

Absorptive Capacity in Practice: An Empirical Examination of Zahra and George's Model

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Abstract

The idea of absorptive capacity has emerged as a concept that bridges across the literature on dynamic capabilities and organizational learning. But its development has been largely at a conceptual level with major contributions building on secondary data and literature reviews. There are very few studies that seriously address the concept based on fresh primary data.

In this paper we apply the idea of absorptive capacity, based primarily on the model of Zahra and George, to case studies drawn from organizations in three different industries: IT, Chemicals and Health Care. The analysis enables us to challenge key features of Zahra and George, but perhaps more significantly to open up new avenues for understanding absorptive capacity in practice.

Keywords: absorptive capacity; dynamic capabilities; organizational learning; politics

Suggested track: Dynamic capabilities

1. Introduction

Absorptive capacity (Cohen & Levinthal, 1990; Zahra & George, 2002) is an intriguing idea because it potentially bridges between the fields of dynamic capability (Teece, Pisano & Schuen, 1997; Eisenhardt & Martin, 2002; Zollo & Winter, 2002) and organizational learning (Fiol & Lyles, 1984; Easterby-Smith, 1997; Akgun, Lynn & Byrne, 2003). On 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 it focuses on learning from past experience and current actions, and the internal processes for translating this into useful action.

Cohen & 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'. Subsequently they adopted a slightly wider view as: '... an ability to recognize the value of new information, assimilate it, and apply it to commercial ends' (Cohen & Levinthal, 1990: 128). Putting the two together provides a 'classical' view of absorptive capacity as: the identification and recognition of new information, both internal and external, and its assimilation, application and exploitation for commercial ends.

In their comprehensive review of the literature, Van den Bosch, Van Wijk and Volberda (2003) discuss three models of absorptive capacity which have current credibility: their own model which is closely linked to the original views of Cohen and Levinthal (1989, 1990), the model of Lane, Salk and Lyles (2001) which is based on research into knowledge transfer within international joint-ventures, and the recent model of Zahra and George (2002). In this paper we focus on the latter model because it incorporates recent research in the field and has the potential for reasonably broad application.

The model of Zahra and George (2002) adds two major stages to the process of converting knowledge into the actions which produce competitive advantage: *potential* absorptive capacity, which includes acquisition and assimilation capabilities; and *realised* absorptive capacity, which includes transformation and exploitation capabilities. In addition, they identify internal processes – activation triggers and social integration mechanisms - and regimes of appropriability which are the conditions of the industry which make it easier or harder for firms to retain control of their own knowledge. This is a very comprehensive model which is supported by an extensive

literature review, which starts to open up ‘the black box of the sustainability of competitive advantage in dynamic markets’ (p. 197). The main features of this model are illustrated in Figure 1.

