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EFFECTIVE APPROACHES FOR INNOVATION SUPPORT FOR SMEs

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ABSTRACT

Providing appropriate innovation support to small to medium sized enterprises (SMEs) is an on-going challenge. Governments offer a range of initiatives from advice, to research and development grants; however, the underlying methodological frameworks for these interventions are often unclear. Universities have an increasing role to play in providing an understanding of the learning frameworks that surround innovation support and by providing design-led interventions that follow a design thinking approach. This paper considers the ways in which innovation knowledge can be transferred to SMEs based on a constructivist model of knowledge development. The development of Communities of Practice that support innovation making use of IT systems is also explored. Observations are made on the most effective ways of providing support for SMEs applying an experiential learning model, based on the authors' experience of directing and working within the Centre for Design & Innovation (c4di) at the Robert Gordon University Aberdeen.

INTRODUCTION

It is often assumed that small businesses or SMEs are enthusiastic when it comes to innovation, after all why wouldn't a business be concerned about remaining at the cutting edge of its field continuously looking for improvements in its products or services? However this assumption cannot be taken for granted. Any form of innovation implies change and a degree of risk and can also act as a major distraction at a time when a business may be focused on other priorities such as maintaining their current market share. In practice the priority for most businesses is making a profit and as long as they continue to do so, significant changes that require major investment or the diverting of resources, or potential restructuring, may be unwelcome. Providing appropriate support to SMEs for innovation remains a priority for Governments who recognise the importance of SMEs who account for over 90% of the European Community business turnover (Horn et al 2009). This difference between SMEs and government priorities creates a challenge for organisations wishing to provide design-led innovation support. However the need for this support has increasingly been recognised by the European Union as a way of driving innovation (European Commission 2013) and as a strategic approach to innovation. This paper considers what are the best ways of supporting SMEs to engage with innovation especially during a time of economic stress when they perhaps are often reluctant to take risks. It considers some of the current approaches for innovation support for SMEs and examines the issues from a knowledge exchange perspective.

The positive benefits of applying design to SMEs (Potter et al 1991: Roy et al 1986: and Walsh et al 1992), suggests that design is still not fully conceptualised and exploited by SMEs (Thenint, 2008). SMEs approach the use of design sceptically (Brazier, 2004), for many SMEs, engaging in design is not seen as a priority and the link between design and innovation is often unclear. Their reluctance is not only due to their lack of understanding it is also a result of a shortfall of credibility surrounding designers which may be due to a tendency for the designer to be a generalist rather than a domain specialist (Gulari et al. 2013a).

SMEs who recognise the need for innovation may seek external advice and support if they lack the internal resources to develop innovation in-house (Nieuwenhuis et al. 1999: Rothwell 1984). Government funded business support agencies will provide helpful advice on how to innovate. This would generally be based on what may be termed an 'instructional model' where a mixed group of businesses will be invited to listen to an inspiring presenter after which they will be left to internalise and interpret the information before trying to apply it to their own circumstances. This might be described as a 'dialogical' relationship if follow up advice is being provided. Alternatively, they may turn to a design consultancy business, which may provide a new product or service improvement in response to a design brief. The disadvantage of this approach is firstly the cost to the SME and secondly the potential lack of knowledge transfer in the consultancy-SME relationship. It may also be the case that the business has no experience of setting a design brief, which can result in an unsatisfactory outcome (Press & Cooper 2003: von Stamm 2004).

As an alternative to these two models, 'instructional' or 'consultancy', we might consider a model based on knowledge exchange provided by University supported innovation projects such as The Box at the London School of Economics and The Sandbox at the University of Central Lancashire, or the Centre for Design & Innovation at the Robert Gordon University in Aberdeen. These 'innovation labs'/centres bring together multidisciplinary groups to encourage creative thinking and idea generation in support of SMEs (Jolly 2011). The aim is to provide an understanding of how to bring about innovation applicable to the SME's particular context. The principle might be described as "Give a man a fish; you have fed him for today. Teach a man to fish; and you have fed him for a lifetime".

