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How having an innovation strategy and process can improve NPD outcomes for Irish SME's

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Abstract: Having a defined innovation strategy and a formal process are generally found to be associated with superior NPD performance. Innovation is at the top of the business agenda in Ireland but despite its importance, little is known about how Irish organisations manage for innovation; whether they have a strategy or whether formal management processes are used, and with what effect. This study finds that two-thirds of innovation active firms do not have an innovation strategy with even less operating any formal innovation process. Having a more formal innovation process is associated with higher innovation returns; more radical or novel innovations and better exploitation of innovations at the diffusion stage of the innovation value chain. Structuring the innovation process has considerable advantages for small firms; in idea generation where they are more likely to develop ‘new to the market’ ideas; in conversion where they take a more risk taking attitude to investing in radical ideas and in diffusion, where they manage the launch process

better by maximising sales and distribution channels and by rolling out new products faster.

Keywords: Innovation, NPD, SME, Ireland, Innovation audit, innovation value chain

1 Introduction

The ability to innovate effectively is increasingly viewed as the single most important factor in developing and sustaining competitive advantage (Tidd and Bessant, 2009); with new product development “among the essential processes for success, survival and renewal of organisations” (Brown and Eisenhardt, 1995:344). The new product development (NPD) process is arguably the most important dynamic capability within a firm (Nelson and Winter, 1982); and NPD programs can be the most profitable growth strategy compared with mergers, alliances, acquisitions, or joint ventures (Jones et al, 2012).

In Ireland, the context for this study, policy makers have argued that success at innovation is critical to industrial development and national competitiveness:

Innovation in all its dimensions will continue as **the** central driver of wealth creation, economic progress and prosperity in the coming decades. Innovation will no longer be about technological

innovation but will include organisation and business model innovation, workplace innovation, creativity and design.

(Forfás, 2009; p. 6. Emphasis added).

However, studies of innovation in Ireland suggest that 55% of firms are not innovation active, in that they have not ‘engaged in any innovation activities’ over the past two years (CIS, 2009:1). This data also reveals that Irish owned firms are less likely than the foreign-owned firms, located in Ireland, to be engaged in innovation of any type (product, service, process, marketing or organisational). Furthermore, Irish owned firms are three times less likely, than foreign-owned firms, to launch a product or service that is new to the market. The innovations of Irish firms are more likely to be merely ‘new to the firm’. The CIS data also suggests that larger firms are almost twice as likely to be active in innovation.

Comparing Ireland to the twenty-six other European countries, the EU Regional Innovation Scorecard (RIS) 2012, ranks Ireland as 7th highest in terms of the rate of innovation. The relatively high ranking in the innovation table is partially attributable to the presence of MNC subsidiaries in Ireland that, according to the study, contribute disproportionately to innovation activity in Ireland.

The CIS data provides answers to some ‘what’ questions, such as what size of company is more likely to be involved in various types of

innovation; and what type of innovation is more prevalent in a given sector; but, it does not answer the ‘how’ questions which might help elucidate how successful firms organise for innovation. This paper seeks to address this knowledge gap by studying the management practices of firms engaged in innovation. Specifically, the paper explores whether firms adopt an explicit and formal innovation process and what are the consequences when they do. The paper adopts a novel approach to data collection. Data was collected through the development of an on-line innovation audit tool that provided firms the opportunity to self-assess their innovation capabilities based on the completion of the on-line audit survey. The innovation audit tool was developed broadly around the innovation value chain (Hansen and Birkinshaw, 2007, Roper et al, 2008). The tool allowed firms to assess how they are managing their innovation activities and identify the factors that encourage or frustrate innovation efforts.

Despite its importance, relatively little is known about how companies in Ireland manage their innovation performance (Roper and Hewitt-Dondas, 2008) and the existing knowledge base comes, primarily, from a series of quantitative studies looking at patenting behavior (e.g. Malerba et al, 1997; Geroski et al, 1997; Cefis, 2003). Extant research that studies the link between product innovation and profitability shows that innovating firms are persistently more profitable than non-innovators

(Geroski et al., 1993; Cefis and Ciccarelli, 2005). Roper and Hewitt-Dundas (2008) suggest that this is because multiple innovations may provide cumulative high profits even though the chances of success of any individual innovation may be relatively low and its profits transitory.