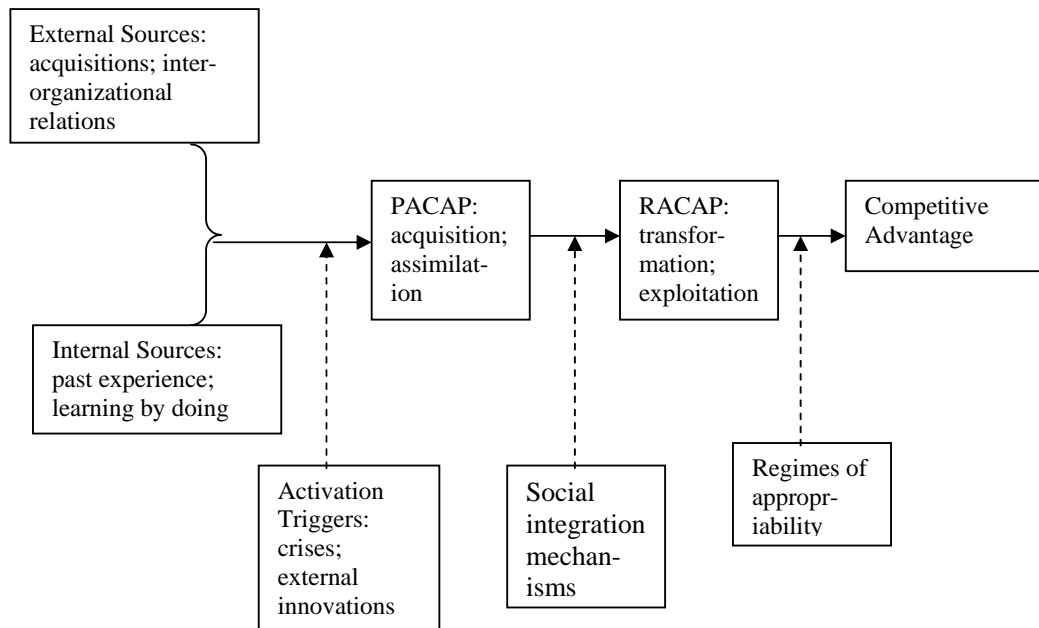


Fig. 1. Absorptive Capacity: Triggers and Outcomes of Knowledge Flow
(After Zahra and George, 2002)

Although Zahra and George claim to ‘open up the black box’ their model is supported by secondary data drawn from others’ studies, the majority of which are cross-sectional survey-based studies that use the firm as a single unit of analysis. The major exception is the longitudinal case study of Hyundai by Kim (1998), which looks at the internal processes within the company. Zahra and George add insightful elements to their model from Kim’s work, particularly about the way internal crises can be manufactured to generate focus and motivation across the organization as a whole. But, in the main, the internal processes in the model are inferred from indirect sources of evidence.

The aim of this paper, therefore, is test the model of Zahra and George against qualitative data drawn from case study material of three organizations, each in a different industry. These studies form part of a wider research project on dynamic capabilities, which uses multiple sub-cases and stories about aspects of innovation, knowledge flows, organizational change and strategic learning. They are also

longitudinal studies because we are gathering, in a structured way, 'live' data to track the evolution of current initiatives over the 2-year period of our project, and this is set into the context of having personal contacts with key actors in each of the organizations going back many years (generally more than half of the life of the current organization). This gives us a historical perspective which enables us to see how priorities and issues can rise and fall over time.

The rationale for restricting the sample to three organizations is that we want to examine in some depth the flow and application of new ideas over time. At the same time the organizations are located in different industries because we are both seeking to assess the generalizability of the concept and to broaden the model through examining absorptive capacity processes in very different organizational contexts. The three organizations are, in 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. We provide more information on each one below.

Data collection is mainly through semi-structured interviews (between 16 and 23 in each organization), supplemented by observation of meetings, organizational systems, and production processes. Periodically we meet with key contacts to share our emergent impressions, to check the accuracy of data and to identify further areas of investigation. The initial sampling of informants includes senior management and members of two operational groups, one of which is considered by senior managers to be particularly dynamic and innovative, and one that is considered to be much less so.

Interviews are recorded and transcribed professionally before being loaded into NVIVO for analysis. Thematic categories are identified immediately after interviews, although the interviews themselves were informed by our prior theoretical reading on dynamic capabilities; thus our analytic model represents a compromise between pre-ordinate research and the Straussian variant of grounded theory (Strauss and Corbin, 1998). Within each organization we have followed specific stories – for example, innovations, changes, debates and failures - which appear to be relevant to our theoretical objectives.

In the present paper we have followed the theme of *absorptive capacity* through our data. We provide details of three cases followed by some reflections on how the case

relates to the wider model. This includes both within-case and cross-case analysis. No single elements of the stories were remarkable on their own, but collectively we believe that the stories help to paint a picture of the inner working of absorptive capacity, in a way which both supports and extends existing models.

2. Three Cases

2.1 Case A: WebCo

The first case is set in a small but fast growing Internet company located in the North of England, which has entered into a series of corporate takeovers. From a research point of view this is a good case because the company is small enough (under 200 employees) for the researchers to have access to the key players over a sustained period of time; yet there is a reasonable chance that many of the phenomena observed would also take place in much larger organizations. Here we provide a story with implications for absorptive capacity, which is primarily about learning from external acquisitions.

The company has evolved a policy of acquiring other IT companies that have run into financial difficulties, and ten such takeovers have taken place over the last two years. 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 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 £20M] 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. [A 7]

The next three acquisitions followed the same pattern: 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 had led to a deliberate policy driven by the CEO of actively targeting potential take-over targets, 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. It turned out that it had not only useful technical assets and a good customer base, but it 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' customer accounts, and this had implications for the role of direct sales, or 'hunters', in the parent. The training manager commented:

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. [A 8]

On the other hand, the sales manager remained unconvinced, and argued for maintenance of the current position:

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. [A 9]

The final outcome of this debate was that sales procedures of WebCo were adjusted to the Wizard practices, creating a much increased sales force through bringing together the direct sales people and the customer service department. As a result of adopting this Wizard practice the relative importance of direct sales was diminished. This prompted internal discussion as to the best way of generating funds and associated discussion of the wage bill, sales people's commissions and overall cost effectiveness. The result of these discussions was the closure of the direct sales department and the integration of a few, long serving salespeople, into the customer accounts department.

