Handbook on Innovation Audit

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1. BACKGROUND

To understand innovation, it is useful to clarify the need for innovation, what we mean by «innovation» and what the various perspectives of innovation are. We can then start to explore the various tools and techniques used to stimulate innovation and capture innovative ideas, processes and concepts.

1.1. The Need for Innovation

Governments all over the world are clearly committed to the development of innovation and enterprise as a means to growth and future economic prosperity and this has not changed with the recent economic crisis.

The accumulation of the former evidence would suggest that there is a need to better understand the nature of innovation in order to better support and facilitate education, research and consultancy, in the area for both contributes to the public sector innovation dimensions as well as the private sector drive for growth. In this respect, it can be seen that there are a host of pervasive issues that would span such activities. Indeed, work by Miles (2005), Ploeger (2000), OECD (2001, 2002) and CEC (2002) all support the need for in-

novation coupled with entrepreneurship within a strategic management framework. This may form the starting point of programme development. However, to fully understand the nature and components of innovation it is useful to further explore what the concept of innovation is and means.

1.2. The Concept of Innovation

In reviewing the literature on innovation, various definitions emerge highlighting different dimensions of innovation or innovativeness.

The consensus is that 'innovation' is the engine for growth and prosperity, and economies must move–up the value–added chain to sustain growth and development. This 'value–added' dimension, as we will see, is increasingly pronounced in the modern definitions of innovation. The OECD/Eurostat (2005) Definition of innovation is as follows:

An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations.

Innovation can be incremental or radical in nature, it can be across product (Oslo 2005, Frascati 2004), process (Dosi 1982, Klin& Rosenderg 1986, Cohen & Levinthal 1990, Dogson, 1991, Patel & Pavitt 1994, Edquist1997), position (Rogers 1983, Urabe 1988, Utterback 1994, Afuah 1998, Garcis & Calantane 2002, McDermott & O'Connor 2002, Pedersen & Dalum 2004), users (Chesbrough 2003, Von Hippel 1988, 2005), social networks (Rogers 1983, Ahuja 2000), environments (Utterback 1994, Tushman et al 1997) or even paradigms (Popadiuk & Choo 2006), and it is based on concepts or sources of discontinuity e.g. new markets, new tech-

nologies, new rules, new business models, unthinkable events etc. In essence, the architecture of innovation is knowledge, knowledge about the components of the business, its market and industry, and how the components can and do fit together.

However, most commonly held concepts of innovation refer to innovation as the need for a degree of «newness» or novelty of products or processes. (see Atuahene-Gima 1996, Avlonitis et al. 1994, Hollenstein 1996, and Kleinschmidt and Cooper 1991) usually with a further dimension of speed of innovation added i.e. lead time required for developing and introducing new products (Stalk 1993, Cohen et al., 1996; Cooper, 1993; Ittner and Larcker, 1997; Karagozoglu and Brown, 1988; Kessler and Chakrabarti, 1996, Banbury and Mitchell, 1995; Deshpande et al., 1993, Kerin et al., 1992; Lieberman and Motgomery, 1988; Makadok, 1998; Patterson, 1993), or speed associated with early adoption of new technology (Rogers 1983, Subramanian and Nilakanta, 1996).

Categorising innovation has received considerable debate. What is clear is the need to distinguishing between product innovation and process innovation (Abernathy and Clark, 1988; Ettlie et al., 1984; Hollenstein, 1996, 2003; Huiban and Bouhsina, 1998; Kraft, 1990; Tidd et al., 1997; Tushman and Nadler, 1986; Yamin et al., 1997; Zairi, 1995). Product innovation represents the development of new technologies and products as well as new uses for existing products, while process innovation reflects more of an attempt to re-engineer or design the flow of activity in the organisation. In addition to the nature of the innovation it is widely recognised that such innovation needs to impact on business performance in order to have any degree of significance. Indeed Several studies have examined the impact of different innovation forms and innovation dimensions

on business performance (Yamin et al. 1997, Subramanian and Nilakanta 1996, Gallouj and Weinstein 1997, Evangelista and Sirilli 1995, Gallouj, 2002, Gallouj and Weinstein 1997, Gadrey et al., 1995, Barras, 1986, Voss et al., 1992) and shown that positive relationships do exist between business performance and innovations (see Deshpande et al 1993, Dwyer and Mellor 1993).