Secondly in Ireland, there is a link between foreign ownership and innovation with externally owned firms generally more likely to be innovative than indigenously owned ones in both the area of product innovation (Harris and Trainor, 1995; Love and Ashcroft, 1999) and their adoption of new processes and technologies (Hewitt-Dundas., 2006). The dominance of foreign owned firms is significant with only 2 Irish owned firms appearing in the list of Ireland's top 20 electronics companies and only 2% of patent applications made in Ireland now being made by Irish residents (Tyng-Ruu Lin et al., 2010).

In Ireland, SME's make up the substantial proportion of the enterprise economy, with over 99% of businesses in this sector and 70% of people employed by them. Despite this, SME's only account for 52% of both turnover and gross value added in the economy (CSO Central Business Register, 2012).

The paper is structured as follows. First, 'best practice' in firm innovation and firm level capability measurement tools are outlined. This is followed by an explanation of recent arguments about the stage-gate

process for the management of innovation as compared to the ‘innovation value chain’ (Hansen and Birkinshaw, 2007). The research method section outlines how the innovation audit tool was developed and used to collect data on how firms in Ireland manage new product and service development. The findings section explores the extent and impact of formal processes in the management of innovation. The paper concludes by outlining implications for research and practice.

2. Literature Review

‘Best Practice’ in Firm Level Innovation

Innovation is the generation, acceptance, and implementation of new ideas, processes, products, or services (Thompson, 1965). Drucker (1985) defined innovation as the specific instrument of entrepreneurship and the act that endows resources with a new capacity to create wealth; while Chandler et al. (1998) asserted that innovation is not just a novel idea; it’s a process that includes developing the idea into a usable product or service to gain a competitive advantage in the marketplace. Bessant et al. (2005, p. 1366) suggest; “Innovation represents the core renewal process in any organisation. Unless it changes what it offers the world and

the way in which it creates and delivers those offerings it risks its survival and growth prospects”.

Given the link between product innovation performance and firm performance, managers seek to ensure that the innovation process is managed (Cormican and O’Sullivan, 2004). However, for many firms, particularly small firms, managers are often unaware of prior research that provides a large body of knowledge on “good practice” many firms do not know of these practices and their association with successful NPD (Barclay and Porter, 2005). Radnor and Noke (2006) propose that companies should assess their capacity to innovate successfully by carrying out an audit and using the results as a basis for improvement through the development of an action plan (Gardiner and Gregory, 1996).

A number of authors have shown the usefulness of auditing to measure, benchmark and understand innovation performance (e.g. Chiesa et al., 1996; Gardiner and Gregory, 1996; Cormican and O’Sullivan, 2004). The usefulness of such tools is not merely in their capacity to develop a measure of firm level performance but also in their ability to assess the gap between best-practice and actual practice or between current performance and desired performance. Chiesa et al. (1996) advocate a process that goes beyond static diagnosis and includes a step to develop action plans to help improve innovation performance;

Auditing methodology should go beyond simply performance measurement by highlighting problems and needs and providing information that can be used in developing an action plans for improving performance (Chiesa et al., 1996:105).

A number of tools have been developed to measure firm capability at innovation (Table 1). Radnor and Noke (2006) developed an index of factors linked to superior performance at innovation. They likened the innovation process to a ‘journey’ and hence chose the metaphor of a compass for their model. Within the compass framework, they developed a theory around ‘SLOT’ factors. These were: *structure, leadership, outputs and team*. Around the circle describing these factors, they added an outer ring to the compass, which was used to describe the operating *Context* for the firm. The compass is useful insofar as it highlights strengths and weaknesses for a firm; however, it does not acknowledge the individual stages in the innovation process and assumes that innovation is simply one core activity.

Sawhney et al. identified 12 components of an innovation ecosystem or framework, they called the *Innovation Radar* (Table 2). Each dimension represents a vector along which firms can focus their innovation strategy. The dimensions of the business system that they discuss are shown below. They are grouped under four main themes and

then companies' performance is measured and shown in a spider diagram tracking each dimension. The logic behind this model is that, according to the authors, business innovation should be considered systemically and that high performance is required along multiple dimensions. However, this model is also agnostic to the stages in the innovation value chain and makes no provision for the differential importance of various elements depending on the stage of the innovation value chain.