The following paper considers some of the ways in which effective innovation support can be provided to SMEs based

on an experiential learning model (Kolb1983: Beckman & Barry 2007), which overcomes some of the principle disadvantages of an instructional approach or use of a design consultancy. The paper examines the role of Universities within innovation frameworks and considers some of the key challenges that affect the innovation relationship. The paper also considers some IT based developments, concluding by speculating on future approaches to innovation support for SMEs.

EXISTING MODELS FOR PROVIDING INNOVATION SUPPORT

The most common form of innovation support provided by Business Support Agencies for SMEs is the one-off event. The dominant learning model for this type of intervention is based on the invited 'expert' providing the theory followed by Case Study examples of successful companies who have succeeded in innovation development. It could be argued that this has limited value mostly because of the number of SMEs that can be involved in this process, and secondly because of the difficulty the SME has when it comes to applying the information to their own particular context.

The establishment of an Innovation Centre or 'Lab' based within a University has the potential to provide a longer-term relationship between SMEs and advisors, however many projects only receive funding for a few years at a time which makes it hard to sustain an extended relationship. Again the number of businesses that can be supported is going to be limited. As a way of extending the effectiveness of the Centre, case studies are sometimes presented however these are often not of a critical nature, giving an over-simplified impression of the innovation process, which in many cases is perhaps considerably more complex (Gulari et al 2013b). Some of these Centres/ Labs for example c4di at RGU (www.c4di.org.uk) and the Centre for Design Innovation at Sligo Institute of Technology in Ireland (http://www.designinnovation.ie) follow the model originally developed by the UK Design Council under their 'Designing Demand' Programme. http://www.designcouncil.org.uk/resources-and-events/designers/continued-professional-development/training-for-designers/designing-demand/. The Design Council's programme provided for three levels of intervention. An initial one-to-many workshop focused on design opportunities; a more in-depth one-to-one project focused consultancy of approximately 5 days in duration and a third level concerned with an extended project development making use of a Design Associate working closely with an SME over a 12–18 month period of time. The programme employs design methods based on a participatory and collaborative relationship. The programme has been very successful for those companies involved. However, its principle disadvantage is its cost and the relatively small number of companies it is able to support.

An alternative framework for innovation support funded through the Technology Strategy Board (TSB), is represented by Technology Innovation Centres (TICs) (www.innovateuk.org), (Hauser 2010). The Renewable Energy Centre based at the University of Strathclyde, Scotland, provides an example of a TIC. In addition to the TSB initiative the Scottish Government are in the process of funding the establishment of several more new sector-specific Innovation Centres in Scotland (http://www.sfc.ac.uk/newsinformation/Circulars/2012/SFC0612.aspx).

Scottish examples of TICs are based on proposals initiated by University research groups led by industry consortia. This represents a considerable investment (£10M in 2012 and a further £20M in 2013) however there are a number of assumptions that underlie these TIC initiatives, which may be important to question. The first assumption is that clustering around a particular sector for example Energy, Food & Drink or the Creative Industries, will automatically lead to innovation as opposed to Innovation Centres that are not sector specific but are deliberately cross sectorial. It could be argued that the bringing together of expertise across disciplines is more likely to lead to new pathways to innovation, for example applying micro-electronics to Life Sciences or sensor technologies to Food & Drink, or more generally combining the approaches and expertise from the Creative Industries with the Sciences, deliberately encouraging cross disciplinarity and challenging existing paradigms of enquiry. This echoes the philosophy proposed by Paul Feyerabend (2010) when he offered a challenge to the existing scientific paradigm in his book 'Against Method'.

Another implicit assumption inherent in these Centres relates to the idea that the Centre should be industry demand led. This assumes that the industry partners will know where future demand is going to come from, where in practice, very few industries are sufficiently future-focused to anticipate society's future needs. Also, most businesses will naturally focus on what they feel comfortable producing and will be unwilling to explore completely new avenues, indeed this may be unwise from the commercial partner's perspective depending on how the company is positioned. A potential drawback of the TIC model is the possible disconnect

between the needs of end-users and the technology being developed that may not find an immediate application and indeed which might be superseded by an alternative technology before it can find an appropriate use. This is reinforced by the matrix used to measure the success of the TICs such as number of patents lodged. Too much emphasis on the application of a particular technology can obscure the potential for much cheaper alternatives that might be based on behavioural change rather than a particular technology fix, for example an Innovation Centre focused on computer based solutions might fail to consider lower-tech alternatives as this would not fit their remit.

