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Oswald Jones and Martin Craven

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Absorptive Capacity and New Organisational Capabilities: A TCS Case Study

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Absorptive Capacity and New Organisational Capabilities: A TCS Case Study

Oswald Jones and Martin Craven
The Business School
Manchester Metropolitan University
Aytoun Street
Manchester, M1 3GH
Telephone: ++44 (0) 161 247 3733
E-mail: ossie.jones@mmu.ac.uk

Biography

Oswald Jones is Professor of Innovation and Entrepreneurship at The Business School (MMU) and was previously employed as a Senior Lecturer in Innovation Management in the Strategic Management Group at Aston Business School. After completing PhD at Manchester Business School in 1990, Professor Jones spent 3 years at UMIST School of Management as an ESRC Teaching Fellow.

Professor Jones has published widely in the general areas of innovation and technology management. Current research interests include the outsourcing of R&D, links between higher education institutions (HEIs) and small & medium-sized (SMEs) manufacturing firms in mature sectors, innovation networks and entrepreneurship.

Abstract

The term 'absorptive capacity' (Cohen and Levinthal, 1990), which describes the ability to assimilate new knowledge and skills, has been widely adopted in the study of collaborative links between organisations. In this paper the concept is used to examine the process by which participation in a Teaching Company Scheme (now know as TCS) helped develop managerial capabilities in a small manufacturing company over a two-year period. *RSL* is a family-owned business which has been in existence for forty years, has approximately 70 employees, and manufactures office supply equipment. It is concluded that improving absorptive capacity requires the introduction of new organisational routines which help codify tacit knowledge. Within RSL, such changes helped increase turnover by almost 25% during the two years the TCS programme was in operation.

Keywords: TCS, SMEs, absorptive capacity, managerial capabilities, case study.

Introduction

RSL, a family-owned business founded in 1954, has seventy employees engaged in the manufacture of office supply equipment. The company's main site in Birmingham produces a variety of sheet manila files, folders and wallets and also has a print department which accounts for an increasing share of turnover. Sheet metal products such as cabinets and trolleys are manufactured at RSL's Bristol site. Office wholesalers (Spicers, John Heath, Kingfield), contract stationers (Guilbert, Niceday) and direct mail companies (Viking Direct) account for 50% of RSL sales while direct sales account for the remaining 30%. In the mid 1990s RSL was acquired by a family trust fund set up by Philip White who appointed his three sons to senior managerial positions: William, Managing Director; Matthew, Marketing Director and Edward, Operations Director. The management team were concerned about a lack of new products and the growing power of large office wholesalers who were beginning to rationalise their suppliers. A chance meeting with a Teaching Company Scheme (TCS) representative encouraged William to consider the programme as a way of stimulating change. In September 1997 a TCS programme was established between Aston Business School and RSL.

The UK's Teaching Company Scheme (TCS) began in 1975 and supports partnerships between companies and universities for technology transfer and training (Baker, 1995; Howells, 2000; Peattie, 1993; Senker and Senker, 1995). TCS programmes are financed by government and participating firms whose joint contribution is paid in the form of grant to the university partner. These funds support the employment of one or more young graduates, known as TCS associates who work on company projects designed to stimulate innovation. TCS partnerships focus on introducing new or improved products, services and processes as well as identifying new market opportunities (Senker and Senker, 1994). In recent years, TCS has been acknowledged as the government's premier technology transfer scheme (Quinquennial Review, 1996). This owes much to the scheme's design which helps overcome barriers to the acquisition and retention of organisational knowledge.

> 'It is not sufficient for a firm to access useful knowledge. It has also to organise methods for the internal diffusion of new knowledge, to ensure that knowledge which is received from external sources is communicated and utilised effectively throughout the organisation' (Senker and Senker, 1994:81).

My[1] objective in the paper is to examine the process by which participation in TCS helped develop managerial capabilities within a small manufacturing company. To do this, I utilise the concept of 'absorptive capacity' (Cohen and Levinthal, 1990) which describes the organisational ability to assimilate new knowledge and skills. The paper begins with a review of literature associated with innovation networks and absorptive capacity and this is followed by a discussion of the research methodology. The next two sections present the empirical data which illustrate the way in which the creation of new organisational routines (Nelson and Winter, 1982) contributed to the expansion of RSL's capacity to innovate new products. I then discuss the implications of this case study for a broader understanding of absorptive capacity.