Researchers at the Solvay Business School examined "the main competences that come into play in the firms' innovation process" (Peeters and Van Pottlesverghe 2003). The main difference with this survey was a focus on firm competencies that relate to the innovation process. Specifically culture was a variable which had not previously featured highly on other measures of innovation. According to Peeters and Van Pottlesverghe (2003; 2):

The firm's culture surrounds all aspects of the innovation process so that the development of a culture of innovation becomes a competence in itself.

Table 1: Innovation audit tools and measures

Author	Tool	Components
Sawhney et al. (2006)	Innovation Radar	(see Table 2)

Radnor & Noke (2006)	Innovation Compass	Structure, leadership, outputs and team
(Peeters and van Pottlesberghe, 2003)	Questionnaire	Training, rewards, knowledge management, communication, strategic goals, time to innovate, intrapreneurship
Kahn et al, (2012)	Best practice survey	Strategy process market research project climate company culture metrics and performance measurement commercialisation

Table 2: Components of the Innovation Radar (Adapted from Sawnhey, 2006)

Offerings <i>What</i>	Customers <i>Who</i>	Processes <i>How</i>	Presence <i>Where</i>
Product	Customer	Organisation	Ecosystem
Platform	Value Capture	Process	Network
Solutions	Customer experience	Supply chain	Brand

Managing the Innovation Process: Stage-gate or Value-Chain?

Extant literature suggests that organisations that have a dedicated innovation process experience high levels of success in innovating (Kahn et al, 2006; Cooper and Edgett, 2008). The dominant approach to managing for innovation is the stage-gate approach (Cooper and Kleinschmidt, 2007). This approach to innovation is a prescriptive and mechanistic approach to managing specific innovation projects that mandates a sequence of defined activities punctuated by key decision points. It is a linear model of innovation and it maps the flow of decisions at key stages of an innovation project. As such it provides managers with a clear process for managing innovation.

More recent perspectives on innovation argue that the innovation process involves a number of sub-processes and cannot be considered as just one skill, or just one act. As Yang (2012: 38) states: 'Firm innovation capability is a meta-capability.' Many researchers view innovation projects in terms of three discrete stages (Table 3). These stages are sufficiently distinct to require different skills to manage them effectively. O'Connor and Ayers (2005) advocated a three part programme for innovation in which the three elements are discovery, incubation and acceleration. Such a three-part division of the innovation process is increasingly a feature of this literature (e.g., Cooper and Kleinschmidt, 1996; Veryzer, 1998; Tidd and Bodley, 2002; O'Connor, 2009; Vuola and Hameri, 2006; Hansen and Birkenshaw, 2007; Roper et al., 2008). The three parts described are generally configured as: a) the discovery or idea generation phase; b) the incubation or transformation phase and c) the launch or implementation phase.

Hansen and Birkinshaw (2007) suggest that executives need to view the process of transforming ideas into commercial outputs as an integrated flow, from end-to-end. The first of the three phases in the chain is idea generation, which can happen in three ways; within a single department, or across the company using cross-functional teams or by involving external partners to generate ideas. The first phase is linked to organisational creativity. Any new product development (NPD) process

requires a high level of creative performance. According to Leenders et al (2007), creative performance is of paramount importance in NPD projects and most NPD projects are managed through a NPD team as the organisational nucleus for innovation. Innovation inevitably involves creativity: the initiation, identification or discovery something novel, an idea, technology, or process that is new to the organisational setting which is then followed by its development and implementation.

The second phase is to convert ideas; to incubate the best ones and to amplify the elements of the ideas that have most appeal. More specifically, the second phase helps select, sift, rank and prioritise ideas for funding (or resourcing) aimed at developing them into products, services or practices. The third phase is to diffuse, exploit or implement those ideas both inside the organisation or outside in the case of launching new products and services or creating new markets.