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 critical element was external information obtained via the City contacts of the CEO, and there were no problems implementing these ideas since the CEO had the confidence of the Board and these acquisitions had minimal implications for the internal structure and procedures of the parent. But when it came to exploiting ideas from the fifth acquisition, absorptive capacity had major implications for the working beliefs of managers, and more widely for organizational structure and personal careers. Hence there was a vigorous debate about whether or not 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 idea of acquisitions as external knowledge sources, and a political dimension to the *social integration mechanisms* that supposedly convert potential into realised absorptive capacity.

2.2 Case B: HealthCo

The second case comes from a study of a Hospital Trust in a rural part of the North of England. It is a medium-sized organization (2500 employees), which gives more complexity than Case A, and also enables us to see whether the private sector theory of absorptive capacity can be applied 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 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, length of waiting lists, etc. Data on performance measures has to be returned quarterly to the Strategic Health Authority which awards 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 lowest 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 are studying was awarded zero stars in 2002, having achieved two stars in the previous year. By the end of that year 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 effect 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 as 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 health care 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 verbalised this strategy to us: recruitment of the 'right' management team; engagement of staff throughout the Trust; and the management of the external reputation.

In relation to the senior management team she moved very quickly, as she recalled:

My first week in post, I knew the directors and what they wanted intellectually or anything else; who had no insight, and whose visions were poor. I interviewed them on Day 1 and I dismissed them on Day 2, and then I implemented my standards on Day 3 and I ran the organisation with 1 Medical Director and the Director of Finance which meant that I was 3 directors down. And that didn't worry me because it was that bad anyway, I wasn't going to loose anything anyway. [B 4]

She then set about recruiting senior staff onto the top team with expertise, and contacts, relevant to her project. This included recruiting from the Strategic Health Authority the Regional Director of Nursing who had detailed knowledge of operational issues in hospitals, 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 was also 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.

Thus, 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 Health Service both regionally and nationally.

The second element of her 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. As one consultant commented on this process:

I went down to her office. But it's a long time ago to remember, I certainly don't think everybody did because I think I actually ... if I remember correctly it was a last minute thing because she was behind time.

Q: And what was she focusing on, was she just very, 'hi I'm here, what do you want from me', or was she going, 'this is my vision, this is what's going to happen'?

Oh no she wanted to know what we felt about things.

Q: What impact did that have?

Everyone was impressed by it. [B 14]

This initial initiative was supplemented by a number of consultative forums which were established right across the Trust. These included the Clinical Policy Group 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 was known as the Improving Working Life (IWL) initiative. This involved about 40 representatives drawn from all levels and sectors of the Trust for a 2-way exchange on what currently concerned senior management and about the experience of current policies and problems at the level of wards and operational units.

A third element in the strategy was to exert as much control as possible on 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 above 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 paper out to dinner at the first opportunity, and similar tactics were employed with local politicians. More recently the battle has been 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 – no single option is ideal, but the key implication is that the community itself must accept responsibility for deciding which path should be chosen.

Reflections. At this point we highlight three aspects of absorptive capacity in the above case study, although we will return to more general issues later in the paper. First, strenuous efforts were made to tap both *internal and external sources* of knowledge, through recruiting senior managers who already had external networks in place, and through establishing a range of mechanisms to gather internal data. However, this was not just a matter of absorbing knowledge that was waiting to be ‘downloaded’; in each case it involved dialogue with the sources of information and an attempt to influence the perceptions of these parties about the hospital Trust and its management.

Secondly, the *external sources* of information had to be actively constructed through making judicious appointments to the senior team. And they remained essentially personalised: each individual had his or her distinct external network and information

from these networks was normally shared at team meetings every Monday morning. The Monday meetings therefore helped to assimilate this information at an organizational level, even though the sources of information remained the social capital of the individuals.