Actors, Knowledge and Networks

Innovation networks incorporate the formal and informal linkages which are established within and across organisational boundaries as a means of capturing codified knowledge represented in specifications, reports and software as well as tacit knowledge which can only be communicated by direct social interaction (see Nonaka and Takeuchi, 1995). Networks are formed or emerge in response to some perceived need within organisations for knowledge which will contribute towards the development of new products, processes or services (see Freeman 1991; Robertson, Scarbrough and Swan, 2000). Network formation is a process by which random patterns of social activity which are gradually institutionalised into organisational routines (Nelson and Winter, 1982; Clark, 2000). Data, documents, software and the setting of standards are the basis for information transfer between

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[1] This joint paper is written in the first person because it is concerned with the perceptions of the first author who acted as academic supervisor on the project (Martin Craven was the TCS associate).

organisations. Such information transfer is associated with the role of *boundary spanners* (or *gatekeepers*) who are responsible for collection, evaluation and dissemination (Allen, 1971; Tushman and Scanlan, 1981; Tidd *et al*, 1997; Scarbrough, 1999). But as Simmie (1997:329) points out 'Even highly -qualified professional workers are limited in their abilities to innovate without adequate public and private funding'. Knowledge creation requires access to a wide-range of information and is central to the process of organisational learning (Nonaka and Takeuchi, 1995). Tidd *et al* (1997) argue that different network types provide different opportunities for learning. The authors also see collaboration as an important mechanism for the acquisition of new organisational competences or capabilities.

Collaborative links between organisations are a widely accepted means of acquiring new knowledge and of expanding existing capabilities (Kreiner and Schultz, 1993). Recent contributions to resource based theory suggest 'that firms's competitive advantages derive from their preferential access to idiosyncratic resources, especially tacit knowledge' (Dussauge *et al*, 2000; Penrose, 1959). Effective collaboration helps combine resources in ways which provide benefits for all partners. It is further argued that there are more opportunities for learning between competitor firms because they operate in similar contexts and have 'overlapping dominant logics' (Hamel, 1991). Results from a study by Dussauge *et al* (2000) indicate that firms are better able to acquire new capabilities when they have competence in similar areas (see Hennart, 1988). This confirms work by Cohen and Levinthal (1990:102) who argue that having knowledge or skill in a related area 'confers an ability to recognise the value of new information, assimilate it, and apply it to commercial ends'. Although learning at an organizational level depends on the absorptive capacity of key 'gatekeepers' it is more than the sum of individual contributions. Cohen and Levinthal (1990) argue that identifying absorptive capacity means examining structures of communication between 'the organization and its environment' as well as between subunits. Knowledge acquired by boundary spanners must be passed to those who can further assimilate and disseminate it throughout the organization. It is also important to understand how to access organizational knowledge which incorporates 'know-how' (von Hippel, 1987) and 'know-who' (Rogers and Kincaid,

1981).

Cohen and Levinthal (1990) obtained cross sectional survey data from1719 business units representing 318 US manufacturing firms. R&D intensity was used as the dependent variable and three factors, technological opportunities, appropriability and demand conditions, were hypothesised to be the 'principal determinants'. Statistical analysis revealed that firms with effective absorptive capacities (high R&D spend) had low spillovers because external knowledge was appropriable through patents and learning curve advantages (Cohen and Levinthal, 1990:145). In recent years there have been a range of studies examining the nature of absorptive capacity in a number of organisational settings (Autio, Sapienza and Almeida, 2000; Van den Bosch, Volberda and De Boer, 1999; Makri, 1999; Mangematin, 1999; Vozikis, 1996; Prevezer and Toker, 1996). Most researchers adopt similar quantitative methods to those used in the original study. For example, Mukherjee *et al* (2000) use a statistical approach to analyse data on 16 machining and assembly lines in a single site. Absorptive capacity was measured by 'production line performance in terms of labor productivity and conformance quality' (Mukherjee *et al*, 2000:157). A study of 290 Flemish R&D companies utilised bi-annual questionnaire data to evaluate their effectiveness in accessing external technological knowledge (Veugelers, 1997). Again R&D expenditure was used as a proxy for absorptive capacity but Veugelers also included an educational measure based on the number of R&D employees with doctorates:

> 'If willingness to absorb of a researcher is related to his (*sic*) scientific
> profile, this could lead to higher absorptive capacities for firms employing
> doctors (Veugelers, 1997:313).

