to new information and opportunities.

Story B: HealthCo

The second story comes from the public sector—a hospital trust in a rural part of the north of England. It is a medium-sized organization (2500 employees), and therefore has more complexity than WebCo; this also enables us to see how the theory of absorptive capacity, developed in the private sector, might apply to a public sector organization.

The trust is publicly funded and was established in 2001 to provide an integrated service comprising two existing general hospitals and other related

health services for a population of over 300,000 people. As part of the UK government's policy of improving the performance of public-sector institutions, a rating system was established across the country whereby all hospital trusts were awarded up to three 'stars' based on performance measured against key targets including financial efficiency and length of waiting lists. Data on performance measures had to be returned quarterly to the strategic health authority which awarded ratings annually to the 20 health trusts in its region. In addition to the obvious reputational effects, these star ratings have major material implications for hospitals. Those with the higher grades get better funding and less subsequent scrutiny from government authorities; those with the lower grades are put under extreme pressure to improve the quality of management and overall performance. In many cases, this includes the replacement of entire management teams.

The trust that we studied was awarded *zero* stars in 2002, having achieved two stars in the previous year. By the end of 2002, the chief executive had departed, and he was replaced by an interim appointment, pending the arrival of a new chief executive in June 2003. In this case, we track some of the initiatives and strategies introduced in order to produce a turnaround of the trust—specifically where they relate to issues of absorptive capacity.

The new chief executive was a nurse who had been appointed to a supervisory position at an early age, and had then progressed rapidly up the management tree. Subsequently, she acquired a national reputation for work on contracting processes within healthcare systems and was responsible for implementing the first performance management system in the country. In 2002 she also spent some weeks as an external performance assessor to the trust in question, so she had already formed a view of its strengths and weaknesses in clinical and administrative areas. By the time she accepted the job she had already worked out her initial strategy for turning around the organization. Three elements stand out in the way she verbalized this strategy to us: recruitment of the 'right' management team, engagement of staff throughout the trust, and the management of external reputation.

In relation to the senior management team, she moved very quickly, and within three days had dismissed over half of the directors. She then recruited onto the top team senior staff who had relevant expertise and external contacts. This included the regional director of nursing who had detailed knowledge of operational issues in hospitals across the region, and the head of the performance assessment unit who was responsible for collecting performance data from all trusts across the region. Her director of finance, who was one of two survivors from the previous team, happened to be married to the chief executive of another (successful) trust. Thus all the new appointments had exceedingly good external networks, and all knew each other from their previous roles.

This first phase brought external sources of information into the organization through recruitment, or 'grafting', which was directly relevant to tackling the central performance issues of the trust. Moreover, the external networks of these new members ensured that they knew how to influence perceptions among key external stakeholders, and that they would be kept closely in touch with evolving political and evaluative agendas within the National Health Service (NHS) both regionally and nationally. This led to the absorption of a number of ideas and

methods from outside. Most of this took the form of copying, as the general manager recalled:

> I'm not entirely sure we are learning more as an organization . . . you can look over the parapet and see what's happening in Northumbria [another trust] and extrapolate it here. I think the timescales are shorter, i.e. we've got to cross-site working within two years, where Northumbria waited five years.[1] Maybe because we're smaller and dealing with two hospitals instead of five. So, therefore we perceive that we can do it quicker. But I personally think we are a copying organization based on what's happening in Northumbria, rather than us copying a model and learning from that model and changing it, and localising it. [NC 27]

The second element of the CEO's strategy involved extensive engagement with staff right across the trust. The most pressing area was to rebuild confidence with clinicians who had recently passed a vote of 'no confidence' in the previous management. Accordingly, during the first two months in post, she interviewed most of the 120 consultants in order to find out what they wanted from the trust, what they thought had gone wrong, and what their personal interests and needs were. This initial initiative was supplemented by a number of consultative forums. These included the Clinical Policy Group (CPG) which met for a day each month in a local hotel and comprised all the clinical directors and senior management (about 40 people). These meetings involved a mixture of inputs from the chief executive on strategic priorities and dilemmas, and a workshop format where cross-disciplinary groups worked (at round tables in the same room) on a range of issues and problems. A second forum known as the Improving Working Life (IWL) initiative was imported from wider practices elsewhere in the NHS. This involved about 40 representatives drawn from all levels and sectors of the trust for a two-way exchange on the impact of current policies at the level of wards and operational units.