Third, the existence of the star rating system means that we have some potential to link aspects of absorptive capacity with the consequent *performance* of the organization. However it is difficult in practice to track specific items of information through processes of transformation and exploitation because strategy formulation appears to be a holistic process with many elements pre-determined (in this case by the CEO's initial diagnosis). It is also because the 'performance' of the organization resulted not just from the incorporation of relevant information, but also from the ability to influence perceptions of key stakeholders. But we hope that it will be possible to follow the potential link as the performance indicator changes over time. In this context it is interesting to note that the Trust managed to achieve its first star in the evaluation process of 2004, and senior management are confident that they are on track to gain three stars by 2006.

2.3 Case C: ChemCo

Our third case is part of a large European multinational chemical company and is located in a city in the North of England. Since the plant is of moderate size (approximately 500 employees) this provides focus to the fieldwork, while allowing potential generalisability since it is part of the wider MNC.

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 amongst the management group.

At the present time managers and employees are aware of major threats coming from China. This includes 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 poses a potential threat because it controls whether or not future investment is made in the plant, and ultimately it could decide to close down the plant.

There have been two main responses to these threats. The first takes the form of energetic image management in relation to the Head Office through demonstrating a proactive management style which involves dealing with problems and issues as soon as they arise through restructuring and other strategies. Senior managers are working hard to maintain and develop relationships with their counterparts in head office. The second response involves 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. In this case we tell the stories of two such innovations, one which was completed nearly ten years ago, and the other which is very much live and ongoing.

The first innovation involved building a plant to manufacture the product in liquid rather than powder form, which would enable them to sell directly into the North American market. The initiative was pushed by the managing director who approached the parent company in 1996 asking for a thirty million pound investment. This was approved quickly and the plant was built, up and running, within eighteen months. Initial sales in North America were very successful and therefore the plant was able to run at full capacity. But established players in North America responded by putting pressure on the company's new customers and gradually the company got squeezed out of the market. Fortunately there was sufficient flexibility in the new plant that they were able to take over some of the existing production capacity with considerably greater efficiency and increased quality – but an internal debate continues in the company as to whether or not this was a wise investment. As one of the key proponents commented:

It depends on who you talk to, I think the fact that we lost the business that was the main reason of building the unit in the first place tends to make people in [Head Office] say it wasn't a success. But I must admit it's one of the few things that actually gets me annoyed when I hear people saying that, because it was a very successful project. I'm biased: I was involved in a large part of it; it was the

first job I did when I moved into R&D was to work with that customer to get the process established from his point. [C16]

The second, and ongoing innovation is Project Ivan, which has been running for two years and involves cutting out several critical stages in the production process. If it is successful, it should 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 'slack' time (this is a local 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 6-7 scientists to work on Project Ivan for 18 months. The results of this study have been very encouraging and they now wish to move from the laboratory to a pilot production facility which will require capital investment and the recruitment of further staff. Both these decisions require approval from Head Office – which is proving to be very sceptical:

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 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]

An interesting feature here is that in order to encourage radical innovations the parent company has set up a substantial Innovation Fund to support the development of new ideas which fall outside the current R&D programme. But in this case the application by the Ivan researchers was rejected due to opposition from some scientists in Head Office, and because it does 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 is being undermined first because the project is not congruent with the past experience of decision-makers and second because it does not fit with the agreed direction of the organization. Of course, the problem is that 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 'normalisation' of radical innovation.

At the time of writing the debate is continuing and the Ivan team, plus senior managers from the plant, are working hard through their contacts in the Regional HQ and Head Office to influence the outcome of the decision in their favour. In some respects they recognise that they face an uphill battle because corporate policy is to concentrate future investments in the Asian region; but on the other hand recent changes to key positions suggest that they may yet get a sympathetic hearing.

Reflections. This case concentrates on absorptive capacity based on internal sources of knowledge. Since the company is one of the global leaders in its field, much of the technical expertise resides within the company in the collective experience of innovation and in the expertise of its scientists. The problem here is 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* exist to aid the decision, including technical and managerial visits in both directions, plus a formal working party which has been established to review the decision. But 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 the right position to influence the decision in the right direction, 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

regimes of appropriability are high because there is little transfer of personnel between competitors, the critical knowledge is mainly internal, and external contacts are 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.