As Veugelers points out more work is needed to identify firm-specific characteristics which generate absorptive capacity. R&D is clearly significant in some sectors but other factors including 'cumulative experience' and 'central positions in networks' are also important. More general organisational characteristics such as internal structures and HRM policies 'could give additional evidence on the potential to assimilate external ideas, further characterizing what could generate absorptive capacity' (Veugelers, 1997:314). To date, no studies have attempted to utilise a

detailed qualitative approach to study absorptive capacities in smaller organisations.

Research Methods

The data for this paper were acquired through my participation in a TCS established between RSL and Aston Business School in September 1997. There were two main source of information first, as academic supervisor I visited the company for half-a-day every fortnight for the two years the scheme was in operation. The majority of this time was spent providing help and guidance to the TCS associate and in team-meetings (between one and two hours) with the associate and managing director (industrial supervisor). The second source of data was the associate himself who acted as a participant-observer during his two-years working in RSL. Information on activities within the company was passed to me informally during our meetings and formally in submission of a MSc dissertation (Craven, 1999). Hence, the data presented in this paper are based on my own observation of activities in RSL over a two-year period and Martin Craven's experience of acting as TCS associate in the company. The MD had two main objectives for establishing the TCS: first to strengthen the company's market position by introducing a range of new products. Secondly, to create a 'more innovatory culture' within the company by institutionalising the search for new ideas and the mechanisms for turning those ideas into new products. Change was initiated in RSL by the MD who recognised the need to become more proactive in the introduction of new products. On a day-to-day basis Martin was the initiator of change as he was responsible both for the development of new products and the introduction of new 'innovation routines' to the company.

It is a major weakness that most research concerned with innovation, change and knowledge creation lacks a temporal dimension (exceptions include Fincham *et al*, 1994; Thomas, 1994; Webb, 1992). Although, as Loveridge and Pitt (1990:2) point out single cases are criticised because results are not generalisable (see Gummerson, 2000). In stating the advantages of case study research Yin (1994) claims that observing a 'chronological sequence' permits investigators to 'determine causal events over time'. Establishing causality in highly complex social organisations is

extremely difficult whatever methodology is adopted. Rather, as Barley (1986:81) argues mapping 'emergent patterns of action' demands a detailed qualitative approach: 'Retrospective accounts and archival data are insufficient for these purposes since individuals rarely remember, and organizations rarely record, how behaviors and interpretations stabilise over the course of the structuring process'. In discussing shifts from micro to macro levels Hamel *et al* argue (1993) that objectives are more important than the number of confirmatory cases. This refers to the distinction between statistical generalisation (Yin, 1994), in which inference is made about a specific population, and analytical generalisation, in which empirical data are compared with a theoretical 'template'. This two-year study of RSL is intended to reveal those managerial processes which contribute to an organisation's absorptive capacity.

Extending RSL's Absorptive Capacity

The three brothers occupying senior managerial roles in RSL all had recent experience in other organisations. William White, MD, previously worked as a stockbroker, Matthew White, sales and marketing director, had been employed by a major international company and Edward White, operations director, had also had a managerial experience in a large organisation. Two non-family members completed the senior management team: works manager Derek Breeze was a long-serving employee of the company while finance manager, Brian Wilson, had recently been recruited from a senior position in medium-sized manufacturing company. Consequently, the management team, unusually for a company such as RSL, had broad experience in other sectors and were willing to consider new ways of working. For the first weeks of the programme Martin spent his time getting to know people, developing his understanding the product range and identifying ways in which change could be enacted. William White provided Martin with considerable amount of insight into how he managed the company and the areas which he felt needed most attention. These discussions helped clarify the programme's objectives as originally agreed between industrial and academic supervisors with guidance from the regional consultant representing the Teaching Company Directorate. The

objectives for RSL's were as follows:

1.   develop a structured approach to new product development;

2.   review new market and product opportunities;

3.   fully utilise skills such as technical drawing and basic manufacturing competences;

4.   develop a bill of materials for each product to improve costing and redesign;

5.   improve company growth by introducing new and improved products.

Change does not take place in organisations without someone recognising the potential for improvement. The new owners were galvanised by a lack of innovation in the company and declining markets for the majority of their products. Participation in the TCS was certainly a very significant strategic decision (Kanter, 1983) taken by the new management team. It was decided that developing a positive attitude to innovation within RSL meant that early projects should be incremental rather than radical. Redesigning existing products to reduce manufacturing and assembly costs was less risky than creating an entirely new and untested products or concepts. In the first few days of the TCS project an informal meeting occurred between William White, Matthew White and Martin. William described the TCS to Matthew and they then discussed Martin's priorities:

> MW: If you look at the catalogues you will see two American companies, Rolodex and Bates, who are also selling similar products. The problem is we just cannot compete. The products are featured on the same catalogue page and as the most expensive it's not surprising that sales are declining. Currently our manufacturing cost for the *rotanote* is about £8.50 and this is too much. If we can get this down to about £5 we'll be able to secure our current sales and be in a position capture more of the market.