Therefore it can be seen that innovation includes both new product development and process at its core, and in the workplace tends to be about examining the way things are currently done with a view to finding new and better ways of doing them. It can be applied to any element of the business, throughout the value chain and does not have to be original or groundbreaking in nature. Innovation can simply be the extension, modification, or combination of already existing ideas in a way that improves existing functions. Indeed in many ways innovation is relative.

1.3. Mechanisms for Innovation

Given the former it is clear innovation is both important and «manageable». This section highlights briefly some of the key mechanisms used for innovation before the next section explores the tools and techniques available.

- The mechanisms for innovation include the following:
- Novelty in product and service
- Novelty in process
- Management of complexity
- Protection of innovation i.e. IP
- Extending the range of competitive factors
- Effective and strategic use of timing
- Robust design platforms

- Rewriting the rules of the industry or changing the rules of the game
- Reconfiguring the process (all or parts)
- Transferring across different contexts, applications and domains.

While the former represents the «what» of innovation, the next section explores the «how» of innovation.

2. TOOLS AND TECHNIQUES TO STIMULATE INNOVATION

We contend that innovation can be developed from two perspectives either a prescriptive or systematic attempt to harness innovation, or more of an emergent approach to innovation. This section explores the tools and techniques which can be applied to adopt a prescriptive/systematic approach to innovation.

Systematic or prescriptive innovation is «the purposeful and organised search for changes, and the systematic analysis of the opportunities such changes might offer for economic or social innovation» (Peter Drucker, 1994). The following table (Table 1) provides an overview of the key tools and techniques used for this purpose. These tool and techniques are distinct from innovation models (e.g. Rothwell's five generations of innovation model) or the basic systemic steps of investigation; preparation; incubation; illumination; verification and application, but should be considered in conjunction with such models.

Table 1. Tools and Techniques for systematic or prescriptive innovation

AREA	TOOLS/TECHNIQUES
Business Creation/ Strategic Management	▶ Business Simulations ▶ Business Planning ▶ Spin-offs from research to market ▶ SWOT analysis ▶ PEST analysis ▶ Market tracking study ▶ Technology roadmaps ▶ Product development risk analysis ▶ Risk analysis matrix ▶ Knowledge trees ▶ Parametric analysis ▶ Product lifecycle analysis ▶ Visual mapping ▶ Problem abstraction
Design and Product Development	▶ CAD systems ▶ Usability approaches ▶ Value analysis ▶ Rapid prototyping ▶ Quality function deployment ▶ Delphi techniques ▶ Visual mapping ▶ Product function analysis ▶ FAST (Function analysis systematic technique) ▶ Function and feature analysis ▶ VAVE (value analysis value engineering) ▶ Card post-it systems ▶ Market needs research ▶ Opportunity specification ▶ Knowledge trees ▶ FMEA (Failure mode effect analysis)

Project Management	▶ Project management ▶ Project appraisal ▶ Project portfolio management
Knowledge Management	▶ Knowledge audits ▶ IPR management ▶ Document management ▶ Knowledge mapping ▶ Storytelling
Market Intelligence	▶ Technology watch ▶ Patents analysis ▶ CRM ▶ Technology search ▶ Business intelligence ▶ Geo-marketing
Process Improvement	▶ Benchmarking ▶ Workflow ▶ BPR ▶ JiT
Creativity	▶ Brainstorming (Osborne) ▶ Brainstorming (Catalogue technique) ▶ Lateral thinking ▶ TRIZ ▶ SCAMPER – stretch matrix ▶ Mind mapping ▶ Card post-it systems ▶ Brainwriting – trigger and cascade ▶ Knowledge trees ▶ Parametric analysis ▶ Semantic processes – random matching ▶ Semantic processes – idea search matrix ▶ Excursive techniques ▶ Problem abstraction ▶ Ideas book ▶ Orthographic analysis ▶ Analogies ▶ Evaluation – phases of integrated problem solving ▶ Clichés and proverbs

Human Resources	▶ Tele-working ▶ Corporate intranets ▶ On-line recruitment ▶ e-learning ▶ Competence management
Interface Management	▶ R&D-Marketing interface management ▶ Concurrent engineering
Co-operative and Networking	▶ Groupware ▶ Team-building ▶ Supply chain management ▶ Industrial clustering
Decision Making	▶ Paired elimination analysis (PEA) ▶ Risk analysis matrix ▶ Priorities analysis matrix ▶ SWOT analysis
Problem Solving	▶ TRIZ ▶ Brainstorming – Osbourne ▶ Fishbone ▶ Force field analysis ▶ Pareto chart ▶ Problem abstraction ▶ Search and re-apply

Adapted and developed from Hidalgo & Albors 2008

Variations of the former tools are often used in the overall generic process of the innovation cycle. The following represents the innovation cycle and the various components of it. However, please note that this paper does not focus on the commercialisation of innovation i.e. innovation incubators or innovation churn, but more on the nature of innovating itself.