LEARNING MODELS FOR SMEs

There is no shortage of helpful books offering advice on innovation for SMEs to turn to, however learning about innovation by reading about it, is always going to be limited in its effectiveness because of the need to move from generalisations to specific application in a given context. Developing opportunities for SMEs to explore ideas through experiential learning approaches, which involve learning creative problem solving techniques, may be a more effective way of developing an understanding of innovation appropriate to the particular SME context. Bringing together individuals representing different business sectors within a workshop situation can provide opportunities for the cross-fertilisation of ideas. Bringing businesses together from a single sector however, runs the risk of individuals being worried about giving their intellectual property away to other rival concerns. Creating a space that allows for creative thinking to flourish requires careful planning to ensure that individuals feel confident in putting ideas forward, hence the need for non-specific activities to be used within workshops which may appear to be play-like in nature but which have a valuable contribution in building a collaborative working atmosphere. The term 'serious-play' (Schrage 2000) has been coined to describe this type of activity in which adults are given permission to explore ideas without feeling constrained by normal hierarchical relationships or feeling judged as being 'non-creative'. In his TED talk 'Build a Tower Build a Team' Tom Wujec's Spaghetti Challenge provides a good example of a serious play activity. This exercise is designed to emphasise the importance of prototyping as early as possible and questioning assumptions http://www.youtube.com/watch?v=H0_yKBitO8M.

Applying an experiential learning approach has clear advantages over the instructional approach when the aim is to promote 'situationist' learning (Lave & Wenger 1991). It is also important to recognise the nature of what is being taught. In the example of design-led intervention what is actually being taught is not a theoretical framework or a set of accepted facts. The intervention can be thought of as constructed knowledge based on shared exploration of issues within a specific context (Bruner 1960). Design methods may be applied to make the process more effective but the aim is not to turn all SMEs into design companies, rather the aim is to develop new perspectives to allow new insights to be identified. Visual methods used within participatory workshops are an effective way to overcome communication issues between discipline specialists, for example the use of image cards to establish core values of companies who are encouraged to identify qualities represented by particular images that they associate with their organisation. This simple method is used to encourage conceptual non-literal thinking by participants (Malins 2011).

The role of the innovation facilitator or the designer is to question the existing assumptions that often lie behind the way in which the original problem has been framed. The designer has to be able to acknowledge the human factors, in particular the users' emotional responses that make the difference between a successful or an unsuccessful solution. Once the problem has been clearly identified the designer's role is to reframe the problem trying to avoid existing assumptions. At this point appropriate technologies can be sought to provide a solution (Malins 2013).

Universities provide a source of academic knowledge derived from research and their remits include knowledge exchange. Increasingly Universities are trying to develop income streams based on commercialisation of their assets both intellectual and physical. This can sometimes lead to potential conflicts of interest between the goals of research and commercial development and competition between Universities and commercial providers.

A large part of Knowledge Exchange between Universities and SMEs is supported by Knowledge Transfer Partnerships (KTPs) in which an associate is appointed to carry out a specific project with a company under the supervision of an academic. However KTPs are not particularly easy to establish and the number of companies that can be helped in this way is always going to be limited (O'Nions 2007). More than 2.5 million new connections were made between experts and facilitators through Knowledge Transfer Networks in 2009 (Jolly 2011).

The relationship between funding agencies, industry and universities is a complex one. Sector specific Innovation Centres are being funded, but how they are going to bring

about new forms of innovation is as yet unclear (Malins ibid). Some are following a technology push approach, others will have to develop methodologies whilst making do with the existing infrastructures provided by Universities. However, generally, University administration structures which are geared up to provide a quality assurance framework for students have not been designed for the consultancy model in mind which can lead to excessive bureaucracy and an insufficiently agile response to the needs of companies. The academic timetable does not recognise the need of the business client who has different goals and often operates on a different timeframe.