A third element in the strategy was to influence proactively the relations with local media and other stakeholders. This is particularly important for rural hospitals which are deeply rooted in the local community, both as employers and as providers of health care. We have noted earlier how all of the senior management team had extensive personal networks with other external organizations and that this aided the communication of appropriate messages to these important stakeholders. But local media relations were very problematic at the outset because the media had fanned negative stories about the old regime culminating in a front-page article when the previous chief executive resigned. In order to signal the desire for a new working relationship, the CEO took the editor of the local newspaper out to dinner at the first opportunity, and similar tactics were employed with local politicians. Subsequently, the battle was taken into the community by launching a community-wide consultation exercise to evaluate four strategic options aimed at eradicating the financial deficit of the trust—with the key implication being that the community itself must accept responsibility for deciding which path should be chosen.

These efforts were largely successful judging by the changes in the performance indicator over time. In each of the next two years (2004 and 2005) the trust was awarded another star, and it would have been on track to obtain three stars

by 2006, if the star rating system across the NHS had not been discontinued in that year.

Reflections   At this point, we highlight two aspects of absorptive capacity in the above story, although we return to more general issues later in the article. First, the external sources of information had to be actively constructed through making judicious appointments to the senior team, and these individuals were made responsible for introducing external innovations. Sometimes this was just a matter of copying knowledge and practices that existed elsewhere (e.g. IWL) which produced direct exploitation; in some cases it involved minor adaptations (e.g. the faster implementation of 'cross-site working'); and in a few cases it involved creative transformation of external ideas, as when external practices aimed at improving bed management efficiency[2] were blended with ideas from operations management (Goldratt and Cox, 2004) to produce a unique local solution.

Second, a range of mechanisms was established to gather *internal* data. At the top level, team meetings were established every Monday morning where senior managers were expected to share both internal developments and insights from their personalized external networks. The Monday meetings therefore helped the assimilation of this information at an organizational level, even though the sources of information remained the social capital of the individuals. At the same time, numerous discussion forums and structures (such as CPG and IWL) were established within the trust, which generated a large amount of internal knowledge.

Story C: ChemCo

Our third organization is part of a large European multinational chemical company, and is located in the north of England. It provides some insights into a classical manufacturing environment. In addition, because the plant is of moderate size (approximately 600 employees) it provides focus to the fieldwork, while allowing some insights into processes within the wider multinational company.

The plant has been running since the early 1950s and is a major employer in its area with deep links to the local community—often with several generations of the same family having worked there. It grew steadily until the late 1970s, but its fortunes have been mixed since then. There have been several major threats to its existence which have been handled either through dramatic staff reductions or through the introduction of major innovations in production processes—in combination, successive threats have led to a constant feeling of crisis among the management group.

At the time of the study, managers and employees were aware of major threats coming from China. This included joint-ventures owned by their company in China, which have the potential to substitute for UK production, plus sharper competition in more established markets elsewhere. But the head office also posed a potential threat because it controls whether future investment is made in the plant, and ultimately it could decide to close down the plant.

There were two main responses to these threats. The first took the form of energetic image management in relation to the head office through demonstrating

a proactive management style, by dealing with local problems and issues as soon as they arise through restructuring and other strategies. Senior managers worked hard to maintain and develop relationships with their counterparts in head office. The second response involved continuing efforts to generate major innovations in terms of process and products. As Cockburn and Henderson (1998) point out, firms have to invest in absorptive capacity in the form of in-house basic research if they are to access and learn from upstream basic research.