The cycle of innovation can be seen to be composed of the following overlapping components:

1. *Visualisation*
    a. Define strategic objectives
    b. Identify where innovations are most needed
    c. Identify sponsors and stakeholders
2. *Identification*
    a. Define the system (customers, suppliers, processes and units)
    b. Evaluate openness to change
    c. Identify levers and obstacles to openness
3. *Engagement*
    a. Identify sources of creativity
    b. Create commitment
    c. Selecting the right teams
4. *Creation*
    a. Collect information on internal and external factors
    b. Generate ideas
    c. Screen options
5. *Implementation*
    a. Develop market research
    b. Pilot concepts
    c. Implement new product, process, paradigm, or business model.

The next stage in the process is to map the tools and techniques presented in table 1 to the above overall process and attempt to shape a toolkit of innovation. This tool kit can then be developed further by considering the issues raise in section 4 below.

3. CAN INNOVATION BE MANAGED?: CRAFT OR SCIENCE?

This section explores the skills and attributes needed to adopt a more emergent perspective to innovation.

We recognise that to be competitive in the global market, organizations must continuously develop innovative and high quality products and services, and deliver them on time and at a lower cost than their competitors. As such, employees are required to look for new opportunities and ways of doing things i.e. to be creative. At the same time, they are required to be professional, understand the boundaries of their responsibilities and authority, and to work within the rules and standards of their profession.

Creativity is often perceived to be essential, yet creativity is not synonymous with innovation (Kirton, 1976, 1980, 1994; Kirton & De Ciantis, 1986; Levitt, 2002; Rogers, 1959; Hayes & Allinson, 1988, 1994; Myers & Briggs, 1976; Mumford & Gustafson, 1988; Schuler & Jackson, 1987), rather 'Innovation is the successful implementation of creative ideas by an organization' (Amabile, 2000, p. 332). This definition is useful as it distinguishes between the generation of new ideas and their implementation (West, 2002) and poses questions as to the skills sets and knowledge required to support and generate «innovation».

Creativity is undoubtedly the dominant factor that brings new idea to the implementation stage (Amabile, 2000; Kanter, 1988; Mumford & Gustafson, 1988; Van de Ven, 1986) and a personal characteristic that is most clearly associated with innovation. So what is it? Amabile (1983) defines creativity as «the production of novel ideas that are useful and appropriate to a given situation». So what are the personal characteristics required for this? A large body of liter-

ature has focused on identifying the personal characteristics, cognitive styles, and other attributes associated with creative achievement (see Scott & Bruce, 1994; Amabile, 1983, 1996, 2000; Woodman, Sawyer, & Griffin, 1993; Kirton, 1976; Oldham & Cummings, 1996; Tierney, Farmer, & Graen, 1999). Overall, cognitive styles are recognized as core characteristics of employee creativity (Kirton, 1976; Scott & Bruce, 1994; Tierney et al., 1999; Amabile, 1988; Woodman et al., 1993), where cognitive style is a person's preferred way of gathering, processing, and evaluating information. As such the style influences how people scan their environment, organize and interpret information, and how they «integrate their interpretations into the mental model and subjective theories that guide their actions»' (Hayes & Allinson, 1998, p. 850). This therefore would appear to be the challenge for educators in helping to stimulate innovative action and innovation in practice.

To further shape the nature of the skills sets for creativity it is useful to refer to the work of Kirton (1976). Kirton developed Adaptor–Innovator Inventory (KAI theory), which proposes that individuals can be located on a continuum ranging from Adaptation style to Innovation style. Adaptors are characterized as precautious, reliable, efficient, methodological, disciplined, and conforming. They reduce problems by introducing improvements that increase efficiency and maintain maximal continuity and stability. In addition, these individuals are able to maintain a high level of accuracy in detailed work over a prolonged period of time. On the other hand, innovators do things 'differently,' and they prefer breakthroughs to improvement. Innovators are very original but seem to be undisciplined, impractical, unsteady, and incapable of adhering to detailed work. The differences between innovators and adaptors have often been assessed

by three personal characteristics: originality and idea creation; conformity to rules and group norms; and efficiency, which is about paying attention to detail, and thoroughness (Kirton, 1976; Janssen, DeVries, & Conzijnsen, 1998).

