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SME INNOVATION

PRACTICE AND NEEDS, LESSONS FROM THE PrISMS PROGRAMME

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SME Innovation – practice and needs, lessons from the PrISMS programme

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Innovation management is widely recognised as an integral part of strategic thinking in firms, and has become an area of rapidly growing interest within academia and industry. However, amid calls for practical approaches to support implementation of innovation in smaller manufacturing firms, there is a lack of practice-based knowledge about innovation management in such companies and how it is related to and influenced by their operational strengths and constraints.

This paper reviews the innovation practices and needs of seven manufacturing SMEs by drawing on data from outputs of the PrISMS project, a European-funded manufacturing development programme, in the context of the SME innovation literature. Using data from the PrISMS programme we explore how this small group of SMEs approach innovation drawing upon their operational context, looking at their current practices and where they require further support to grow their businesses sustainably.

1. Introduction

PrISMS is a programme for SMEs and Start-ups in the UK's Eastern Region funded by the European Regional Development Fund (ERDF). The programme is designed to help companies grow their business in a sustainable way. It targets manufacturers with up to 250 employees, who wish to grow their business while reducing their costs and overall carbon footprint and accept fully-funded independent help from experienced practitioners to achieve this. Established businesses receive support for identifying company's key issues and priorities, establishing a successful business strategy, determining the most appropriate market and product combinations (Product Market Groups or PMGs), attracting more customers, building necessary capabilities and reducing environmental impact. Firms that apply for PrISMS support are selected based on their ambition, ability to grow revenues and create jobs as well as their potential for, and commitment to, reducing their resource and environmental impact.

The PrISMS programme addresses all manufacturing sub-sectors and believes that the needs of these resource constrained firms have not generally been

taken into consideration. PrISMS is distinct from other approaches used to improve manufacturing as it is aimed at enabling manufacturing SMEs to strategically review their business, adopt low carbon practices and generate jobs, rather than just improving productivity.

The business support offered in PrISMS has been developed and refined over several years in collaboration predominantly with companies in the East of England and the West Midlands. It aims to enable SMEs to achieve sustainable economic and employment growth that will lead to a long-term positive impact to the economic growth of the UK.

2. Literature Review

2.1 *The importance of SMEs to European economy*

Micro, small and medium-sized enterprises are socially and economically important, since they represent 99% of all enterprises in the EU. They provide around 65 million jobs and contribute to entrepreneurship and innovation (EC 2009). Supporting small innovative businesses is critical for enhancing the competitiveness

of the UK and wider European economy and is a strategic part of most countries' policy goals. It is generally accepted that companies that proactively plan their long term strategy and product innovation activities perform better overall, while companies that do not are more likely to fail (EU 2008; BIS 2010; OECD 2002; Robinson & Pearce, 1984; Cooper & Edgett 2009). The majority of SME employers (68 per cent) aim to grow in the next two to three years, but most actually do not show growth in any given year (BIS 2012).

2.2 *The need for SMEs to become more innovative to grow and prosper*

The business support that has been provided up to now to UK SMEs has been mainly focused on increases in productivity. During the period 1998-2007, the effect of focusing industrial policy and support primarily on productivity was that manufacturing GDP was essentially flat but employment fell by 35-40%. A recent report on manufacturing SMEs has shown that increased productivity without output growth has increased cost-competitiveness of small manufacturing firms but reduced jobs (IfM 2010). However effective SME support programmes need to be configured to the needs of each individual firm. There is a consensus that a prime goal of support should be to assist the SMEs in developing capabilities so that improvements can be sustainable, especially in innovation (Bessant *et al.*, 2005).

2.3 *The lack of research on SMEs innovation practices and needs*

It is generally accepted that most innovation literature refers to large companies but that smaller companies face different challenges and opportunities (Lee *et al.*, 2009; Vossen 1998). In a useful review of literature on innovation capabilities at SME level, Bayanova (2010) considered a long list of innovation barriers and enablers. Two elements of this review stand out, the need for innovation strategy as a key enabler (Tidd *et al.*, 2001, Cannel & Dankbaar 1996, LaForet 2009, Ritter & Gemunden, 2004 and O'Regan *et al.* 2006) and the lack of management skills and absorptive capacity as key barriers to effective innovation (Cannel & Dankbaar 1996, La Foret & Tann 2006, Bessant *et al.* 2009).