The innovation, code named Project Ivan, had been running for three years. The key idea in this project was to cut out several critical stages in the production process. If it was successful, it would dramatically reduce costs and thus provide a window of advantage for the company, and possibly the plant. The current head of R&D initiated the idea with his deputy several years ago, along the following rationale:

> Yes . . . we are seeing good quality products coming out of China at very low prices. So if we continue to do what we're doing here . . . I think there's no way that we can make money by selling our products at the kind of prices that the Chinese are entering the market with. So we really need to do something radically different and that's where Project Ivan comes in because we are looking at radical new low cost ways of making [the product]. [C7]

Initially, they decided to use their 'Friday' time (this is a common practice in R&D which encourages staff to spend Friday afternoons experimenting with anything that takes their fancy) for an initial feasibility study, which led to approval by the local management team for a dedicated team of between six and seven scientists to work on Project Ivan for 18 months. The results of this study were very encouraging and so they wanted to move from the laboratory to a pilot production facility, which would require capital investment and the recruitment of further staff. Both these decisions required approval from head office—which proved to be very sceptical. He continued:

> We've got resistance from [head office] from [the] process development [people]. Because they are looking at our concept and they are saying: 'It will never work. It won't work, there's no point in putting money into this; we tried it 10–15 years ago and we couldn't get it to work, so you guys won't be able to get it to work'. So there's been a lot of, they've been asking for more and more information. [C7]

In order to encourage radical innovations, the parent company had set up a substantial innovation fund to support the development of new ideas that fall outside the current R&D programme. But in this case, the application by the Project Ivan researchers was rejected due to opposition from some scientists in head office, and because it did not fit the current strategic priorities of the company. Thus we have the interesting paradox of a mechanism, or routine, intended to support 'out of box' projects which was being undermined, first because the project was not congruent with the past experience of decision makers and second because it did not fit with the agreed direction of the organization. Of course, when funding requests exceed the funds available then some criteria must be established to differentiate between the more or less worthy projects—and this inevitably leads to what can be labelled as the 'normalization' of radical innovation.

Over the next few months, senior managers at the plant started lobbying politicians and officials in the regional development agency to see if they could develop leverage which would influence the decision makers at head office. They were largely successful in this strategy when they obtained agreement from the Regional Development Agency for funding to cover the salaries of additional researchers, and this enabled senior management to convince head office to provide additional technical and capital funding to support the project.

Reflections This story concentrates on absorptive capacity based on internal sources of knowledge, although one of the initial triggers was the competitive threat from China. Because the company is one of the global leaders in its field, world-class technical expertise resides in the collective experience of innovation and in the expertise of its scientists. The problem here was to determine which bits of experience and expertise are relevant to the funding decision: should top management listen to the researchers in head office who failed to make this innovation work 15 years ago; or should they back the new generation of researchers who now believe that they have found the solution? Various social integration mechanisms existed to aid the decision, including technical and managerial visits in both directions, a formal working party which has been established to review the decision, and a recent decision by the R&D head from Europe to spend time working in the laboratory with the UK researchers. And there are other factors which have substantial bearing on whether this knowledge will now be exploited including: the historical experience in the company, the politics of who is currently in a position to influence the decision, and the wider strategic priorities of the company.

The *activation triggers* include both a continuing sense of threat and crisis within the plant and substantially increased global market competition provoked mainly by the growing production competence and capability in China. In this case, they are not responding to external innovations, but attempting to lead innovations themselves to enable them to stay ahead of global market pressures. In this part of the industry, the critical knowledge is mainly internal, with external contacts largely restricted to scientists in local universities. But they also believe that their main competitors have decided not to follow this technical route and hence if they are able to implement the new technology successfully, they will have a competitive advantage which should be sustainable for several years.