Creativity is a necessary precursor for innovation (Amabile, 1983, 2000). It pertains to the generation of new and valued ideas that often reflect a broad shift in perspective and reorientation of existing practices. Implementation of these ideas requires major changes in organizational structures or processes (Damanpour, 1991; Kirton, 1976; Chan, 1996; Foxall & Hackett, 1992; Scott & Bruce,1994; West, 2002). The combination of creativity and its implementation leads to innovation. The implementation of a new idea often implies taking the initiative to execute the idea (Amabile, 2000; Kanter, 1988; Mumford & Gustafson, 1988; Van de Ven, 1986). Creative people have many ideas but sometimes have little business-like follow-through, and no initiative to make the right kind of effort to help their ideas get heard and tried (Levitt, 2002). 'Personal initiative is a behaviour syndrome resulting in an individual's taking an active and self-starting approach to work and going beyond what is formally required in a given job' (Frese, et al, 1996, p. 38). Implementing new ideas may often encounter obstacles and resistance from others. However, initiative means that one deals with these obstacles actively and persistently (Frese, et al, 1997). This implies a need to manage context not process and to develop and enhance creativity skills in the person not in a system or prescriptive process.

However, innovative capabilities go beyond creativity. Creativity is the gel that holds the process together. To be innovative there is also a set of abilities or capabilities, the ability or capability to recognise opportunity, align, acquire, generate, choose, execute, im-

plement, learn, and develop the organisation. So, is innovation and the practice of innovation a craft or a science? Clearly the tools that exist can help support and structure the innovation process in effect providing for the efficiency dimensions required and the sharing of ideas in a systematic and methodologically «comfortable» way to allow buy in and ultimately implementation. So perhaps both craft and science form the most productive approach to innovation and therefore the development and content of innovation curricula and an innovation toolkit.

4. SUMMARY

From the former discussion it is clear that innovation is at the heart of future business in terms of competitive advantage, knowledge based processes and core business processes. As such, innovation should form an implicit and pervasive dimension to any business and management and thus form a core part of business and management curricula.

However, in addition to what we know, a number of issues or questions arise:

Is innovation a science or a craft? What impact does this have on curriculum design? Can innovation be taught? What role does reflective and reflexive experiential learning play? How do we blend craft and science? Can we «professionalise» innovation and innovative capability?

Ultimately, however the questions are answered and by whom, it is clear that there is a need for a holistic innovation toolkit to address the problems of the management of distributed innovation knowledge and ideas in complex environments and develop such

ideas to help foster growth, competitiveness and progress through the research; management and transfer of innovation. Such a tool kit may be developed by combining the tools and techniques with a generic process and craft characteristics. However, innovation and innovative ability is often time and context determined, and as such, different «organisational» contexts will also need to be considered. A daunting and exciting task!

5. CONCEPTUAL MODEL FOR INNOVATION AUDITING

Definitions

Market Knowledge

The changes to the external general and specific environments as reflected in economic, social, political and technological change.

A-Tunement

Awareness of the interconnections in the market and the potential knock-on effects of change.

Sensitivity

Degree to which changes can be sensed and timeliness of awareness.

Sensemaking

Synthesis of the changes in the market and awareness as to potential impacts and opportunities.

Creative Talent

The creativity of the individual.

Tools

The range of tools and techniques available to the individual or groups to help facilitates elements of the innovation process.

Context

Different industry, geographic, time, and relative situations which provide a set of differing (sometimes unique) characteristics.

Cycle Citizenship

The collective ownership, identity, and sense of belonging that aligns to the stakeholders.

Innovative Capability

The ability to align creative competencies to the contextual situation.

Innovative Fit

The appropriateness of the tools and techniques used and available to the particular circumstances or contextual situation.

Innovative Capacity

The ability of the individual or group to select appropriate tools and techniques to match their talent capabilities and the required outcomes.

Innovation Leadership

The combination all of element that compose the core of the innovation cycle.

Learning and Development

Part of the process that supports, develops and nurtures innovative talent through learning, reflection and reflexive activity.