3. Toward a Revised Model of Absorptive Capacity

In this paper we have selected three organizational cases which illuminate different aspects of the model of absorptive capacity. We are not seeking to test the model in any formal sense, but to populate it with 'live' case study data. This seems important since it was initially synthesised by Zahra and George (2002) from earlier studies, most of which adopted survey designs across larger samples of organizations.

In the main, we have found that our case studies substantiate the initial model in the sense that we are able to identify stories and examples which illustrate different aspects of the model. In particular the categorisation of external sources of information fits well with the data we have selected from WebCo and HealthCo, and the categorisation 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. The existence of social integration mechanisms was apparent in WebCo and ChemCo, although the issue of whether assimilated knowledge becomes transformed and exploited seems rather more complicated than suggested in the initial model. Finally, regimes of appropriability may have an impact on competitive advantage, but this seems to depend on the nature of competition – which is very different in each of these three cases.

Despite our confirmation that the model provides a valuable mapping of absorptive capacity our qualitative data indicates a number of areas where the model might be extended. This is not just to add complexity for its own sake; these features seem to be critical to a basic understanding of absorptive capacity in practice. In this section we discuss the main elaborations and extensions to the original model which are illustrated below in Figure 2. Using cross-case analysis we consider in turn: competitive

advantage and appropriability; timing and performance; politics; pro-activity; external competition; and boundaries.

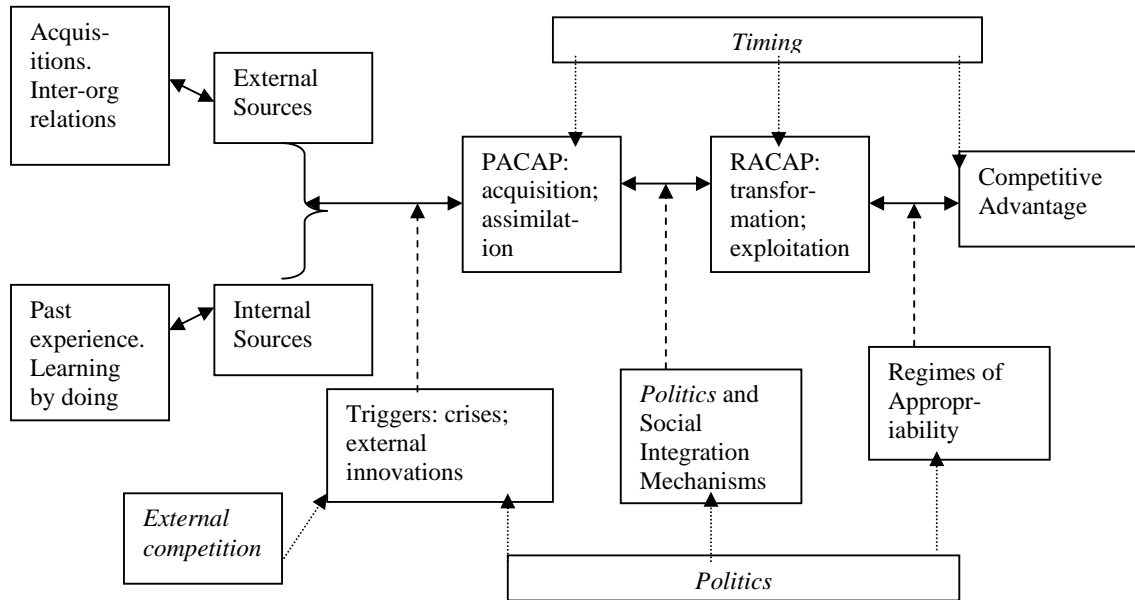


Fig 2: Amended and Extended Model of Absorptive Capacity

3.1 Competitive Advantage and Appropriability

WebCo operates in a highly competitive environment because there are potentially an unlimited number of players in the Internet business. Appropriability is low because products are easily visible on the Internet, all players indulge in ‘mystery shopping’ to test out their rivals, and most internal systems are commercially available on the open market. It is not so much the knowledge and its exploitation that is critical; more the particular combination of knowledge, systems, individual expertise, collective experiences, and general path-dependency that seems to be leading to sustained competitive advantage in this case.