There is also work on open innovation (OI) related to SMEs which suggests that resource stretched SMEs do already engage in collaborative activities and other 'open' approaches, however often focusing more on commercialisation than R&D (Lee *et al.* 2009). Barriers to adopting OI practices in SMEs include NIH (not-invented-here) syndrome, problems due to lack of proximity, organisational, cultural and institutional differences, and problems with contracts (Van de Vrade *et al.* 2009).

Another avenue of research on SMEs investigates the bearing of internal SME characteristics on innovation performance (e.g. Pullen *et al.* 2009) and the practical effect of innovation cultures in SMEs (e.g. Wolf *et al.* 2012) to develop profiles of innovating SMEs, which shows promise.

However it is generally difficult to link ideas of good practice with implementation and improvement on the ground. Two studies that move towards this goal are a meta-analysis looking at team creativity and innovation (Hulsheger *et al.* 2009) and a review of the link to organisational improvement of a symbiotic quality-innovation initiative (McAdam & Armstrong 2001).

However many questions about how manufacturing SMEs can build on their current resources to grow successfully remain unanswered. Programmes such as PrISMS collect significant amounts of data that may be analysed to give some signposts to areas of fruitful further research. Hence the questions posed by this paper – what does the PrISMS program tell us about how a small group of SMEs leverage their operational resources to innovate? What are their current practices and what needs do they have in innovation?

3. Methodology

The PrISMS programme provides four main areas of data to draw upon in reviewing the seven companies in terms of leveraging their operational strengths for future innovation. The companies were self-selecting for this study in that they chose, or responded to encouragement to choose, to take advantage of the innovation based workshop on offer as part of the PrISMS programme.

3.1 *Manufacturing company performance diagnostic survey*

This overall review provides the company's answers to 120 questions covering the priorities and performance of their manufacturing business in which Business Strategy and Unique Value & Innovation (UVI) are sub-categories. The examination of UVI at this high level has three parts: idea generation, portfolio management and implementation.

3.2 *Business strategy workshops*

If Business Strategy is indicated as an area needing attention, companies are taken through a set of four interactive workshops to review their strategic thinking, including the external environment and growth aspirations, internal competencies, current and desired operating principles (efficiency, service, innovation/new products) and an action planning session.

3.3 *Light-weighting innovation workshop*

If innovation is highlighted as a priority during the Diagnostic review and Strategy discussions, the third step is a light-weighting innovation workshop. The provision of 'light-weighting' methods, i.e. those that provide good outputs for a relatively small amount of resource, as available within an SME, are a key aim of the PrISMS programme. The innovation workshop draws upon portfolio and roadmapping techniques to explore and select innovation opportunities for the company in a short (5 hour) interactive session.

3.4 Employment and revenue data

This data is collected for each company upon entering PrISMS and at the end of the programme. It summarises the changes in employment and revenue for the company since becoming involved in the PrISMS programme in 2013 and indicates the extent to which companies have expanded and safeguarded jobs during this time.

These four sources of data are brought together in two ways. Firstly in two overview tables (Table 1 and 2) which aim to summarise the relevant elements of companies' operational and innovation position that they are encouraged to **leverage** during the PrISMS program. Table 1 gives each company description and size followed by Table 2 which has a column for each data collection area: a) Business Diagnostic survey, b) Business Strategy workshops, c) Lt Wt Innovation workshop, d) Revenue data, and e) Employment data. Secondly in more detailed discussion of the findings related to innovation, which aims to summarise relevant aspects of the companies' activities to provide information on their **innovation practices and needs**. A schematic of the three main tools used to support the SMEs is shown in Figure 1.