Roper et al (2008) developed a similar model in which an ‘innovation event’, like the launch of a new product, service or process, represents the end of a series of knowledge sourcing and translation activities by a firm. It also marks the start of a means of value creation that, subject to the firm’s capabilities and the buoyancy of the markets it operates in, should yield an improvement in NPD results. According to Roper et al. (2008), the first link in the innovation value chain is a firm’s knowledge sourcing activity; these authors focus in particular on the

factors that drive firms' engagement with particular knowledge sources; experts, research institutes etc. The second link in the innovation value chain is the process of knowledge transformation, in which knowledge sourced by the enterprise is translated into innovation outputs.

The final link in the innovation value chain is knowledge exploitation, i.e. the firms' ability to fully commercialise their innovations. While this model builds closely upon the Hansen and Birkinshaw (2007) innovation value chain model, it does contain some specifics about how and, specifically, where firms can access knowledge that may be useful as a start point for new product or service ideas. The authors classify five sources of such knowledge: Internal dedicated R&D; backward linkages to suppliers and consultants; forward linkages to customers/consumers; horizontal linkages to competitors or joint ventures and public linkages to research institutes and universities.

The Kahn et al, (2012) best practice framework for innovation is based on the PDMA best practice survey of NPD practitioners. Their framework suggests 6 dimensions of NPD practice: strategy; process; market research; project climate, company culture, metrics and performance measurement and commercialisation. Strategy emerged as the most influential dimension according to this study, which builds on work by Cooper et al (2002) in which they found that almost 65% of US

firms have a strong, well defined innovation strategy allowing them to focus on longer-term prospects in the future and to look for customers known, unmet and latent needs in the course of identifying such new opportunities. This allows us to form the first hypothesis that firms with a formal innovation strategy will outperform firms with no strategic goals for their NPD initiatives.

H1: Firms with a formal innovation strategy will outperform firms with no strategic goals for their NPD initiatives.

Having a dedicated, customized innovation process has frequently been cited as the defining factor between the success and the failure of NPD projects (Brown and Eisenhardt, 1995; Griffin, 1997b; Page, 1993). Best practice characteristics (Kahn, et al) include the use of a formal NPD process that is documented and focuses effort on quality of execution but is also flexible and adaptable to meet the specific needs of individual projects, while poor practices are characterised by the absences of formal stages in projects and a lack of paperwork or process to guide various projects. Our second hypothesis is that firms with a formal process for managing NPD projects will outperform firms without one.

H2: Firms with a formal process for managing NPD projects will outperform firms without one.

Specifically, the index we developed measured firms' performance and capacity across all three phases of the innovation value chain and it also probed for the six dimensions mentioned above.

Table 3: Phases in the innovation process

Author	Stage 1	Stage 2	Stage 3
Roper et al. (2008)	Knowledge Sourcing	Transformation	Exploitation
Hansen and Birkenshaw (2007)	Idea Generation	Idea Conversion	Idea Diffusion
Loewe ad Chen (2007)	Discovery	Opportunity	Realisation
O'Connor and Ayers (2005)	Discovery	Incubation	Acceleration

This research is guided by two research questions:

- 1) How many Irish firms manage innovation through the use of some structured process?

- 2) Are formal innovation management processes associated with superior innovation performance in terms of outcomes such as higher incidence of radical innovation; speed to market, and the proportion of firm revenue generated from recent product launches.

Building on the ideas in the literature related to the management of innovation and our knowledge of existing innovation audit tools, this research is guided by two research questions. The first is to establish the prevalence of formal innovation management processes within Irish firms; and the second is to explore if formal innovation management processes are associated with superior innovation performance in terms of process outcomes such as speed to market, and innovation outcomes, such as percentage sales from innovative new products.

3. Research Methodology

To address these questions we designed an audit tool based on the value chain perspective. The instrument, called the Irish Innovation Index, uses questions from some existing surveys including CIS, NESTA and some suggested by Hansen and Birkinshaw (2007) (See Appendix A for the tool). The tool differs from other tools (reviewed above) in that it is

based around the innovation value chain and hence it takes account of the different skills and activities that characterise the three phases of an innovation project or programme. The survey also integrates information on best practice drawn from the PDMA guidelines (Khan et al, 2006).