Knowledge Transfer

Components of Knowledge Management to share, refine, develop and adapt ideas, knowledge and learning.

Infrastructure

Physical resources and facilitating processes and policies adopted by organisations.

Commercialisation/Enterprise

Taking innovation to market for either profit or «the common good».

Clusters/Networks.

Sustainability of innovation through the maturity phases through the development and operation of groups of complementary (sometimes similar) innovators and/or implementers.

Professionalisation

Management and professional skills and knowledge required to support commercialisation, roll out and expansion of ideas through growth and maturity phases.

Impact – Metrics

Set of measures to measure the impact and contributions of innovations.

Impact – Standard

The standard to be achieved for professional recognition of innovative capability and ultimate benchmark.

6. QUESTIONS

Part A: Management of and for the Innovation Process

A.1 Market Knowledge

What markets are monitored?

Who monitors them?

How are they monitored?

A.2 A-Tunement

How well informed are organisation representatives about other parts of their organisation?

Who is responsible for this?

How quickly can they react to opportunity?

A.3 Sensitivity

How responsive is the organisation?

What allows an organisation to be agile?

How are changes in the market detected? By whom?

A.4 Sensemaking

What tools are used to monitor and make sense of market changes?

What structures are in place to filter market changes and direct to appropriate actors?

How is effectiveness of «sensemaking» measured?

A.5 Innovation Interplay

How are the «innovators» kept informed of opportunities?

How are innovators managed?

How are innovators rewarded?

A.6 Learning and Development

How is learning from projects captured?

How is learning and experience shared?

How are development needs identified?

How is development delivered?

How is effectiveness measured?

A.7 Knowledge Transfer

How are knowledge transfer needs identified?

What knowledge is transferred? How is it validated?

How is «appropriate» knowledge determined?

How is knowledge transfer valued?

Who is knowledge transfer directed to?

What strategy and methods are used for knowledge transfer?

What structure and range of approaches are used?

How is information technology used?

What opportunities exist for enhancing Knowledge Transfer?

A.8 Infrastructure

What is the current infrastructure?

How effective are each element of the process?

Which elements of infrastructure are most significant for knowledge transfer?

What threshold standard is required for knowledge transfer?

Who controls and manages the infrastructure?

How well aligned is the infrastructure to the delivery of innovation?

A.9 Commercialisation/Enterprise

How are innovations commercialised?

What support is provided to commercialise?

What training is provided to innovators?

How are projects funded/How is equity raised?

How are innovators rewarded?

What processes are followed for commercialisation?

A.10 Clusters/Networks

What clusters or networks exist in your area/region?

How are these organised?

What does membership entail?

How effective are these?

How could they be enhanced?

What are the most valuable features of the cluster/network?

A.11 Professionalisation

How professional is the innovation support at your institution?

What indicators are used to measure professionalism?

Should there be a professional standard for innovation support?

How can the process be more professionalised?

A.12 Impact – Metrics

What metrics does your organisation use to measure impact of innovation?

What metrics are used by the government?

What metrics should be used?

How can innovation be measured?

How should innovation be measured?

Who should measure impact?

A.13 Impact – Standards

Should there be a set standard for innovation support?

What should that standard be?

How does your organisation measure the quality of innovations?

Who should measure standards?

A.14 Feedback/Forward

How is feedback on ideas and innovations managed?

How could it be managed?

Who should provide feedback?

Who should feedback be fed too?

Part B: Management of and for Innovative Talent

B.1 Creative Talent

How do you identify creative talent?

Do you develop talent or employ it?

How importance are the following skills/traits:

- Ability to recognise opportunity
- Align business processes to opportunity
- Acquire resources
- Generate ideas
- Choose effective options
- Execute projects
- Implement ideas
- Learn from past experiences
- Develop the organisation
- Develop a network
- Communicate ideas
- Inspire other
- Lead a team

Where does most of your talent come from?

How do you retain talent?

How do you develop your talent?

B.2 Tools

What innovation tools and techniques are you aware of?

Which tools and techniques do you use/teach?

Why do you use/teach these?

Which tools and techniques are the most useful?

Which are the most universal in nature?

Where are there gaps where tools or techniques need to be developed?

B.3 Context

How important is context when innovating?

What contexts are best to allow innovation?

How easy is it to shift between context?

What generic principles hold true in any context?

B.4 Cycle Citizenship

How aware are you of your stakeholders?