Processes of Absorptive Capacity

The examples from these three organizational stories substantiate previous work on the key concepts of absorptive capacity (Table 3). In particular, the categorization of *external* sources of information fits well with the data we have selected from WebCo and HealthCo, and the categorization of *internal* sources of information fits the data from HealthCo and ChemCo. We have seen the role of *activation triggers*, particularly the sudden crisis in HealthCo and the continuing crisis in ChemCo, and the existence of *social integration mechanisms* was apparent in WebCo and ChemCo.

Table 3 Features of absorptive capacity identified in the three organizations

Concept	WebCo	HealthCo	ChemCo
Recognize, assimilate and use external knowledge	X	X	
Relevance of internal knowledge base		X	X
Boundary spanning and gatekeeping	X	X	X
Activation triggers		X	X
Social integration mechanisms	X	X	
Individual agency	X	X	X

However, it is significant that issues of boundary spanning and individual agency were present in all three of our case studies, especially since they have not received much attention until recently. Further treatment of these concepts is important for building understanding of the processes of transformation and exploitation of organizational knowledge. In the following sections, we tackle both of these elements, and we locate them within wider theoretical discussions, respectively on the role of power and the nature of boundaries within and around organizations.

Power

In almost every interview, once a degree of rapport had been established, managers and employees made spontaneous mention of political issues, and as our map of actors and debates grew we were curious to explore as many sides of this as possible. We also drew from the literature because scholars have, for a long time, recognized that knowledge is linked to power, and that the decision to share, request or transfer knowledge is frequently a political act (Marshall and Brady, 2001). Lawrence et al. (2005) claim that power and politics have largely been ignored by organizational learning theorists, and hence, given the inherent political nature of organizations, that existing theories are incomplete. They adopt Foucault's distinction between episodic power (discrete political acts initiated by self-interested actors) and systemic power (which is diffused through the social systems that constitute organizations) in order to understand the movement of ideas in organizations.

Examples of *systemic* power from our cases include the prevailing assumption within WebCo that there was nothing worth learning or adopting from each acquisition; the control exercised by the ChemCo head office over whether or not the pilot testing of the new technology should be funded; and the procedures established by senior management in HealthCo to gather information internally and externally, both to control current practices and to inform strategic decision making. Examples of *episodic* power include the ability of the training manager in WebCo to mobilize support for the idea that they should adopt practices from the fifth acquisition, the way the CEO of HealthCo sought to achieve personal influence over the senior clinicians and other key stakeholders in the trust, and the way ChemCo managers worked hard to establish relationships with key individuals both in head office and among regional politicians.

Both forms of power can be related to absorptive capacity. External access to information is influenced by systemic power to the extent that individuals are placed in roles that legitimize this external interaction. This was most evident in the case of HealthCo where the CEO and other senior managers were explicitly required to interface with local politicians and regional funding authorities; whereas in WebCo it was only the CEO who was expected to interface externally with key stakeholders, and in ChemCo there was minimal expectation that even the CEO should do this. In the latter case, it was only through the exercise of episodic power that the CEO managed to redefine his role so that lobbying of external stakeholders became a key priority, thus individual agency and proactivity supplement systemic power when trying to access new knowledge from outside the organization.

However, the internal appreciation and utilization of external knowledge depended mainly on episodic power. This was most clear in the case of the training manager at WebCo who wanted to adopt new practices from the fifth acquisition. It was also important for the CEO of ChemCo in convincing his bosses that the package of technical innovation and local funding support provided a viable business proposition. In both cases, the successful use of episodic power led to structures and roles being established which then provided a systemic power basis for continuing operation, and thus there is an interaction between the two forms of power.

This interaction between the two forms of power provides insight into the processes that underlie the somewhat tautological proposition of Cohen and Levinthal (1990: 137) that the higher the level of absorptive capacity, the more likely a firm will be proactive in '. . . exploiting opportunities present in the environment, independent of current performance.' In our three cases it is mainly systemic power which provides the basis for gathering external information, but episodic power is required to create the systems that ensure the continuing exploitation of this new knowledge.