For HealthCo, despite being a public sector organization, there is a degree of competition since there is a fixed pot of funding nationally, and allocations are essentially relative to the average performance across the system. Star ratings are also important for overall reputation and this affects the ability of institutions to attract the

best clinicians, which again feeds into reputation (although world-class clinicians can be a mixed blessing because pioneering treatments can absorb very high levels of resources). UK hospitals have very low appropriability because they are all subject to the same government guidance on 'best practice', and different 'tribes' within the hospitals (e.g. clinicians, nurses and administrators) all have their national professional networks, which encourage and facilitate information exchange. Nevertheless there are substantial performance differences between hospitals, which seem to depend less on ideas and knowledge, and more on the quality of management and leadership in each one.

The industry in which ChemCo is located has high appropriability because technical innovation is regarded as critical to competitiveness, and there is very little movement of personnel between companies. Competitive advantage, as indicated by market share and profitability, is highly dependent on the ability to make radical innovations. But it gets eroded quickly because there are very few players in the industry and people find out what others are doing by talking to customers. Therefore sustained competitive advantage can only be ensured by generating regular technical breakthroughs.

These observations generally support Proposition 7 in Zahra and George (2002) which states that: *'The regime of appropriability moderates the relationship between RACAP and sustainable competitive advantage'*. Thus, in ChemCo where appropriability is high, competitive advantage is linked to the exploitation of internally-generated knowledge. In WebCo and HealthCo where appropriability is relatively low, there is still a link between absorptive capacity and competitiveness. Though this is achieved not through establishing 'isolating mechanisms' (Zahra and George, 2002: 197), but through the particular combinations and configurations of knowledge that were adopted in each case.

3.2 Timing and Performance

Zahra and George comment that timing may be an important factor in competitive advantage, but do not elaborate much on this point, perhaps because their model is based mainly on studies that use cross-sectional research designs. The one exception in their literature is the longitudinal study of Hyundai (Kim, 1998) which shows how

senior management tended to construct 'crises' at different points in time in order to instigate change and rapid learning.

In our three cases above there a number of issues that had clear time dimensions. In WebCo the potential to absorb knowledge depended on what was available at that time: the absorption of a new acquisition provided a window of opportunity to identify, evaluate, and argue for the adoption of specific ideas and practices. This window may be longer in the case of larger acquisitions which take longer to digest; but in due course the strategic (and operational) attention shifts to the next acquisition target. In ChemCo, time was both a driver for generating innovations and provided a historical dimension to justify or resist the exploitation of new knowledge. Most significantly, time dimensions were linked to judgements about performance and competitiveness. In ChemCo the new plant was initially regarded as a great success, but several years later, following competitor reactions, opponents realised that there was sufficient evidence to demonstrate that it was a poor investment. In HealthCo we have noted the volatility of star ratings which shifted from two, to zero, to one, in the space of two years, and it seems that presentational factors had as much influence as enduring changes in underlying processes.

Given the apparent importance of the time dimension we have added it to the revised model in Figure 2, as an indication of the areas where it may have the greatest impact. Our data also raises questions about the construct of *sustained* competitive advantage, unless linked explicitly to a time dimension.

3.3 Politics

Although political issues do not often feature in survey-based research, they are a constant feature of qualitative and longitudinal research – and much of organizational life. In almost every interview held with managers and employees, political issues were mentioned spontaneously by interviewees once a degree of rapport had been built up, and as our map of actors and debates grew we were curious to explore as many sides of each issue as possible.

As far as the process of absorptive capacity is concerned, political issues are most relevant to the conversion of potential into realized absorptive capacity, and hence this

provides a different spin on *social integration mechanisms* –which are essentially managerial attempts to influence others. Examples of political processes include the debate behind whether or not to adopt systems from the WebCo acquisition; the complex political intrigue behind the decision of whether or not to fund the pilot testing of the new technology in ChemCo; and the continuous attempts of senior management in HealthCo to gather information both internally and externally, with ensuing debates within the top management team about the significance of this information for current strategic directions.

Thus in the revised model, political processes are the key to the conversion of potential into realized absorptive capacity. Social integration mechanisms may also be important, but they will only be introduced if management chooses to introduce them as ways of influencing other organizational members.

3.4 Proactivity

As we noted above in Kim's 1998 study, senior management tended to act proactively to influence perceptions and judgements of employees. This was also apparent in each of our organizations, although on the basis of what we have presented it was most apparent in ChemCo and HealthCo. In both cases managers had to spend a lot of energy maintaining relationships with, and influencing perceptions of, key stakeholders. In HealthCo they also spent much time trying to engage internal support for the required changes. The implications for the revised model in Figure 2 are two-fold. First, we have placed two-headed arrows between some of the central boxes, which fits with Zahra and George (2002) saying that there was not a given sequence to the various stages of their model.