How aware are you of stakeholder expectation?

Does your community have a sense of identity?

Should there be a sense of identify?

Is there a culture of innovation?

How can you develop a culture of innovation?

Is there a sense of community?

B.5 Innovative Capability

How do you decide what skills or knowledge are needed for different context?

Do you need different skills and knowledge for different situations?

How do you gain the required skills and knowledge for a particular context?

Do you work alone and form short life teams?

How do you decide on the team composition?

How do you monitor the team performance?

If you need a new skills set, how do you get it? Buy or build?

B.6 Innovative Fit

Which tool and techniques do you sue for different situations?

How do you measure the effectiveness of the tools and techniques?

How do you teach or advise on appropriateness of tools and techniques

What criteria do you use to decide on the appropriateness of a tool or technique?

What makes a tool or technique appropriate?

B.7 Innovative Capacity

Do you have collaborative arrangements with other institutions?

How do you determine these?

How do you measure the effectiveness of these?

How do you determine which tools and techniques to use?

Do you use different tools and techniques at different stages of the innovation process?

What staff development is needed to help you improve your innovative effectiveness?

Who should provide this development?

How should the development be provided?

B.8 Innovation Leadership

Can the innovation process be led?

What would you look for in a leader of innovation?

What skills and traits are needed?

How can these be developed?

Should the leader always be the same or change for each project or context?

What personal characteristics are desirable within the team?

How can these characteristics be developed?

ANNEXE

Innovation Audit Questionnaire

1. Introduction and Objectives

The purpose of this study is to help us understand the process of innovation in SMEs. All responses will be kept confidential and in accordance with data protection act. Further information on site security policy is available from www.surveymonkey.com/Monkey_Security.aspx.

We hope you can help us with this survey. Time taken to complete this questionnaire ranges between 10-15 minutes .

2. Demographic Information

1. Which title best describes your role and level of responsibility?

- ◯ General Manager
- ◯ IT Director
- ◯ Finance Controller
- ◯ Managing Director
- ◯ Finance Director
- ◯ Technical Director
- ◯ Owner
- ◯ IT Manager
- ◯ Partner

Other (please specify)

2. How many employees do you have in your company?

- ◯ 1) 0-9
- ◯ 2) 10-19
- ◯ 3) 20-49
- ◯ 4) 50-99
- ◯ 5) 100-250
- ◯ 6) 251-499

3. What is your primary industry?

- ◯ Advertising, Media and Entertainment
- ◯ Creative Industries
- ◯ Financial Services
- ◯ Food and Drink
- ◯ Forest Industries
- ◯ Healthcare Services
- ◯ High Tech
- ◯ Hospitality/Tourism
- ◯ Manufacturing
- ◯ Professional Services/Consulting
- ◯ Real Estate/ Renting activities
- ◯ Retail
- ◯ Services
- ◯ Software and E-Business supply
- ◯ Wholesaler
- ◯ Other (please specify)

4. We define "Product innovation as the development of new technologies and products as well as new uses for existing products, while process innovation is more of an attempt to re-engineer or design the flow of activity in the organisation"

Do you?

- ◯ Agree with the explanation for product innovation
- ◯ Agree with the explanation for process innovation
- ◯ Don't agree with both of them

5. In our view "Innovation includes both new product development and process at its core, and in the workplace tends to be about examining the way things are currently done with a view to finding new and better ways of doing them. It can be applied to any element of the business, and does not have to be original or groundbreaking in nature. Innovation can simply be the extension, modification, or combination of already existing ideas in a way that improves existing functions"

Do you agree with the above statement?

- ◯ Yes (go to question 7)
- ◯ No (go to question 6)

6. What is your view/opinion on innovation?

7. Is or has your company been involved in product innovation?

- ◯ Yes (go to question 8)
- ◯ No (go to question 9)
- ◯ Don't know

8. What kind of product innovation does your company involve in? Will it be possible to state the number of product innovations in the last 5 years?

	Yes	No
Development of completely new products	◯	◯
Radical improvements to existing products	◯	◯
Modification of existing products	◯	◯
Minor alterations to existing products	◯	◯

How many? Please list the number for individual choices

9. Is or has your company been involved in process innovation?

◯ Yes (go to question 10) ◯ No (go to question 11) ◯ Don't Know

Other (please specify)

10. What kind of process innovation does your company involve in? Will it be possible to state the number of process innovations in the last 5 years?