The innovation audit tool measures innovation management inputs in terms of the activities undertaken at each of the three phases of the value chain. We probed for best practice in Idea Generation; Idea Conversion and Diffusion. We also checked for known correlates of strong performance: having an innovation strategy, R&D resources, dedicated team leader, innovation budgets, innovation teams and innovation processes (Cooper et al, 2008; Barczak et al, 2009; Kahn et al, 2006).

4. Data Collection

The data is based on a convenience sample. The first step in the implementation of the audit tool was to get a class of 36 managers attending a workshop on innovation (at the Irish Management Institute) to complete the tool. This first group then recommended the tool to a further 50 respondents ('snowball sampling'). The next step was that the 'Irish Innovation Index' audit tool was formally launched during national Innovation Week in Ireland in November 2010. The announcement garnered considerable publicity in the national media and on the online

business pages. The tool remained live for a period of 19 months (November 2010 to June 2013). Over this time 571 self-audits were undertaken. The mean duration of time taken to complete the survey was 22 minutes.

Of the 571 surveys, we include only firms that self-report they are innovation active, we further exclude foreign-owned subsidiaries and use only the firms that declared whether or not they have an innovation process. This gave us an active sample of 231 businesses. These are independent innovators that have been innovative active at least in the last three years. Descriptive data on the respondents is presented in Table 4.

Study Limitations

As this study was carried out using a convenience sampling technique in which participants self-selected, the sample is not representative of all Irish firms or of all innovative Irish firms, and therefore cannot be generalised beyond the respondent firms. The data collection process was biased towards the inclusion of firms that self declare as active in innovation. A second issue with the tool was that respondents could choose not to answer all questions. Questions that probed for information which might be considered sensitive (like sales data or R&D spend) had missing data for nearly fifty per cent of

respondents. A further limitation is that this firm level data is based on a single respondent.

Table 4: Descriptive data (all respondents)

Category	Percentage of respondents
Size of firm (n=228)	%
- Micro & Small Businesses (<50 employees)	67.0
- Medium Sized Business (50 - 249 employees)	13.2
- Large Business (250+ employees)	19.7
Business Outputs (n=231)	
- Mostly Products	21.2
- Products and Services	32.5
- Mostly Services	46.3
Innovation (past 3 years)	
- Product (n=231)	100.0
- Process (n=229)	74.2
Mean percentage of sales from products and services launched in last three years (n=206)	35% (Std dev: 27.6)

5. Findings

Innovation practices

There is a constellation of practices (formal strategy, innovation process, metrics, teams, dedicated team leader) or processes, what we call ‘innovation architecture’ as a broad label for elements or foundations that have been shown to be correlated with success in innovation. The majority of firms surveyed have few aspects of these formal innovation practices (See Table 5). Of those firms that report themselves as innovative active we find that 68.6% don’t have a formal innovation strategy; 66.2% don’t have formal metrics and objectives for measuring the success of innovation; 70.6% don’t have formal processes for managing innovation; 72.2% do not have a formal fulltime leader dedicated to managing innovation projects; 68.8% don’t have formal innovation or R&D budgets. However, 62.8% report that they do use cross-functional teams in managing the innovation process.

Some of these factors although worrying, are not surprising, reflecting the relatively small size of the firms included in our study. However, despite the absence of these supposed ‘aspects of best practice’ in innovation management, these firms are innovative active. These innovative active firms have an external orientation, in that at least half perceive that lots of good ideas come from outside of the firm and 78.8% are engaged with two or more external innovations collaborators, most typically customers and suppliers.

Table 5 Innovation Practices in innovation active firms

Category	%
- <i>When working on innovation, do you apply:</i>	
- <i>Formal strategy</i>	31.4
- <i>Specific metrics and objectives</i>	33.8
- <i>Formal structures and processes</i>	29.4
- <i>Dedicated fulltime leader</i>	27.8
- <i>Dedicated innovation or R&D budget</i>	31.2
- <i>Use cross functional teams to manage innovation</i>	62.8
<i>Lots of good ideas, for new products and services, come from outside</i>	
- Strongly agree/agree	53.1
- Neither agree/disagree	25.2
- Disagree/strongly disagree	21.8
<i>Extent of external collaborations</i>	
- No external collaborators	7.4
- 1 external collaborator	16.5
- 2 external collaborators	21.2
- 3 external collaborators	25.5
- 4 external collaborators	12.6
- 5,6,7 external collaborators	16.9
<i>External collaborators</i>	
- Customers	63.6
- Supplier	40.7
- Industry experts	37.2
- Consultants	33.3
- Universities	27.3