Second, it is apparent that proactivity is important in other areas – for example in establishing structural conditions and external networks which make the acquisition of certain kinds of strategic information more likely – and these are again indicated by double-headed arrows. More widely our findings fit with the earlier views of Cohen and Levinthal (1990:137) who suggest 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."

3.5 External Competition

The previous research cited by Zahra and George (2002) identifies external innovations as a major trigger for absorptive capacity, but from our data above this seems to be too narrow. Within the research-oriented culture of ChemCo the threat of external innovations is always a driver, but it was the international competitive environment and the emerging corporate policy on future investment priorities which generated the primary feeling of crisis. Likewise in WebCo the rapid external market evolution and the changing structure of competitor firms were things which provided both the driver and the opportunity for innovation.

HealthCo was similar and different at the same time. The external evaluation procedure provided the main driver and sense of crisis to which the organization was responding. However there were also a large number of external innovations, both clinical and managerial, taking place elsewhere in the Health Service and which other hospitals were encouraged to follow, as 'best practice'. In this sense external innovations do not create a sense of crisis which leads to internal innovation; their absorption is part of the normal business of the hospital, which are strongly supported by professional and clinical norms; it would be more likely to provoke a crisis if this steady absorption was *not* taking place.

From these three cases it is the external competitive factors, rather than external innovations *per se* which are the main driver for generating and implementing new ideas. Hence we have modified the box in the model to refer to external competition.

3.6 Boundaries

The concept of absorptive capacity requires that boundaries can be clearly delineated around a given organization, but boundary definition is quite problematic when looking across our three organizations. First, the three organizations vary considerably in the permeability of their external boundaries: the boundaries of HealthCo are very permeable; those of the other two commercial organizations are much less so. Moreover, when members of an organization have external professional and business contacts, two-way flows of information become more likely, so in these cases the boundary becomes less easily defined. There are also problems with internal boundaries. HealthCo is part of a national healthcare system which employs around a

million people; it is also part of a regional organization and a member of a local consortium. In some functional areas, such as IT, it has to collaborate with other local health and public sector organizations; for clinical specialisms and training it collaborates with university hospitals in other regions of the country. Within its own boundary it has subunits each of which has strong local or professional identities that, in the minds of many staff, are far more important than the current definition of organizational boundaries.

Similarly ChemCo, as part of a multinational, has many layers: international, regional, national and plant levels. Across the organization there are different functional groupings such as HR, Finance, R&D, etc., each with their professional norms and rivalries. And the formal structure and reporting lines change from time to time from product divisions, to national groupings, to market segments, and so on. Additionally, as a multinational it is engaged in numerous alliances and joint ventures; and most of these partner organizations are also competitors for ChemCo in other sectors of the business. Even in the relatively small WebCo there are problems in defining boundaries as new acquisitions, and their employees, become absorbed into the parent organization. And this is not just a matter of natural osmosis; it requires considerable effort and attention to detail in deciding how far contracts, HR, training, information, finance and customer relations should, or should not, be standardised. We have not found a way of illustrating this point in Figure 2, but we raise it here, nevertheless, because it adds some complications to the overall idea of absorptive capacity.

4. Discussion and Conclusion

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.

Van den Bosch et al (2003) distinguish between the antecedents and outcomes of absorptive capacity. The antecedents identified in the present paper largely support the existing literature. Key sources of information lie both inside and outside the organizational boundaries, and the ability of the organization to appreciate and absorb this knowledge depends on factors such as existing internal expertise and experience,

and the internal processes for sharing information. The review of outcomes discussed by van den Bosch and colleagues covers innovation, expectation formation, adaptation, knowledge transfer and diversification, as so is wider than the 'sustained competitive advantage' proposed by Zahra and George (2002). Our data supports this wider definition not only because we have included a public sector organization in our sample, but also because there are clear interactions between performance factors and other features, which makes it hard to say which elements are at the end of the causal chain.