> WW: On reflection this is as good a place as any to start. I suggest that Martin familiarises himself with our *rotanote* so that he can improve it.

During these first two months I, in my role as academic supervisor, met Martin on a regular basis both in RSL and in my office at ABS. I was keen to hear his analysis of the company's activities and provide him with the means by which he could

stimulate change. Some of this time was also spent in joint discussions with MD William White. Over the next few months Martin focused his attention on two issues: first, a redesign of existing products (*rotanote* and *platfile*) to reduce manufacturing costs and improve customer appeal. Secondly, the introduction of mechanisms to help all employees contribute to the innovation of new products and processes.

New Routines and Absorptive Capacity

The appointment of Martin as TCS associate was in itself a significant departure from tradition. If the project was to succeed he needed access to resources and the unambiguous support of senior managers. Although inexperienced he was enthusiastic, committed and hardworking. Also, given the low-tech nature of RSL's products it was relatively easy for him to become familiar with the manufacturing processes. He demonstrated his competence by quickly creating a bill of materials for each product which significantly improved stock control. These breakdowns were also the basis for deciding which areas had most potential for improvement. Although it was originally intended that Martin should concentrate on the *rotanote*, it was decided the *platfile*, which was increasingly unpopular with customers was a more pressing problem. Variations in storage capacity required a range of central pivot-poles to accommodate one, two, three or four levels. Consequently, it was necessary for customers to stock a full set of pivot-poles to meet end-user demand. The first stage of the process was to examine trade journals for competing products which possessed more attractive design features. Prior to this no-one in RSL had given serious consideration to how the *platfile* could be improved

I adopt the term ' new routines' to indicate revised working practices within RSL (for a detailed review of 'routines' see Clark, 2000). Table 1 summarises the eight activities (routines) associated with moving from revised concept to a prototype of the modular *platfile*. To illustrate the emergence of a new routine I briefly describe activities associated with the 'literature scan'. RSL managers and staff were regularly exposed to a wide range of information contained in trade journals, newsletters and product promotion material. As a result of Martin's intervention,

employees at all levels were encouraged to see this literature as a means of stimulating ideas about improved products. Rivals to the *platfile* had begun to appear in the UK office supply catalogues and it was noted that one particular design was modular. Modularity meant fewer components, less confusion for end-users and less logistical problems associated with delivery. The competitor's version of the *platfile* had smaller, standard stem sections that were packed with base platforms. End-users did not have to order separate stems and the components were unlikely to get lost in transit. This simple scanning of the literature by RSL employees provided Martin with a 'template' for redesign of the *platfile*. The new *routine* encouraged all staff to be more analytical when examining trade journals and to pass on useful information to Martin who then carried out detailed investigations. Table 1 describes the development of the 'modular *platfile*' from idea to prototype.

Table 1 Redesigning the Platfile

Organisational Routine	Associated Activity	Contribution to Modular Platfile
Literature Scan	Managers and staff encouraged to examine trade journals, promotion materials, supplier catalogues.	Identified products with appropriate design features
Customer Contacts	Sales staff encouraged to build strong relationships with customers as a means of identifying future needs	Indicated major failings of existing product
Trade Shows	Informal discussions with staff from competitors and observation of their products helped stimulate ideas within Rotadex	Valuable information on competitor prices and future plans
Competitor Price Check	Before initiating new projects it is important to be aware of competitor prices and to estimate likely manufacturing costs	Calculated target price & set maximum production costs
Customer Input	Regular meetings with wholesalers and contract stationers provided the opportunity for informal discussions about potential new products	Customers complaints about stocks of various stem sections
Supplier Input	Many components were bought-in and suppliers were encouraged to contribute their suggestions for improvements to quality and cost reductions	One major supplier contributed design & engineering skills not available in RSL
Reverse Engineering	Unlikely to be any radical new products in such a mature industry - therefore - examination of existing products important in reducing material content & manufacturing costs	Detailed analysis of competitor product most similar to desired design
Prototype Development	Even incremental changes demand prototypes to evaluate operation and appearance - even more important with new products (or major modifications)	Prototype unstable - manufacturing tolerances changed

There are two important points to make with regards to the routines outlined in Table 1. First, it is not suggested that the eight 'routines' were discrete events. For example, activities associated with routines such as 'customer contacts' and 'customer input' were strongly linked. Secondly, my intention is to provide a deeper insight into the links between routines and absorptive capacity by describing in more detail those higher level routines which helped shape operational routines associated with the *platfile* redesign. These factors, summarised in Table 2, are examined in the

next section.