Figure 1. Three main tools used for improving the performance of manufacturing SMEs

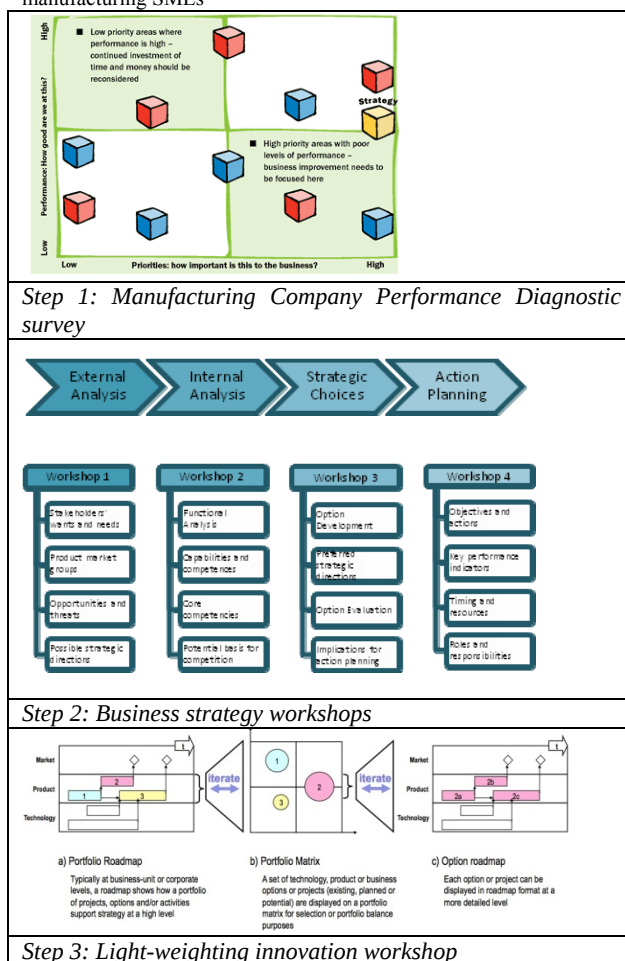


Table 1. Case overview

Case	Co description/sector	Co size t/o £ million	Co size # of staff
#1	1: a world leading supplier of screens, reagents and instrumentation for protein structure determination by X-ray crystallography.	2.26	16
#2	2: a leading manufacturer of high quality precast concrete products.	22.1	165
#3	3: expert in broadcast product and system design, integration and installation from studio through to transmission.	10.0	36
#4	4: supply, design, install and service cost effective processing machinery and plant for many different industries.	1.6	13
#5	5: leading industrial infrared heating systems provider including design, manufacture and complete turnkey systems for industrial and commercial applications.	3.0	50
#6	6: door guard design, design and installation; a world leader in child safety.	0.2	4
#7	7: extensive range of electro-mechanical components, electronic housings and cabinet solutions; design, eng, production, worldwide sales network, customer service.	4.1	54

4. Results

With reference to Table 2, this section aims to review the information collected.

4.1 Business Performance Diagnostic

In all the companies, work was deemed necessary on business strategy, to provide a clear way forward for company growth. The Diagnostic also revealed the innovation stance of the companies. In Companies 1, 2, 4 and 7 innovation was a priority but performance was low. In Companies 3 and 5, innovation was low priority for the business as a whole but in company 3 innovation was high priority for one product focused business segment. For company 5 it became evident through the strategy workshops that if the growth targets were to be achieved innovation had to take a more prominent role with new products developed for existing customers.

4.2 Business Strategy Workshops

During the follow up Strategy workshops, high growth aspirations were revealed for all the companies except company 3 which aimed instead to maintain turnover and staff during a refocusing of the business. The workshops also reviewed the potential basis for competition on a sector by sector basis, to be chosen from Efficiency, Innovation/Product leadership and Service. Companies 1, 2, 3, 4, 5 and 7 all chose to compete on the basis of Innovative Products in at least part of their business, with company 6 moving to Service to exploit an innovative product range.