- Research institutes	24.2
- Government agencies	23.4
- Competitors	23.4
- Others	9.1

Impact of innovation processes

How do firms with an innovation management process compare to other firms? Innovation process is associated with size, with larger firms more likely to be characterised by a formal innovation process (Table 6). While the firms with an innovation process report a slightly higher percentage of sales coming from new products or services introduced within the past three years, 39.5% compared to 33% for firms without a formal innovation process, these differences are not statistically significant. That is firms, whatever their size, can effectively innovate without a formal innovation process.

Hypothesis 1: Only 34% of the surveyed companies have an innovation strategy to provide focus and guidance to their innovation efforts. In prior research, strategy is considered to be the key ingredient in NPD success (Kahn et al, 2012). Our survey showed a number of benefits to having an innovation strategy. First and, possibly, chief among them is the fact that having a strategy increases the likelihood of the organisation having a formal process to manage innovation by over threefold. Having a strategy also makes firms more likely to launch more new to the market

innovations (39 v's 31%); it helps them maximise the return on investment by penetrating all possible distribution channels and it makes them faster to roll out new products than organisations without such a strategy. Moreover, firms with an innovation strategy report getting a slightly greater return in terms of the percentage of their revenue accounted for by products and services launched in prior three years.

Hypothesis 2: Only 31% of firms surveyed operate a structured innovation process and those that do derive considerable benefits in terms of innovation outputs. A formal process for managing innovation might be expected to be associated with benefits such as more on-time completion of innovation projects and faster roll out of innovative products and services. However, this does not appear to be the case since over half of the firms reported that innovation projects often are not completed on time. For those with a formal innovation process, 30.3% reported that projects often finished on time, compared to 16.9% for firms without a formal innovation process, the differences are not statistically significant. Similarly, in terms of rolling out innovative products and services on time, 48.5% of those with a formal innovation process, 30.3% reported that innovative products/services are rolled out on time, compared to 35% for firms without a formal innovation process, the differences are not statistically significant.

Formal innovation processes are also not associated with more ‘open innovation’, at least not in terms of perception of the number of ideas coming from outside the firm or the number of external innovation collaborators. Lots of good ideas come from outside the organisation for 57.4 % of firms with formal process, compared to 51.2% for firms without formal innovation processes (not a statistically significant difference). There is no statistically significant difference in the number of external collaborators.

From an internal process perspective, one benefit that may flow from having a formal process is the perception that managers are supported in the innovation process. Firms with a formal innovation process reported that they disagreed/strongly disagreed with the idea that managers were not supported in the innovation process 16.4%, compared to 27.2% in firms without a formal innovation process (significant at $p < 0.5$). This may reflect the perceptions of managers that the presence of a formal process is a de facto support for managers. However, there was no perceived difference in terms of the firms’ risk-taking attitude to radical ideas or to the value put on outside ideas. Of those with a formal process, 45.6% reported they had a risk-taking attitude to radical ideas, while 39.5% of firms with no formal process reported having such a risk-taking attitude (not statistically significant). Of firms with a formal process, 69.1%, compared to 56.2% for firms with no formal process, reported that

they were not characterised by a ‘not invented here’ culture (not statistically significant).

However, there were a number of important ‘outputs’ that differentiate between those firms with an innovation process and those without. First, firms with a formal innovation process were more likely to have radical or novel innovations, in that the new product or service was the first of its kind in the market. 55.4% of firms with formal innovation processes reported that this was the case, compared to 28.4% of firms without a formal process (statistically significant at $p < 0.001$). One explanation for this is that firms with a formal process will have a purposeful method of scanning their market and understanding the competitive offerings and targeting their innovation efforts at new opportunities.

Second firms with a formal process reported that the firm’s innovations were exploited across all possible channels, customer groups, and regions. Of those with a formal process, 32.8%, compared to 14.8% of firms without a formal process, penetrated across all possible channels, customer groups, and regions (statistically significant at $p < 0.001$).