Our studies do add significantly to the existing literature by demonstrating the importance of political factors influencing what information is accessible, whose views and knowledge become 'legitimized', and how different performance criteria and judgments get accepted. It is a political process in the sense that there are different actors, factions and interest groups within any organization whose perceptions are influenced by their past experiences and whose interests are affected by their location and sense of organizational identity. The political process involves attempting to influence the perceptions of key stakeholders and decision-makers to move in the desired direction. This also helps to explain the conundrum of levels (Cohen and Levinthal, 1990) whereby there is a conversion from individual to organizational absorptive capacity.

Two other aspects are important: timing and pro-activity. Issues of timing were significant in all three of our cases, and this confirms the suspicion about the importance of timing (Zahra and George, 2002), and more generally about the importance of path-dependency (van den Bosch et al., 2003). Proactivity suggests that organizations do not absorb information without effort: it is a matter of deliberate will and policy. Both external and internal expectations can be influenced in ways that will affect access and use of knowledge (Cohen and Levinthal, 1990; Volberda, 1998), and efforts to influence one element of the process may well impact in unpredictable ways on other elements. This explains something of the non-linearity of absorptive capacity processes as suggested by Zahra and George (2002).

Throughout this study, and in our written account, we have been conscious that we have used methods to examine absorptive capacity, which are at variance with the methods used in research on which the model is based. At a superficial level support through methodological triangulation provides strong confirmation for the original

model, which in the main it does. At a further level, it is also clear that qualitative and longitudinal methods are likely to highlight aspects which are not noticeable using quantitative survey methods, and vice versa.

This is partly a matter of different forms of attention, and partly due to different logics of 'scientific discovery'. 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 judgments by researchers regarding which data, out of a huge set, to select and present in order to tell a story which is both coherent and faithful to the phenomena they have observed. 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 of method.

Finally, with regard to future research agendas we suggest, not surprisingly, that more work needs to be done on understanding the inner processes of absorptive capacity and that it would be most profitable to do this using longitudinal and qualitative methods. 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. We also think it is important to explore these phenomena in different kinds of organizations and national settings, provided there is sufficient consistency in the sample to make cross-case analysis worthwhile.

References

- Akgun, A. E., Lynn, G. S. and Bryne, J. C. (2003). Organizational learning: a socio-cognitive framework. *Human Relations*, 56(7): 839-868.
- Cohen, I. M. and Henderson, R. A. (1998). Absorptive capacity, coauthoring behavior, and the organization of research in drug discovery. *Journal of Industrial Economics*, 46(2): 157-183.
- Cohen, W.M. and Levinthal, D.A. (1989). Innovation and learning: The two faces of R&D. *The Economic Journal*, 99, 569-596.
- Cohen, W. M. and Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 35(1): 128-152.
- Easterby-Smith, M. (1997). Disciplines of organizational learning: Contributions and critiques. *Human Relations*, 50(9): 1085-1113.
- Eisenhardt, K. M. and Martin, J. A. (2000). Dynamic capabilities: what are they? *Strategic Management Journal*, 21(10/11): 1105-1121.
- Fiol, C. M. and Lyles, M. A. (1985). Organizational learning. *Academy of Management Review*, 10(4): 803-813.
- Kim, L. (1998). Crisis construction and organizational learning: Capability building in catching-up at Hyundai Motor. *Organization Science*, 9(4): 506-521.
- Lane, P.J., Salk, J.E. and Lyles, M.A. (2001). Absorptive capacity, Learning and performance in international joint ventures. *Strategic Management Journal*, 22, 1139-1161.
- Locke, K. D. (2001). *Grounded theory in management research*. London, Sage.
- Strauss, A. L. and Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. London, Sage.
- Teece, D. J., Pisano, G. and Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7): 509-533.
- Van den Bosch, F. A. J., Van Wijk, R. and Volberda, H. W. (2003). Absorptive capacity: antecedents, models and outcomes. *Blackwell handbook of organizational learning and knowledge management*. M. Easterby-Smith and M. A. Lyles (Eds). Oxford, Blackwell: 278-302.
- Volberda, H.W. (1998). *Building the flexible firm: How to remain competitive*. Oxford: Oxford University Press.

Zahra, S. A. and George, G. (2002). Absorptive capacity: A review, reconceptualisation, and extension.
Academy of Management Review, 27(2): 185-203.

Zollo, M. and Winter, S. G. (2002). Deliberate learning and the evolution of dynamic capabilities.
Organization Science, 13(3): 339-351.