The LMC (local management committee)

The quarterly LMC (local management committee) meetings represented a significant change within RSL. All TCS grant applications must be accompanied by an outline of the associate's weekly tasks and details on deliverables. In conjunction with the TCD (teaching company directorate) consultant, academic and industrial supervisors agree, in advance, the nature of these company outcomes. At subsequent LMC meetings supervisors and consultant are required to evaluate 'progress against the objectives' as well as restating 'deliverables for the next three months'. During the two years of the RSL scheme there were seven Local Management Committee meetings beginning with LMC0 (28th October 1997) and ending with LMC6 (17th September 1999). Each meeting followed a similar agenda and had five main elements:

- Industrial supervisor's report in which William White outlined progress in relationship to the company's corporate plans;

- Associate's report in which Martin described his main activities since the previous LMC and set out his progress against the TCS objectives (set out in the original timetable);

- Martin also presented 'develiverables' for the next three month period and where there were variations from the original timetable these had to be agreed by all participants;

- Academic supervisor's report in which I discussed Martin's academic progress (he was studying for an MSc in Innovation) and assessed his practical contribution to RSL;

- As academic supervisor I was also responsible for presenting the financial statement which detailed spending to date and future commitments of resources.

LMCs were important for ensuring that Martin's day-to-day activities were contributing to the scheme's overall objectives. TCD consultant David Britton was responsible for monitoring progress against milestones set out in the original plan. These meetings also represented a key 'learning' mechanism by which new

knowledge was absorbed into the organisation. For example, David Britton had many years of engineering experience and emphasised the benefit of redesigning existing products. I stressed the importance of a structured approach to both the improvement of existing products and the evaluation of new ideas. LMCs provided an ideal forum to discuss how ideas associated with the 'new product development process' could best be introduced. After some debate in LMC1 it was agreed to constitute a new product development committee (NPDC) to evaluate ideas and allocate resources to their development.

The NPDC and ICF

Early in January 1998 TCS objectives were outlined to staff emphasising the need for new products to help ensure the company's long-term survival. Sales representatives and service staff were encouraged to listen carefully to customers as a way of identifying new opportunities. Martin suggested an 'idea capture form' (ICF) could be distributed to all employees helping stimulate involvement. The ICF proved an important factor in translating tacit knowledge possessed by managers and employees into codified knowledge. The new product development committee (NPDC) was central to institutionalising innovatory activity within the company. William agreed with Martin's suggestion that membership should extend beyond the three company directors and the first meeting with a team of six took place on the 3rd March 1998:

William White	Managing director
Matthew White	Sales and marketing director
Edward White	Operations director
Derek Breeze	Works manager
Maggie Ford	Sales representative
Martin Craven	Teaching Company Associate

William also agreed that at the first meeting Martin should explain to the other members why the NPDC was being set up:

'New product development has been identified as an area that should

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receive greater focus. To aid development of successful new products a new product development committee (NPDC) will be formed. One fundamental objective of the NPDC is to bring together a range of knowledge, skills and experiences that will directly affect the development of new products. The NPDC will guide development of new products along a path thought to be of most benefit to the company.'

Over the next two years the NPDC met on a monthly basis for approximately two hours (17.00 to 19.00 hours) and it was rare for any of the six participants to miss a meeting. In the first instance, new innovation activity within Rotadex focused on improving two existing products which were losing-out to competitors because of high manufacturing costs and unattractive design features. Therefore, in the first 12 months of the programme Martin concentrated on redesigning the *platfile* and the *rotanote* (RSL's version of the better known *Rolodex* rotating business card file). As discussed above, the 'modular' *platfile* was the result of a redesign which eased transportation and improved storage capacity. Modifications to the *rotanote* halved manufacturing costs and resulted in a product which was extremely attractive to customers. By the end of 1999 sales of the two redesigned products contributed an additional £312,000 to turnover and in the first full year of production (2000) it was estimated this would increase to almost £600,000. Turnover the start of the TCS in 1997 was £2.5 million and consequently, a modest investment in the TCS of £35,000 had an immediate and significant impact on company finances. The success resulted from William's clear criteria for the introduction of new products:

WW: 'Realistically I'm looking for two or three products per annum that generate at least £50,000 of turnover in the first year.'