Table 6: Formal processes and process and market innovation outcomes

Formal innovation process (n=68) %	No formal innovation process (n=163) %	Significance
55.2	72.0	***
7.5	15.5	
37.3	12.4	
39.5 (n=60)	33.0 (n=146)	None
51.5	56.9	None
18.2	26.3	
30.3	16.9	
33.8	44.2	None
17.6	20.9	
48.5	35.0	
57.4	51.2	None
16.2	29.0	
26.5	19.8	
19.1	25.8	None
16.2	23.3	
26.5	25.2	

38.2	25.8	
58.2	37.7	*
25.4	35.2	
16.4	27.2	
45.6	39.5	None
14.7	24.7	
39.7	35.8	
16.2	21.6	None
14.7	22.2	
69.1	56.2	
55.4	28.4	***
44.6	71.6	
43.3	67.3	***
23.9	17.9	
32.8	14.8	

Impact of innovation processes in small firms only

Does having an innovation process matter within innovative active smaller firms? This section explores the impact of formality of innovation processes in innovative active smaller firms (less than 50 employees) (Table 7). This group accounted for two thirds of all respondents. For this group of firms, formality of innovation process is associated with aspects of both the innovation and innovation outcomes. The smaller firms with a formal innovation process reported that they had a higher percentage of sales from innovative products or services introduced within the previous three years. The difference is nearly 50%. Smaller firms with a formal innovation process report that 52.5% of sales come from new products or services, compared to 35.4% for other firm (statistically significant difference). Formal innovation processes are also associated with two other innovation outcomes: innovations are the first to the market (54.8% for smaller firms with formal innovation processes, compared to 26% for smaller firms with no formal innovation process); and innovations penetrate all channels, customer groups, and regions (40.5% for smaller firms with formal innovation processes, compared to 11.3% for smaller firms with no formal innovation process).

Having a formal innovation process is also associated with more timely completion of innovation projects (45.7% compared to 15.8%, statistically significant) and with on-time roll out of innovations (67.7% compared to 35.3%, statistically significant). In terms of internal support

for innovation, in smaller firms with formal process, 77.8% responded that managers receive support in innovation, compared to 25% in smaller firms with no formal innovation process (statistically significant). This difference should however be treated with caution, as given the size of the firm, the respondent may have been directly involved in the formal innovation process, and the positive response may reflect their perceptions rather than the perceptions of other managers.

There were some differences in innovation culture between smaller firms with formal processes and those with no formal processes, though the differences are only statistically significant at the $p < 0.05$ level. Having a formal innovation process is associated with a risk taking culture to investing in novel ideas (64.9% compared to 40.5%) and with being open to external ideas (absence of a 'not invented here' culture), 78.4% compared to 56%. However, formality of innovation process was not associated with aspects of 'open innovation'. For example, there were no statistically significant differences in terms of the perception that lots of good ideas come from outside the firm or with the number of external collaborators.

Table 7: Formal processes and process and market innovation outcomes in small firms

Category	Formal innovation process (n=37) %	No formal innovation process (n=116) %	Significance
<i>Size of firm</i>			None
- Micro (<10 employee)	51.4	48.3	
- Small (10<50 employees)	48.3	51.7	
<i>Mean percentage of sales from products and services launched in last three years</i>	52.5 (n=31)	35.4 (n=102)	**
<i>Often don't finish on time</i>			**
- Strongly agree/agree	42.9	55.3	
- Neither agree/disagree	11.4	28.9	
- Disagree/strongly disagree	45.7	15.8	
<i>Slow to roll out</i>			**
- Strongly agree/agree	13.5	41.4 23.3	
- Neither agree/disagree	18.9		
- Disagree/strongly disagree	67.6	35.3	

6. Discussion & Conclusions

This study sought to explore how Irish firms innovate by (i) assessing the extent of formal innovation systems in independent firms in Ireland, and (ii) by testing if formal innovation systems are associated with superior innovation performance. These questions were explored through

data collected through an innovation audit tool. These issues are important because extant research suggests over half of Irish firms are not innovation-active (CIS, 2008) and that innovation projects are uniquely configured to be difficult to project manage, as innovation, by definition, requires a break from routine, challenging the future, out-of-the-box thinking, risk-taking and a step into the unknown; (Burns & Stalker, 1961; Kanter, 1983; March, 1991). Reflecting these difficulties various authors have used colourful metaphors and language to characterise the process of managing innovation; 'Grabbing Lightning' (Correli-O'Connor, 2008) and 'Innovation Leaders Should be Controlled Schizophrenics' (Buijs, 2007).