THE CHALLENGE OF INNOVATION

Many SMEs are described as lifestyle businesses, which are not intended to expand or outlive the original proprietors. There were 261,000 new business start-ups in the UK in 2011 according to the Office of National Statistics. By definition these new companies are demonstrating some level of innovation and as such it may be inappropriate to encourage further innovation support until the company is more mature, however it would still be valuable to imbue these businesses with a culture supportive of continuous development. At the opposite end of the business cycle, are businesses that may have a declining market. These businesses may have left it too late to initiate major change. In contrast a minority of businesses are highly receptive to innovation. These are usually businesses which have included innovation as part of the company ethos and which welcomes and rewards new ideas for development.

One of the most significant challenges for an SME is how they bring about a shift in what they perceive as their core business or main areas of expertise. How do companies move from an internal view, perhaps an individual's perspective e.g. that of the CEO, to an external view? Simon Sinek (2009) writing in his book 'Start with Why' provides an interesting model which he terms the 'Golden Circle' based on the idea that companies that describe why they are in business, in other words what their core values are, are likely to be more innovative than those who describe themselves in terms of what they produce or offer. He uses the example of Apple, expressing their core value as 'always challenging the status quo', allowing them to shift their perspective from a computer company to a company that is known for its innovative design and attention to the user experience appealing to their customers at an emotional level. This challenge of moving the company's understanding of its own purpose is one area in which external support can be most effective.

Buchanan (1992) suggests that the core skills possessed by designers provide them with a unique skillset that can be applied to any context. These skills include the ability to take a new critical position on an existing problem perhaps because of the way in which designers are able to deal with ambiguity (Michlewski 2008). Designers have a particular form of creativity that means they can envision alternative ways in which a problem may be resolved. This has been described by Cross (2001) as 'designerly ways of knowing'. Design consultancies that offer business innovation support may apply design methods but may not actually be using designers. Perhaps the most successful ones are using multidisciplinary teams with a range of backgrounds and experience (including psychologists, ethnographers, and various design specialists). Kelley and Littman (2009) writing about the IDEO design consultancy describe this idea in their book The Ten Faces of Innovation. SY Partners provide another example of a design consultancy with a multidisciplinary base, offering innovation support (http://www.sypartners.com/we/the-team/).

One of the difficulties for an SME is to identify sources of appropriate innovation knowledge. This is partly a result of the difficulty of being able to articulate and recognise this expertise, which may be based largely on tacit knowledge (Polanyi 2009). The result is that somewhat ambiguous phrases such as 'design thinking' are used to describe whole areas of knowledge and expertise. A further issue arises from the very different cultures that exist between Universities and SMEs, resulting in problems of establishing credibility with SMEs by academics, and recognition of the Universities' core competencies by the SMEs. As a result, communication materials such as websites tend to provide an oversimplified view of the innovation support, which does not make it easier for the SMEs to assess whether the support is going to be appropriate for their needs.

Developing credibility can be improved by developing a long-term relationship with SMEs or by the designers providing a more domain specific service (Gulari et al 2013a). Establishing a set of shared beliefs and recognising the ways in which decisions are made within the organisation is also an important factor in establishing an effective innovation intervention. Initiating a relationship with an SME can often prove problematic. Impinging on areas of professional territoriality can result in internal conflict. Without commitment from the key gatekeepers in the organisation, for example senior management, the innovation support is unlikely to succeed, individuals further down the hierarchy

will not be motivated to engage with the process. Achieving involvement from all levels within the organisation must be a priority if the intervention is to be successful.

Irrespective of the nature of the business, common challenges recur, each of which have associated strategies for providing appropriate solutions. These challenges may be internal to the business, for example, relating to managerial, organisational or communication structures which reflect behavioural issues or external challenges such as competition, legislation and changing customer needs. Given sufficient examples, it suggests that an approach based on Case Based Reasoning (CBR) might provide a starting point for how some of these issues can be approached. CBR is a field of computer science, which uses algorithms to provide solution predictions based on previous examples.