MC: 'Why £50,000?'

WW: 'If you can't get that level of turnover then it's probably not worth the effort. As we try to operate on a third gross margin £50,000 sales will generate about £16,000. By the time we've administered those products net profit pa is even less. So, if new products can't generate £50,000 sales in the first year it's not worth the resources we put into their development.'

The drive to 'routinise' information processing was successful and after Martin's

initial screening 26 ideas were passed-on to the NPDC for formal evaluation. Following this early surge, suggestions continued to be submitted in a steady flow. Gradually, less formal methods of passing-on information such as e-mail and post-it notes were utilised by staff. However, submission of ideas to the NPDC did not always lead to new products and more than 40 which were given serious consideration and then rejected are identified in Appendix 1. My view is that these 40 'failures' are not evidence of weaknesses in the system. Rather, any scheme for evaluating new products is heavily dependent on the subjective judgements of those participating in such meetings. As pointed out by Coombs *et al* (1987) it is the managerial discipline imposed by such *routines* which is important rather than the sophistication of the evaluation criteria. At the same time, creating an innovatory culture within any organisation means that it must be accepted that some projects will fail or be rejected. The other key changes were concentrated on communication between the three main actors associated with the TCS programme in RSL.

RSL-Aston Meetings

My meetings with Martin generally occurred during my fortnightly visits to RSL and also on his weekly visits to ABS during which time he attended his MSc lectures. One of courses Martin studied during his first term (October to December 1997) was my postgraduate module: The Management of Innovation. I encouraged Martin to utilise concepts from the course as a basis for introducing new ways of working in RSL. One of the key factors which I emphasised was the importance of adopting a structured approach to new product development. I also suggested that it would be useful if he identified RSL's core competences as a basis for deciding how best to pursue the innovation of new products. At a more general level I spoke about the need to create an 'entrepreneurial culture' within RSL by encouraging employees at all levels to think seriously about the development of new products and processes. I also used my practical experience of managing change to help Martin deal with problems associated with new product development. Early in 1999 his attempt to introduce the redesigned *rotanote* was hindered by late delivery and poor quality components from suppliers. I explained that such difficulties were typical of the introductory stages of new products and not the result of lack of preparation on his part.

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I spent a considerable amount of time meeting jointly with William and Martin during the two years of the scheme. These meetings usually focused on operational issues such as Martin's current activities and their contribution to the scheme's overall objectives. I also used the meetings to suggest improvements to the way in which RSL operated. One factor which I believed to be central to the overall success of the programme was the need to ensure innovation be viewed as a strategic issue within the company. In other words, the TCS should not simply focus on operational improvements but the senior management team should link the introduction of new products to their broader strategic vision for the company. William accepted this suggestion and decisions related to the introduction of new products began to have a more strategic focus (see Appendix 1). In addition, William initiated RSL's first 'strategy away day' in the middle of 1998. There were also regular meetings between William and Martin but as I was not party to these discussions I cannot report on their direct impact on RSL's absorptive capacity. Although I believe that one of the main reasons for the success of the TCS was the time spent by William in this 'mentoring' role.

Table 2. Increasing Absorptive Capacity

Organisational Routine	Organisational Activity	Organisational Benefit
Local Management Committee	Industrial & academic supervisors, TCD consultant and associate meet to discuss progress	Key forum for organisational learning
New Product Development Committee	Monthly meetings of senior manager and staff to formally evaluate new product ideas and to report on progress of those 'in the system'.	Linked innovation to strategy and helped disseminate ideas and information
Idea Capture Form	Encouraged all staff to contribute new ideas as well as suggesting improvements to existing products	Translated wide range of tacit knowledge into codified knowledge
Fortnightly meetings (WW, MC, OJ)	Open discussions (1 to 2 hours) in which the 3 main participants evaluated progress	Ensured that operational (practical) issues were given full attention
Weekly meetings (MC & OJ)	Meetings provided the opportunity for academic input into company activities	Identification of core competences + structured approach to NPD