Boundaries

Theories of absorptive capacity tend to take boundaries for granted, focusing on conditions inside or outside the organization rather than on the conditions of the boundary itself. Our cases suggest that the boundaries themselves are important, and that we need to understand both the nature of these boundaries, and how to facilitate knowledge transfer across them.

It is widely recognized that organizational boundaries can inhibit the distribution of organizational knowledge (Orlikowski, 2002). However, some boundaries are more permeable than others, making it easier to move information across them, a condition sometimes known as appropriability (Zahra and George, 2002). In our cases the external boundaries of HealthCo were more permeable because it was a public sector organization, whereas commercial factors meant that ChemCo and WebCo had to work hard to limit the permeability of their external boundaries.

In HealthCo external boundaries were permeable because clinical staff had strong links to medical colleges and university hospitals elsewhere, and managerial

staff had professional links and personal contacts with other organizational units in the NHS. These external links produced strong loyalties and professional mindsets which shaped the identity of subgroups (e.g. managers, clinicians and nurses), and had more impact on individual career expectations than the organization which employed them.

Senior managers in ChemCo were very concerned to control information from reaching competitors, but this is difficult because the company has numerous external alliances, and often these partner organizations are also competitors. Internally it has many boundaries, between international, regional, national and plant levels, and between different functional groupings such as human resources, finance and R&D. Each of these has its own identity, professional norms and rivalries. In the smaller WebCo there were initially fairly clear external and internal boundaries, as evidenced by the existence of different tribes such as hunters and gatherers, but both of these became blurred as the company started to absorb other organizations.

Thus we have variation between the three cases. In HealthCo there is a possible trade-off between internal and external boundaries: the weaker the external boundaries, the stronger the internal boundaries. In WebCo and ChemCo there were fairly definite internal and external boundaries from the outset, but the strength of these boundaries diminished during the period of our study.

This leads to the issue of facilitating transactions across boundaries. Carlile (2002, 2004) provides a useful distinction between syntactic, semantic and pragmatic approaches to knowledge transfer. The syntactic approach involves the transfer of data through information technology, the semantic approach focuses on the translation of language and creation of shared meanings, and the pragmatic approach focuses on transforming knowledge through political efforts and the negotiation of practices.

During the initial period of the HealthCo exchanges across internal boundaries and communication between groups was largely *syntactic*, it consisted of professional and managerial data, and clinical information regarding patients. But the establishment of cross-disciplinary meetings and groups forced clinicians and managers to work across semantic boundaries, and cross-site working which involved the merging of departments between hospitals required people to work on shared operational problems, thus producing exchanges at the level of *practices*. There was a similar progression with initial knowledge transfers in WebCo and ChemCo taking place at *syntactic* levels: WebCo's early acquisitions simply absorbed technical assets which were grafted onto existing technical capabilities; in ChemCo the dialogue with head office was largely between scientists, at a distance, and in technical terms. However, the fifth acquisition by WebCo triggered a need to share *practices* at a deeper level, and this was facilitated by the integration team and by numerous physical movements of staff from one site to the other. Similarly, the direct involvement of senior scientists from ChemCo head office facilitated exchanges at the levels of practices. In both cases it was extensive discussions and debates (semantic processes) which led to these joint activities.

In all three cases we can discern an evolution from syntactic, to semantic and to pragmatic communication as these organizations improved their ability to benefit from interactions with the external environment. This is not that one mode

replaces another; rather that they are additive, and thus increase the absorptive repertoire of the organization. And at the pragmatic level, it is apparent that transfers generally took place as a result of specific initiatives established by managers and other stakeholders with the ability to span boundaries, and this required a degree of proactivity and the exercise of episodic power.