	Yes	No
Development of completely new processes	◯	◯
Radical improvements to existing processes	◯	◯
Modification of existing processes	◯	◯
Minor alterations to existing processes	◯	◯

How many? Please list the number for individual choices

11. Is or has your company been involved in any of the following?

	Yes	No	Don't know
Management of complexity	◯	◯	◯
Protection of innovation i.e. Intellectual Property	◯	◯	◯
Robust design platforms	◯	◯	◯
Transferring knowledge across different contexts, applications and domains	◯	◯	◯

Any other (please specify)

12. Does your company monitor markets for opportunities to innovate?

◯ Yes

◯ No

◯ Don't know

3. Market Influence

1. What scope of markets are monitored?

- [ ] Sector specific markets
- [ ] Local and regional markets
- [ ] National markets
- [ ] International markets

Any Other (please specify)

2. Who monitors the markets?

- ◯ There is a person in charge
- ◯ There is a department in charge
- ◯ External consultant
- ◯ Everyone in the organisation
- ◯ Don't Know

3. How are the markets monitored?

- ◯ There is a process in place
- ◯ Institutional markers are used
- ◯ External consultant intervenes
- ◯ Don't Know

Any Other (please specify)

4. What does your company use to monitor and make sense of market changes?

- [ ] Technology monitoring
- [ ] Patent watch
- [ ] CRM (Customer Relationship Management)
- [ ] Technology Search
- [ ] Business Intelligence
- [ ] Geographical Marketing

Any Other (please specify)

5. Does your company have any structures in place to filter market changes and direct to appropriate actors?

- ◯ Yes
- ◯ No
- ◯ Don't know

6. If yes to the above question, then can you please explain the structures and their remit?

7. Do you measure the impact of market changes on your company's performance?

- ◯ Yes
- ◯ No
- ◯ Don't know

8. Who measures the impact of market changes in your company?

- ◯ There is a person in charge
- ◯ There is a department in charge
- ◯ External consultant

Any other (please specify)

9. How do you measure the impact of market changes in your company?

- ☐ By the development of new products
- ☐ By major modification of existing products
- ☐ By minor modification of existing products
- ☐ By the development of newer processes
- ☐ By major modification of existing processes
- ☐ By minor modification of existing processes

Any other (please specify)

4. Sensitivity

1. How are opportunity messages relayed in your organisation?

- ◯ No action
- ◯ A directive
- ◯ An institutional directive
- ◯ External consultant

Any Other (please specify)

2. In your opinion, how quickly do your employees react to an opportunity?

- ◯ They do not react
- ◯ They are fairly reactive
- ◯ Reactive
- ◯ They are highly reactive
- ◯ They are extremely reactive

3. In your opinion, what allows an organization to be agile? will it be possible the rank the following options?

	Not at all important	Fairly important	Important	Very important	Extremely important
Market knowledge	◯	◯	◯	◯	◯
Leadership	◯	◯	◯	◯	◯
Human resources training	◯	◯	◯	◯	◯
Creativity	◯	◯	◯	◯	◯
Innovation ability	◯	◯	◯	◯	◯
Ability to adapt to change	◯	◯	◯	◯	◯
Technology Information System	◯	◯	◯	◯	◯
Infrastructure	◯	◯	◯	◯	◯

Any Other (please specify)

4. How informed are your employees about other parts of the organisation?

- ◯ Not very informed
- ◯ Fairly informed
- ◯ Well informed
- ◯ Very well informed

5. Are your company's innovation activities independent?

- ◯ Yes it is Solo/Independent
- ◯ No there is involvement of externals
- ◯ Don't know

6. If no, to the above question, then who are the externals involved in your company's innovation activities?

- ☐ Suppliers
- ☐ Customers
- ☐ External consultant
- ☐ Financiers
- ☐ Network associates
- ☐ Government agencies
- ☐ Universities

Any other (please specify)

5. Knowledge Transfer

1. Does your organisation have any mechanism/structures in place to identify and transfer "appropriate" knowledge related to innovation activities?