Discussion: Organisational Routines and Absorptive Capacity

Since the publication of Cohen and Levithal's (1990) paper there has been increasing interest in the topic of absorptive capacity. The majority of scholars have adopted similar quantitative techniques as used in the original paper. As a consequence, such factors as 'R&D intensity' or 'labour productivity' have been used as proxies for absorptive capacity. While I acknowledge that R&D spend is an important element in knowledge acquisition I also believe that the ability of a managers to extend existing capabilities depends on the mobilisation of broader organisational resources. This is particularly important in smaller companies in which there is unlikely to be any commitment to R&D. There are two strands to my argument: first that an organisation's absorptive capacity can only be identified by adopting qualitative research methodologies. Quantitative approaches may provide some evidence on improvement in organisational performance but cannot demonstrate the way in which organisations actually absorb and utilise new knowledge. Secondly, I believe that it is essential to identify those organisational routines which are central to the translation of tacit knowledge into codified knowledge which can then be disseminated throughout the organisation. I have attempted to illustrate this process by an analysis of activities within RSL over a two year period. During this time a number of new routines were introduced into the organisation and in combination they helped with the introduction of new products and with the evaluation of a range of other opportunities including outsourcing and acquisition.

The LMC, the NPDC and the idea capture form were the most important vehicles for mobilising collective learning within RSL. At a basic level, idea generation was represented by the forms which were easily available to all employees. Much more significantly, the form was a catalyst for changing the way in which RSL employees performed their day-to-day activities. Employees at all levels realised that the ICF provided a mechanism by which their ideas could be brought to the attention of senior managers. Many employees also engaged in regular discussions about how processes could be improved and compared ideas for new products. It was also important to ensure that this was not a transitory effect after which employees lapsed back into previous ways of working. Everyone was kept informed about the progress of their ideas and a regular newsletter provided information on how new products

were contributing to improvements in the 'bottom line'. The new product development committee (NPDC) was central to internal changes in RSL. Early in the programme it became apparent that the management team did not have formal meetings. Instead, managers relied on informal meetings for passing-on information and decision-making. This informality appeared to work because three brothers formed the senior management team and there were no doubt family occasions on which key decisions were discussed. Nevertheless, the absence of formal communication channels within RSL was not commensurate with a professional approach to management. The NPDC provided managers with a regular opportunity to discuss both operational and strategic issues as part of the debate about new products. The LMC was the main mechanism for controlling the TCS programme and for input of new ideas to RSL. Along with TCD consultant, David Britton, I was able to make suggestions about the future direction of RSL. For example, David emphasised the importance of engineering design (Martin was not a specialist in this area) and William eventually agreed to participate in a 'follow-on' TCS based on product design.

Martin adopted a boundary spanning role which enabled him to build a range of network links with external actors including academics in Aston Business School, TCS associates on other programmes, as well as existing customers and (potential) suppliers. As a result of his observation of activities within the company Martin felt that a lot of potentially useful information was being lost because there were no mechanisms by which to capture or pass-on that information. It was essential to create mechanisms by which individual tacit knowledge could be turned into an organisational resource (Nonaka and Takeuchi, 1995). Mechanisms such as the NPDC and ICF were intended to help employees consider how their daily activities could be directed towards innovation and to encourage the sharing of ideas. The concept of routines is important because of the link between innovation and prior-related knowledge. The basis of change in RSL was the mobilisation of existing knowledge *via* such new routines as the 'literature scan' and the 'idea capture form'. I suggest that routines represent organisational absorptive capacity but at the same time provide the opportunity to expand existing skills and knowledge. Within RSL this was done through such mechanisms as the LMC, the NPDC and the ICF as well

as through the informal interaction between myself, William and Martin. Some of the new knowledge was technical such as computer-aided-design (CAD), using the internet or constructing a website. Other key areas of new knowledge were related to the management of innovation such as: product life cycle, core competence, innovation strategy, new product development, building and sustaining networks and creating a more risk-taking environment.

Conclusions

In recent years a number of terms have been utilised to indicate the ability of organisations to acquire new knowledge: learning organisations (Senge, 1992), knowledge creation (Nonaka and Takeuchi, 1995) and knowledge management (Davenport and Prusak, 1998). All these concepts are helpful in understanding some of the mechanisms associated with the notion of 'organisational learning'. Because I have concentrated on the *process* by which knowledge is acquired and utilised, rather than the nature of knowledge, I have adopted the term absorptive capacity (Cohen and Levinthal, 1990) which describes the way managers mobilise their resources to identify, obtain and utilise new knowledge. The absorptive capacity of any organisation depends on the role of key boundary spanners who link the organisation to its environment. Boundary spanners are not only responsible for external linkages they must also encourage the dissemination of knowledge throughout the organisation. Contacts with customers, suppliers and even competitors can be an important way of identifying potential business opportunities. Effective innovation is reliant on managers instituting appropriate mechanisms for the capture and sharing of such information. To date, absorptive capacity has been measured by 'R&D intensity' or 'labor productivity'. I concur with Veuglers (1997) who, though his study was based on questionnaire data, argued that there needs to be more work on the firm-specific factors which contribute to absorptive capacity. Therefore, I believe that establishing the nature of absorptive capacity requires the adoption of longitudinal approaches to research. In other words, knowledge capture is a process rather than a one-off event and studies based on cross-sectional quantitative data are unlikely to reveal the social activities associated with the

management of expertise (Scarbrough, 1996).