4.3 Light Weighting Innovation Workshop

The presentation of ideas resulted in between 30 and 50 ideas per company with usually more ideas in short and medium term than long term time frames. With most companies the ideas split into around 10 groupings indicating different business sector focuses. After voting based on company specific criteria for size of opportunity and level of feasibility, about 20 ideas were usually transferred onto a 2x2 portfolio matrix and positioned using the opportunity / feasibility scoring. The company then discussed which ideas they would like to map out and score in more detail, with the aim of generating a viable innovation project to take forward. There was a mix of commercial and technical projects explored. On the commercial side there was a range of urgent needs to be addressed, with Company 1 picking up on a product launch mechanism, Company 3

choosing a market research project and Company 6 addressing pricing issues. The rest of the projects involved products/services and covered short, medium and longer term development. In Company 3, a project expected to be short term actually split into two products on further exploration, with one with a short timescale and the other longer term. The portfolio matrix was then revisited with improved understanding of the chosen projects to check the validity of their selection. Several companies planned to explore in detail more options than there was time to do in the scope of the workshop.

4.4 Revenue and Employment Data

There is a range of successful growth in the companies with 0-28% increase in revenue and 0-60% increase in employee numbers since 2013. Bearing in mind that one company was aiming to simply maintain turnover and staff numbers in the face of business changes then this appears favourable.

However, it is important to note the following points with respect to this data. Companies are selected for PrISMS based on ambition, ability to grow revenues and create jobs, commitment to reduce resource and environmental impact. The employment and revenues data is captured before entering PrISMS and at the end of the programme and the data is provided by the companies themselves. It is not claimed that any increases are because of PrISMS and it is impossible to know what the companies would have achieved if left to their own devices. Company #2 signed a document confirming that jobs and revenue increases were a direct output of PrISMS support, but this is not available for the other companies in this paper.

Table 2. Results overview

C a s e	1. Business Performance Diagnostic survey output	2. Business Strategy workshop output	3. Lt Weighting Innovation portfolio- roadmapping workshop output	Revenue increase since PrISMS	Staff increase since PrISMS
# 1	Strategy: Weak Innovation: Weak performance	High growth aspiration Focus on services and innovation	Six important opportunities to be enabled by one project on product launch mechanism	28%	60%
# 2	Strategy: Weak Innovation: Weak performance	High growth aspiration Focus on 3 new product sectors	Three new products and one new service mapped up to feasibility stage	13%	6%
# 3	Strategy: Weak Innovation: Low priority for overall business but high on product segment	Maintain t/o and staff while making change to company focus	Succeeded in deciding next two products in new area of business	0% due to business changes	0% due to business changes
# 4	Strategy: Weak Innovation: Weak performance	High growth aspiration Focus on innovative products	Chose a marketing project critical to informing further innovations	12%	8%
# 5	Strategy: Weak Innovation: Low priority	High growth aspiration Focus on efficiency and innovation	Explored three opportunities, two engineering and one commercial project.	N/A	N/A
# 6	N/A	High growth aspiration Focus on service	One short term commercial project and one medium to long term devt project	2.5%	0%
# 7	Strategy: Weak Innovation: Low performance	High growth aspiration Focus on new products	Four opportunities explored with range of timescales	19%	26%

5. Discussion

The key areas of interest are how the PrISMS programme helped SME's to leverage their past to

innovate, what we have learned about SME's innovation practice and needs, and how this compares to current innovation literature.

5.1 How does the PrISMS approach help companies to leverage their past to innovate?

The programme analyses SME performance to give an objective view of the company's strengths and weaknesses, assist the management team in agreeing on their business objectives, supports exploration of possible paths to achieve their growth aspirations, and provides tools and techniques to help prioritisation and development of tangible actions and projects to move forward. The reasoned, documented and traceable journey through from the business review to implementation gives expression to ideas within the company and focuses decision making. The use of company determined baselines, such as customised opportunity selection criteria, and structured discussion templates to support decisions such as the basis for competition, helped validate the process outputs internally and lifted the innovation agenda from a largely individual initiative to a shared group endeavour. Each engagement with the company is done in small and manageable steps, to ensure that they have the absorptive capacity to act on the actions taken. Each step is designed to allow a company time to reflect, analyse and evaluate the decisions taken in the interactive workshops and gradually progress the company forward to its growth targets.