Based on a group of Irish innovative active firms, this study finds that the majority of firms (roughly two thirds) do not have explicit, formal processes and structures in place to manage innovation. While for some aspects of innovation there are no benefits of having a formal innovation process, most notably the percentage of sales from new innovations, the study suggest that there are some advantages to taking a more formal approach to managing innovation. When all firms are included in the analysis, the benefits are mainly in two areas. Structured management processes for innovation, according to the study, tend to steer companies towards more radical or novel ideas giving them a higher likelihood of launching products and services, which are new to their market. But a

further benefit accrues in the launch or diffusion stage where a process facilitates firms maximising their return on innovation investment by ensuring they exploit all possible sales and distribution channels for their new offerings.

This finding is interesting because some prior research suggests that formality in the innovation process may in fact reduce the flow of radical and novel innovations. This perspective, as outlined by Muller and Hutchins (2012) is not borne out in our research. Muller and Hutchins (2012: 2) suggest that most innovation management processes are built around a “typical” project, and hence, the process often becomes:

‘hostile to unorthodox opportunities that don’t fit neatly inside’. Over time, the organisation develops a prejudice against creative growth opportunities that, by their very nature, are often unconventional or ambiguous. Innovation is squeezed out of projects as they move through the pipeline in order to make them more palatable to internal constituencies or conform to traditional expectations.’

The greatest advantages to having an innovation process accrue to small firms (<50 employees). Adopting a structured approach to managing innovation for small firms improves their innovation performance in a

number of areas: they get a higher percentage of their revenue from products and services launched in the prior three years; their innovation projects are more likely to finish on time; they are faster to roll out their new products; they are likely to have a higher number of external collaborators for their innovation projects; they manifest a more risk-taking attitude for investing in novel ideas; their ideas are more likely to be first to the market and they manage the launch process better by maximising the distribution channels and sales opportunities for their new products and services. These benefits accrue across each stage of the innovation value chain: in idea generation where they are more likely to develop 'new to the market' ideas; in conversion where they take a more risk taking attitude to investing in radical ideas; and in diffusion, where they manage the launch process better by maximising sales and distribution channels and by rolling out new products faster.

This study makes the following contributions. First, the data contributes to the debate on the advantages and disadvantages of formalised processes for managing innovation by looking at independent Irish firms. This research suggests that some degree of formality may not be associated with less radical and novel innovations; that having the right process need not necessarily cauterize creativity.

More generally, the research suggests that the two thirds of firms who do not follow any process in managing innovation have the potential

to enjoy greater innovation success if they were to adopt one. Second, the study developed an innovation audit tool that is based on the innovation value chain. The advantages of audit tools have been argued in prior research (Chiesa et al., 1996). Audit tools help managers identify ‘gaps’ in performance and provide ‘blue prints’ of best practice. The innovation audit tool developed in this study exploits an understanding of the innovation process that emphasises the three constituent components of the value chain and overlays them with some known factors associated with best practice.

Implications for managers suggest that there are strong advantages to increased formality in innovation management. Defining a strategy to focus innovation efforts is a worthwhile exercise. Also, developing a process flow for managing innovation projects will yield much benefit. Such processes need to be appropriate and not overbearing. The challenge for managers is to tailor innovation management processes to their size, their resources and their competitive context. But, managers in small firms in particular are highly likely to enhance their business and its sustainability through innovation if they develop and adopt the right innovation process.

Directions for future research might include how SME’s can develop appropriate innovation strategies and processes without the burden of high cost or unrealistic resources. Having innovation

architecture such as appropriate strategy and processes can deliver substantial benefits for SME's but they have issues of scale with most attention paid to operations rather than possible transformations; hence there is a need to see what interventions might be successful in equipping them with the right architecture to innovate.

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