In this paper I have utilised data collected during a two-year study of RSL, a small manufacturing company based in Birmingham, in which managers had recognised the need to innovate new products. The MD, William White, decided that participation in the UK's TCS (TCS) would provide the resources required to improve managerial capabilities within the company. I have focused on the role of the TCS associate, Martin Craven, who acted as a boundary spanner for the two years the scheme was in operation. The introduction of new organisational routines helped make a substantial improvement to RSL's competitive position with an increase in turnover of almost 25%. In particular, routines associated with the NPDC and ICF led to the introduction of new products which increased revenues, improved competitiveness and enhanced customer perceptions of the company. My argument is that activities associated with these organisational changes helped improve RSL's absorptive capacity. Formalising decision-making activities as well as institutionalising mechanisms for knowledge capture helped mobilise existing capabilities while at the same time providing managers with new ideas for developing the business in the longer term. I suggest that the RSL case is important because it demonstrates that even in extremely mature sectors dynamic managers can successful simulate the search for new business opportunities. The case also indicates how relatively simple organisational changes can help mature organisations become more innovative and improve competitiveness.

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Appendix 1: Products Rejected by NPDC

New Product Project	Reason for Rejection
1. Tonzex	UK distributor already established
2. Letter Trays	Manufacturing cost too high
3. Desk File Redesign	Lack of skills to achieve acceptable design
4. CPL	Unlikely to achieve £50,000 p.a
5. Cigarette Bins	Not our business area
6. Collapsible Lever Arch File	Lack of skills to achieve acceptable design
7. Hard Concertina File	Market too small
8. Cable Management Into Av Equipment	Other projects considered more important
9. Vehicle Stickers	Other projects considered more important
10. Monitor Top Storage Device	Other projects considered more important
11. Smaller Desk Turning Filing Product	Lack of skills to achieve acceptable design
12. Pivoting Desktop Storage	Lack of skills to achieve acceptable design
13. Rotary Multi-media Storage Units	Unlikely to achieve £50,000 p.a
14. Acetate Presentation Dispenser	Other projects considered more important
15. To-Do-List Pads	Unlikely to achieve £50,000 p.a
16. Large Mini Card	Other projects considered more important
17. Ceiling Storage Equipment	Lack of skills to achieve acceptable design
18. Laptop Fold Down Table	No market for the product
19. Bar-code Tracking Systems for Files	Lack of resources for this large project
20. Notebook Projector Distribution	Unable to find suitable supplier
21. AV Trolleys	Lack of skills to achieve acceptable design
22. CB Chemicals	Unlikely to achieve £50,000 p.a
23. Monitor Arm	Lack of skills to achieve acceptable design
24. Plastic Lever Arch Rack	Prototypes rejected by customers
25. Document Grip	Unlikely to achieve £50,000 p.a
26. Rotary Menu Holder	Prototypes rejected by customers
27. Special Open Front Wallet	Other projects considered more important
28. Vehicle Maintenance Records File	Lack of understanding in this industry
29. Swinging Cupboards	Other projects considered more important
30. Collapsible Screening and Partitioning	Lack of skills to achieve acceptable design

31.	Journal Holder	Unlikely to achieve £50,000 p.a
32.	Signature Book	Prototypes rejected by customers
33.	Multi Compartment Bin	No market for the product
34.	Office Partition Range	Lack of resources for this large project
35.	Desk Carousel	No market for the product
36.	Chip-guard Stand	No market for the product
37.	Additions to LAR	Lack of skills to achieve acceptable design
38.	Return Call Pads	No market for the product
39.	Chip-guard with Storage	No market for the product
40.	Presentation Boards Distribution	Unable to find suitable supplier
41.	Inkjet Cartridge Re-filler	No market for the product
42.	Computer Cables	Unable to find suitable supplier
43.	Fireproof Server Unit	Lack of resources for this large project