5.2 What does the data on the seven companies tell us about SME Innovation practices and needs?

Looking at the Diagnostic scores for Unique Value and Innovation (UVI) in more detail, even at this high level, innovation needs are revealed. For example Companies 3 and 4 were shown to be weak in all three of the areas highlighted for Unique Value and Innovation, namely idea generation, portfolio management and implementation. In addition Company 1 had no portfolio management, found killing projects hard and its management of new technologies was unsystematic.

Further discussion at the Strategy workshops gave more insights. For example, Company 1 stated that they were a development firm, not a research firm, so needed to find partners in innovation. In Companies 3 and 5 it was realised that although the company as a whole had a low innovation priority, for one new business area it was high and new products were required urgently.

More detailed information was gained during the Light Weighting innovation workshops which provided both portfolio and implementation techniques. The workshops became a conduit for existing ideas, although in Companies 2 and 7 these were supplemented by a creativity workshop on the request of the managing director. Feedback from the workshop participants and the managing director after the workshop also gave insights into what was found useful to support innovation within the company.

Several companies found the quick prioritisation approach using voting criteria and the 2x2 portfolio matrix particularly useful. The managing director of

Company 1 stated that “The process was very useful and we now use the prioritisation method for all new product ideas” while the managing director of Company 2 said “The process is an excellent tool to crystallise and map opportunities for our business”. In addition Company 5 was reported as happy with the selection criteria and the related scaling statements used.

Other companies valued the detailed opportunity exploration mapping. The managing director of Company 3 highlighted how it enabled him and his key sales and technical members of staff to “jointly agree which product range and features to concentrate on” to determine their next two products. Company 6 found that the template resulted in much clearer understanding of business focus and improved confidence to move forward.

The largely positive Revenue and Employment data suggests that companies benefited from the PrISMS interaction and longer term monitoring will reveal whether they met their ambitious 4 year growth targets.

5.3 PrISMS findings versus the literature on SME innovation?

The literature highlights that successful growth of SMEs is not a predictable matter. The structured intervention carried out in the 7 firms has had positive effects resulting in practical action and demonstrated results in terms of revenue and employment.

Innovation in the seven SMEs in terms of practices and needs has echoed the literature on barriers and enablers to some extent. For example the importance of innovation strategy chimes with the enthusiasm for the companies to grapple with the portfolio and roadmapping techniques in the innovation workshop to clarify their priorities. In addition the commercial projects undertaken as an output from the innovation workshop suggest that marketing or market research activities may sometimes be neglected in these smaller firms. The fact that useful techniques, such as effective prioritisation, are not already widely used within smaller companies hints at issues such as the lack of absorptive capacity of management figures.

However the holistic business wide approach as a pre-cursor to focusing on innovation activities, in particular checking for business strategy coherence, does not seem to be emphasised in the literature. It seems that popular academic themes of open innovation or innovation culture are of less immediate relevance although managers often identify such needs themselves as part of discussion. For example by Company 1 in stating that they are a ‘development rather than a research firm’ and identifying that they need to look for partners in innovation. In addition the practical contribution of bite-sized technique and template interventions does not appear in the mainstream innovation literature.

6. Conclusions

Implications for R&D management in small firms
Companies that are growing sustainably gather sufficient resources to create and capture additional

value and invest further in innovative activities, including R&D and innovation. The healthy growth of SMEs in the manufacturing sector is seen as worthwhile in terms of their innovative potential and the employment opportunities that they support.

Senior managers responsible for direction in SMEs also often lead key areas such as Sales or Operations, and have little time left to work on developing the firm’s strategy or capabilities. As a result many firms have ill-defined strategies and capabilities, leading to under-performance. As a consequence, many small businesses need effective and efficient structured approaches, configured to their specific needs and priorities in order to help them to become more effective and to be able to grow.

Analysis of this data, although for a small set of companies, provides an in-depth insight into the proactive steps that a group of manufacturing SMEs are taking to analyse and improve their innovation activities for the future. It can be observed that such companies welcome the increased structure and transparency that light weighted tools and templates provide under the light touch guidance of experienced industrial practitioners.

Implications for further research include more in depth investigation of the relevance of literature streams to the day to day reality of life in smaller companies and into how practical techniques can embody theoretical findings to help to overcome the problems of absorptive capacity in busy management environments.

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