Much of the innovation support available to SMEs relies on a one-to-one relationship between the provider (advisor) and the SME (recipient). Whilst this may be very effective, it is always going to be limited by the number of advisors and the time it takes to create the one-to-one relationship. Developing web-based applications that can be used to extend the reach of the advisory process has clear advantages. It brings the possibility of involving customers (end-users) into the innovation process creating a trialogical learning relationship. Trialogical learning is based on a constructivist model of knowledge development where learning draws on prior knowledge, is constructed (rather than passively assimilated), and takes place within a social context. This is a 'situationist' model of learning (Greeno, 1998), which refers to knowledge situated in activity and dependent upon social, cultural and physical contexts (Gibson, 1977). Adopting a situationist model of learning may be a more effective way of creating a deeper engagement with and ownership of learning. Developing 'communities of practice' (Lave & Wenger, ibid) within the framework offered by new media can lead to interaction between individuals (or groups) who develop 'shared objects' (actual or conceptual) that mediate a specific type of knowledge generation. This concept is being pioneered within the Food & Drink Industry where businesses have addressed customer concerns relating to food provenance creating a much closer relationship between customers and producers. http://provenancesupply.co.ukwebsite.

Another fast growing movement relying on Internet connectivity is the 'Open-Innovation' movement, which is similar to the Open-Source movement in which programmers exchange code on a non-profit making basis. These open-innovation websites provide an opportunity for accessing a global audience of potential innovators. Increasing connectivity and the use of mobile computing has potential to support whole new classes of objects that are either made or adapted in response to the sharing of information.

The use of the Internet to establish an on-going relationship between manufacturer and customers allows for the exchanging of information about the performance of an object and the changing uses that it may be put to. This is very different from the normal form of transaction, which is essentially a one-off occurrence. The establishment of this continuing dialogue has potential for a number of benefits including a source of information on which to base new product development and ways in which value can be added to objects throughout their lifetime thus helping to make products more sustainable. Our consumer habits allow us to identify other likeminded individuals, building on the notion that our consumer habits are in effect 'tribal' (Dixon 2005). For example buying Apple products allows us to join the 'Apple tribe', which defines us as part of a design conscious IT savvy tribe. Shared information based on Social Networking allows us to form new networks of enthusiasts or informed users, who can provide a useful source of information for identifying opportunities for incremental improvements.

Future models of innovation will inevitably make more use of web-based platforms supporting open-innovation and the use of Social Networking to fundamentally alter the relationship between end-users and providers.

CONCLUSION

Universities have an important role to fulfil in supporting SMEs with their efforts to innovate and it is important that this role is clearly understood and shared. Universities are very good sources of knowledge both for innovation and learning frameworks which can support effective experiential approaches. The University's role is to empower through learning and knowledge exchange. The aim should be to develop innovative cultures within SMEs rather than providing specific design solutions, which may be better left to design consultancies.

Design teaching has always adopted an experiential approach, which is appropriate for the type of learning required by the majority of SMEs who need to be able to apply the knowledge directly to their own situation. Drawing on design methods which encourage a shift in perspective, provides an effective way to deliver innovation support to SMEs. Unfortunately there is still considerable misunderstanding as to what design represents to SMEs.

Developing clearer definitions for terms such as 'design thinking' is a necessary prerequisite for improving the relationship between Universities and SMEs.

Much of the innovation support that is presently available to SMEs is ineffective in bringing about sustainable innovation, as the learning models do not allow SMEs to apply the learning to their own context. A model of knowledge exchange based on experiential situationist learning is most likely to provide a pathway to sustainable innovation for SMEs.

REFERENCES

Beckman, S., & **Barry M.** (2007) *Innovation as a Learning Process: Embedding Design Thinking, California* Management Review, 50(1), 25–56

Brazier, S. (2004) *Walking Backward into Design: Support for the SME*, Design Management Review, vol 15, Issue 4, pp 61–70, Design Management Institute

Bruner, J. (1960) *The Process of Education*. Cambridge, MA: Harvard University Press

Buchanan, R., (1992) Wicked Problems in Design Thinking" Design Issues, Vol. 8, No. 2, Spring

Dixon P. (2005) *Wake Up To Stronger Tribes and Longer Life*, Financial Times, October 31st, http://www.globalchange.com/financialtimesdixonfeature31oct2005.pdf

European Commission (2013), Commission Staff Working Document Implementing and Action Plan for Design-Driven Innovation, Brussels

Feyerabend, P. (2010) *Against Method*, 4th ed., New York, NY: Verso Books, 2010,

Gibson, J. (1977) – *'The Theory of Affordances'*–. In: Perceiving, Acting, and Knowing, Eds. Shaw, R. & Bransford, J. ISBN 0-470-99014-7