Implications and Conclusions

In this final section we comment on three things: the wider implications of our analysis for theories of absorptive capacity, reflections on using qualitative methods to extend/test ideas based largely on quantitative research, and finally some thoughts on future research.

Our studies provide additional contributions to the literature in two areas. First, by demonstrating the role of both systemic and episodic power in relation to absorptive capacity, we add specific insights to the role of organizational power. *Systemic* political factors influence what external information is accessible, and who has legitimate authority to make use of it. We found systemic power to be more evident in the larger organizations, but it was also evident in the smaller WebCo. *Episodic* power was also important when new forms of external information became available, which were not covered by existing systems. In all three organizations episodic power was a key component in the internal processes leading to the adoption and utilization of external knowledge. Different actors, factions and interest groups compete for control of knowledge: their perceptions are influenced by their past experiences, and their interests are affected by their location and sense of organizational identity. This form of power is often evidenced by proactive behaviour, which suggests that organizations do not absorb information without effort. In this area we agree with Jones (2006) that absorptive capacity is not just a matter of osmosis: it depends on deliberate will and individual agency.

Second, we have demonstrated that absorptive capacity theory needs to take conscious note of boundaries, as such. They are inherently difficult to define, vary considerably in permeability, and can evolve and change significantly over time. We have found the distinction Carlile (2002) makes between syntactic, semantic and pragmatic approaches to be helpful in understanding how different forms of knowledge can move across boundaries. And we have noted a progression from syntactic to pragmatic modes as organizations increase their abilities to absorb and utilize knowledge from the environment, and that pragmatic modes of knowledge transfer depend on the mobilization of episodic power, in particular. Thus we see these two elements, power and boundaries, as central features of a process view of absorptive capacity.

Throughout this study we have been conscious that we have used methods to examine absorptive capacity which are at variance with the methods used in earlier research into absorptive capacity. Up to a point, the use of different methods provides strong support for the original concept; but qualitative and longitudinal methods are also likely to highlight aspects which are not noticeable using quantitative survey methods. Quantitative methods generally require prior analytic

frameworks which focus and filter observations before the collection of data; qualitative studies, especially where informed by the logic of grounded theory (Locke, 2001), develop frameworks before, during and after the data collection process. This involves constant judgements by researchers regarding which data, out of a huge set, to select and present in order to tell a story that is both coherent and faithful to the phenomena they have observed—which is both a strength and weakness of the present study. This is not to suggest that one perspective should be privileged over another; rather, that each has its value, and that if we are to open up the 'black box' of absorptive capacity (Zahra and George, 2002), we need both types.

Finally, our article demonstrates the need for further development of a process approach and the potential value of conducting more longitudinal qualitative studies to understand the inner processes of absorptive capacity. Indeed, we feel that it would be premature to devote further resources to definitional and measurement issues until we have far better understanding of the features we are trying to measure. And since we have demonstrated that the idea of absorptive capacity can be applied usefully both to our public sector organization and to the multinational, we think it would be worthwhile to explore these phenomena further in different kinds of organizations and national settings.

Acknowledgement

Notes

1. This refers to establishing a single administration for services provided by several different hospitals.
2. This refers to ensuring the maximum utilization of beds every day, through balancing planned 'elective' admissions with unpredictable emergency admissions.

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Contact Addresses

Mark Easterby-Smith is in the Department of Management Learning, Lancaster University, Lancaster LA1 4YX, UK.
[email: m.easterby-smith@lancaster.ac.uk]
Manuel Graça is in the Faculdade De Economia, Universidade Do Porto, Porto P 4200 464, Portugal.
[email: mgraca@fep.up.pt]
Elena Antonacopoulou and **Jason Ferdinand** are in the Management School, University of Liverpool, Chatham Building, Chatham Street, Liverpool L69 7ZH, UK.
[email: e.antonacopoulou@liv.ac.uk; j.m.ferdinand@liv.ac.uk]