

Should Attitudinal Views toward Innovation Development Play a Role in Policy in Peripheral EU Regions? New Evidence from Vouchers Program in Northern Ireland

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Abstract. The impact and effectiveness of policies to support collaboration for Research & Development (R&D) and Innovation is critical to determining the success of regional economic development. (O’Kane, 2008) The purpose of this paper is to evaluate the level of success of the Innovation Vouchers Program operated by Invest Northern Ireland (Invest NI) from 2009 to 2013 and address if attitudinal views towards innovation development should play in a role in future policy design in peripheral EU regions.

Keywords. Peripheral Regions; Regional Economic Development; Innovation; Attitudes; Market Failure; R&D.

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1 Introduction

Historically, spatial separation and lack of funding have negatively affected innovation development. This has created entrenched attitudinal views against innovation development, which has subsequently affected the ability of Northern Ireland, a peripheral region within the United Kingdom (UK), to translate innovative activity into innovative behavior despite heavy investment in its ongoing Research and Development (R&D) vouchers program. Evaluative studies have largely focused on assessing the short-term economic impact of innovation vouchers programs in Northern Ireland, the UK and other European Union (EU) regions. These studies have failed to consider the implications of attitudinal views towards innovation. This represents a significant gap in the academic literature. This paper makes a first attempt at utilizing primary source survey data to not only explore the economic impact of an R&D subsidy program, but also how attitudinal views toward innovation play a major role in the greater scheme of innovation development of peripheral regions.

Academically, the benefits arising from research collaboration to stimulate innovation and improve business performance have long been recognized by both those working in the public (government and academic) and private sectors. The challenge that arises is business advisory and services associated with research collaboration may not be affordable to SMEs located in peripheral regions. As continually high unemployment rates and low productivity are often characteristic of the small business sector in peripheral regions, (Krieger-Boden, Morgenroth and George, 2008) there is an inherent need for funding to not only cultivate organic growth but also to foster a supportive environment to sustain it.

Peripheral regions in the UK have lacked funding due to spatial separation from more central economic hubs. This absence of funding effectively diminishes an SME's ability to benefit from 'knowledge transfer,' and subsequently weakens its capacity to innovate. To compensate for market failure in these regional economies, 'government agencies have introduced and developed several policy initiatives over the years since the free market mechanism does not adequately support the flow of new [and sustained] ventures' (Vadnjal and Nikolovski, 2008).

To address Northern Ireland's own productivity gap, Invest NI launched a one-year pilot program in May 2008 that provided an investment channel to stimulate innovative activity primarily through research collaboration. As peripheral regions typically receive block grants due to the lack of performance history and available collateral necessary to satisfy private investors, Invest NI distributed vouchers valued at up to a maximum of £4,000 redeemable by local SMEs against the cost of practical advice and expertise on specific operational projects (Johnston & Buchanan, 2016, Invest Northern Ireland, 2012). Following the one-year pilot program, an internal review of the Innovation Voucher Program was undertaken. This was followed by an independent economic appraisal and Ministerial approval for £2.7 million to launch a new Innovation Voucher Program to benefit 576 SMEs in Northern Ireland covering the period 26 October 2009 to 31 March 2012

The key objectives of the Innovation Voucher Program were to:

1. Encourage small enterprises in Northern Ireland to engage with public sector Knowledge Providers to access knowledge and expertise to develop innovative solutions to business issues;

2. Increase the level of innovation activity in Northern Ireland's small enterprise sector;
3. Stimulate innovation and encourage research and development in small enterprises; and
4. Increase productivity in Northern Ireland's small enterprises.

More specifically, the Innovation Voucher Program was designed to help enterprises registered in Northern Ireland establish links with the 41 public sector Knowledge Providers (Universities, Regional Colleges, Research Centers and Institutes of Technology) across Northern Ireland and the Republic of Ireland to access knowledge and expertise to develop innovative solutions to business.

The remainder of this paper will first focus on providing a conceptual background of innovation policy in support of small to medium sized firms, the use of R&D as a policy mechanism in peripheral regions, and objectives set by Invest NI for the Innovation Vouchers Program. Using primary source data gathered from voucher recipients, this research specifically addresses the effectiveness of the Innovation Vouchers Program in its ability combat intrinsic market failure in Northern Ireland and the gap in academic literature regarding attitudinal views toward innovation development. Lastly, this research will evaluate the Innovation Vouchers Program's economic impact, value for money and additionality in addition to providing insight into whether the current design of the Innovation Vouchers Program fosters innovative activity and long-term innovative behavior.

2 Concept & Objectives

Historically, innovation support programs have targeted different sized firms within a variety of industries. Since the 1980s, the intended demographic has shifted towards 'smaller' firms, which varies in number of employees per country specification (Cunningham, Gok, & Laredo, 2012). The rationale for direct support to small firms stems from the theory that increased R&D within firms will lead to small-scale innovations that may include production of new products, services or processes. Cunningham et al. (2012) argues that 'limited government subsidies can have a proportionately greater effect (and certainly reach a much larger audience - potentially increasing the likelihood of successful intervention) if allocated to smaller companies rather than larger companies who have a more diverse portfolio of R&D interests and greater resources with which to support these.' While there is a counter argument that indicates a greater spillover effect regarding R&D activities within larger firms, the generally accepted rationale is that public intervention stands as the primary vehicle for protecting inventors and aiding the development of technology that could benefit an industry (Almus, & Czarnitzki, 2003).