- ◯ Yes
- ◯ No
- ◯ Don't know

2. If yes to the above question, then what kind of structures are in place to identify and transfer knowledge?

	Yes	No	Don't know
A dedicated department	◯	◯	◯
A person in charge	◯	◯	◯

Any other (please specify)

3. How important is knowledge transfer in the context of your organisation's innovation activities?

- ◯ Not at all important
- ◯ Fairly important
- ◯ Important
- ◯ Very important
- ◯ Extremely important

4. Is knowledge transfer valued in your organisation?

- ◯ Not valued
- ◯ Poorly valued
- ◯ Valued
- ◯ Well valued
- ◯ Highly valued

5. For the following statements choose the most appropriate answer

	Most important factor	Important factor	Least important factor	Not applicable
Knowledge transfer plays a key role in my organisation's innovation capabilities.	◯	◯	◯	◯
Without knowledge transfer innovation activity in my organisation would cease to exist	◯	◯	◯	◯
Knowledge transfer has helped my organisation to develop new products	◯	◯	◯	◯
Knowledge transfer has helped my organisation to improve business processes	◯	◯	◯	◯
Knowledge transfer helps us to be more competitive	◯	◯	◯	◯

6. In your opinion how can knowledge transfer be enhanced in your company? Also list any specific areas for enhancing knowledge transfer?

7. Does your company use any of the following tools/techniques for knowledge management?

	Yes	No	Don't Know
Knowledge audits	◯	◯	◯
IPR management	◯	◯	◯
Document management	◯	◯	◯
Knowledge mapping	◯	◯	◯
Storytelling	◯	◯	◯

Any Other (please specify)

6. Thank You

1. What is the impact of innovation activities on your company's growth and profitability?

- ◯ No impact
- ◯ negligible
- ◯ Weak
- ◯ Strong
- ◯ Very strong

2. How do you measure the impact of innovation activities in your company?

- ☐ By the development and introduction of new products
- ☐ By the introduction of new processes
- ☐ By increase in profit
- ☐ By increase in market share
- ☐ By increase in customer satisfaction
- ☐ No measurement

Any other (please specify)

3. In your opinion what prevents/ may prevent your organisation from undertaking innovation related activities/exercises?

	Most important factor	Important factor	Least important factor	Not applicable
Lack of financial resources	◯	◯	◯	◯
Lack of technical knowledge	◯	◯	◯	◯
Lack of external support (i.e. suppliers, contractors)	◯	◯	◯	◯
Lack of knowledge on management tools/techniques	◯	◯	◯	◯
Lack of professionalism	◯	◯	◯	◯
Non participation in clusters/ groups/ networks	◯	◯	◯	◯
Organisational resistance/lack of enthusiasm	◯	◯	◯	◯
Prefer status quo	◯	◯	◯	◯
Lack of time	◯	◯	◯	◯

Any Other (please specify)

4. Where is your head office/operations located?

5. What is the annual turnover of your company?

- ◯ Less than £ 500,000
- ◯ > £ 500,000 - £2 m
- ◯ > £ 2 m - £7 m
- ◯ > £7 m - £25 m
- ◯ > £25 m

6. Please use the space below to add your own issues/comments regarding innovation in SMEs

7. Would you like a summary of results from this study?

◯ Yes ◯ No

8. Would you be interested in working with Glasgow Caledonian University's academics or researchers to improve innovation activities in your company?

- ◯ Yes
- ◯ No

9. If yes to either question 7 or 8, then please provide us with contact details (i.e. Name and Address)

Thanks for completing the survey, your responses are valuable and we will contact you in due course if you have asked for a summary of the results

Thank You!

MEDINNOALL CONSORTIUM

Project Partner Universities

- University of Alicante (Project Coordinator)(Spain)
- Glasgow Caledonian University (United Kingdom)
- University of Evry-Val d'Essonne (France)
- Saarland University (Germany)
- École Normale Supérieure d'Enseignement Technologique d'Oran (Algeria)
- University of Mostaganem (Algeria)
- University Dr. Tahar Moulay of Saida (Algeria)
- University of Helwan (Egypt)
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- Higher Institute of Technological Studies of Sousse (Tunisia)
- Higher Institute of Technology of Zaghouan (Tunisia)
- Higher Institute of Technology of Jendouba (Tunisia)

Project Partner Business Associations

- Alicante Chamber of Commerce (Spain)
- Oran Chamber of Commerce and Industry (Algeria)
- Federation of Egyptian Chambers of Commerce (Egypt)
- Confédéracion Générale des Entreprises du Maroc- Union Régionale du Centre Nord (Morocco)
- Fédération Nationale de la Mécanique (Tunisia)

Project Associates

- Supreme Council of Egyptian Universities
- Ministry of Education of Morocco
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