Greeno, J. (1998) – *"The situativity of knowing, learning, and research"* –, American Psychologist 53 (1): 5–26

Gulari, M., **Fairburn S.**, **Malins J.** (2013a) *Trust Me, I Am An Expert, Why Is There A Lack Of Trust To Design Expertise*, 10th European Academy of Design Conference: Crafting the Future, 17-19th April, Gothenburg, Sweden

Gulari, M., **Fairburn S.**, **Malins J.** (2013b), *Assessing the Effectiveness of Design-led Innovation support for SMEs,* 10th European Academy of Design Conference: Crafting the Future, 17-19th April, Gothenburg, Sweden

Hauser, H. (2010) *The Current and Future Role of Technology and Innovation Centres in the UK,* for Lord Mandelson, HM Secretary of State, Department for Business Innovation and Skills

Horn M. et al (2009) *Delivering the Innovation Dream*: The BDI Report for HM Department for Innovation, Universities and Skills (DIUS)

Jolly, A. (2011), *Working with Universities*, Crimson Publishing Ltd, Surrey, UK

Kelley, T. & **Littman J.** (2009) *The Ten Faces of Innovation*, Doubleday, USA

Kolb, D. (1983) *Experiential Learning*: Experience as the Source of Learning and Development, Prentice Hall Inc., New Jersey

Lave, J. & **Wenger, E.** (1991) *Situated Learning*: Legitimate

Peripheral Participation Cambridge: Cambridge University Press. ISBN 0-521-42374-0
Malins, J. (2013) *Transformative Design Thinking: A human-centred model for innovation,* 10th European Academy of Design Conference: Crafting the Future, 17-19th April, Gothenburg, Sweden
Malins, J. (2011) *Innovation by Design: A Programme to Support SMEs'*, In: Swedish Design Research Journal No 2.11, pp25–32, SVID, Stockholm, Sweden.
Michlewski, K. (2008) –*'Uncovering design attitude: Inside the culture of designers.'* – Organization Studies, 29/3: 373–392.
Nieuwenhuis L., Lokman I., Gielen, P. (1999) *Learning VET-colleges within learning regions.* In: European Conference on Educational Research, Lahti, Finland 22-25 September 1999. Available www.leeds.ac.uk/educol/documents/00001202.htm
O'Nions, K. (2007) *The Sainsbury Review*, Foundation for Science and Technology, HM Department for Innovation, Universities and Skills, 14th November 2007
Polanyi, M. (2009) *The Tacit Dimension*, Doubleday Broadway Group, Chicago
Potter, S. et al (1991) *The Benefits and Costs of Investment in Design*, The Open University UMIST Report Dig-03 Design Innovation Group, September
Press M. & **Cooper R.** (2003) *The Design Experience:* The Role of Design and Designers in the Twenty-First Century, Ashgate Publishing, Aldershot, England
Rothwell, R. (1984) *The role of small firms in the emergence of new technologies*, OMEGA, the international journal of management science, 12, pp. 19–29.
Roy, R., Salaman, G. & **Walsh, V.** (1986) *Research Grant Final Report*, Design-Based Innovation in Manufacturing Industry. Principles and Practices for Successful Design and Production, Report Dig-02, Design Innovation Group, Open University, Milton Keynes.
Schrage, M. (2000) *Serious Play: How the World's Best Companies Simulate to Innovate,* Harvard Business School Press, Boston, MA
Sinek, S. (2009) *Start with Why,* Penguin Group, London
Thenint, H. (2008) *Design as a tool for innovation* – Report. PRO INNO Europe – INNO GRIPS. Retrieved 5 June 2013 from http://grips.proinno-europe.eu/knowledge_base/view/549/designas-a-tool-for-innovation-workshop-report/
Von Stamm, B. (2004) *Innovation – What's design got to do with it?* Design Management Review, 15(1), pp.10–19
Walsh, V., Roy, R., Bruce, M. & **Potter, S.** (1992) *Winning by Design*, Blackwell Publishers, Cambridge, MA.
Wujek, T. (2010) *Build a Tower, Build a Team* – The "Marshmallow Problem" Recorded at TED University 2010, February 2010 in Long Beach, CA, Available: www.youtube.com/watch?v=H0_yKBitO8M