There is a comparatively long history regarding measures to foster longer-term cooperation between science and industrial actors. These now represent a significant part of the portfolio of innovation policy support measures in many countries. Direct measures designed to foster R&D within the private sector originated in the aftermath of the World War II, in the form of support programs designed to stimulate innovation within the manufacturing industry (Cunningham et al., 2012). In the 1970s, these programs benefitted from the addition of technological support, which were based on the idea of bringing together groups of researchers and end-users (O'Kane, 2008). The early programs have played a major role in influencing the design of similar programs

in several other countries.

There has been a shift in the primary rationale for collaborative support mechanisms, from a set of 'technology transfer' objectives (based very much on the old linear model of innovation and which sought to directly transfer the results of public sector research into the creation of commercialized products, process and services) towards 'knowledge transfer' objectives (Bruno et al., 2011). While the benefits of research collaboration to boost the economic performance is clear, it is important to note that knowledge creation is costly to sustain.

One of the key drivers behind utilization of R&D as a policy mechanism (as opposed to other types of support) is the ability to hone in on specific areas where state intervention will likely make a positive economic impact (Cunningham, Gok, & Laredo, 2012). In light of the global financial crisis in 2008, direct support mechanisms in the form of R&D stimulation were rationalized even as the need to maintain a sustainable degree of innovation within sectors of industry or specific geographic areas that faced higher levels of economic hardship was recognized. Theoretically, direct support would ultimately alleviate the financial strain that these firms face (Albors-Garrigos, & Barrera, 2011). The objectives of direct support programs have changed over the years to reflect an increase in the functional desire of individuals to achieve goals as well as to simply to reflect the current economic climate.

3 Innovation Vouchers Program

Launched as a pilot program for SMEs in 2008, the Innovation Voucher Program granted vouchers that would offset the cost of expertise on operational projects including:

1. Innovation or technology audits;
2. Tailored training in innovation management;
3. New business model development;
4. New service delivery and customer interface;
5. New product development;
6. Product and service testing and economic impact assessment; and
7. Efficiency audit and process change.

At its core, the Innovation Voucher Program was designed to spark the transfer of knowledge between area experts ("Knowledge Providers") and small to medium-sized enterprises in Northern Ireland in the realm of a specific innovation, 80 percent of whom had never participated in R&D efforts before (Invest Northern Ireland, 2012). The Innovation Voucher Program corrected perceived market failures in Northern Ireland by creating a more self-sustained environment and fostering a sense of competitiveness through both financial appropriations and assistance in identifying a functional structure for innovation activities. This should inherently improve the 'absorptive capacity' of SMEs across Northern Ireland and effectively develop the ability to address 'internally incremental innovation demands' (Northern Ireland Invest, 2012). Although the primary aim of the Innovation Voucher Program was the assistance of SMEs in Northern Ireland by creating a cultural shift toward innovation, an additional objective was the 'positive externality of enhancing the commerciality capability of knowledge providers.' (Invest Northern

Ireland, 2012)

4 Academic Theory

4.1 Effects of Spatial Separation

Historically, regions in the UK have suffered from lack of funding due to spatial separation. As the financial sector in the UK is largely concentrated in London, 'firms in peripheral regions face a challenge in accessing finance which is often located in core regions' (Lee & Brown, 2016). The financing of innovation in peripheral regions should largely be standardized due to the technological advancements that make credit scores and balance sheets more readily available. However, Lee and Brown (2016) found there are increased levels of demand for financing for firms looking to foster innovation in peripheral regions, but due to spatial separation, there is a greater chance for rejection.

Regional economists have historically believed spatial separation should not be a contributing factor in a firm's access to funding as technological advances have improved interconnectivity between peripheral regions and centralized economic hubs (Lee & Brown, 2016). However, a recent study indicates that firms located in peripheral regions of the UK suffer from a disequilibrium in the supply and demand of financing. Since the UK remains characterized by highly spatialized markets, economic geographers indicate that this may be a key reason why UK firms located outside of centralized hubs report the inability to access finance. As a result, 'innovative firms in peripheral regions may be less likely to be aware of specialized financiers or financial alternative' (Seghers, Manigart, & Vanacker, 2011).

The culmination of effects due to spatial separation lead to 'search costs [being] higher outside core areas, and so financiers are discouraged from looking; those providers of finance in peripheral areas which remain are less likely to [specialize] in financing innovative firms; they tend to focus on less resource-intensive early stage finance; and do not develop the appropriate specialisms to fund them' (Lee & Brown, 2016). This highlights that spatial environments can very quickly turn into 'thin' markets, which makes it highly difficult and expensive for entrepreneurs in peripheral regions and outside investors to connect.

Economic Implications

As larger companies in Northern Ireland outpace SMEs in the region in R&D as well as innovative activity, Northern Ireland struggles with a 'productivity gap' as it continues to fall behind both the Republic of Ireland and the UK (Johnston & Buchanan, 2016). There is a strong indication that SMEs in Northern Ireland oppose investment in innovation due to associated costs, a conservative approach to operations and the lack of exposure to knowledge providers who can aid in the demonstration of how SMEs will secure benefits. These sentiments lead to an important concept Lars Tvede described in behavioral finance that directly affect innovation development in peripheral regions: 'We have an irrational tendency to be less willing to gamble with profits than with losses' (Taran and Betts, 2011). Kahneman's and Tversky's Prospect Theory posits that 'negative changes are weighted more heavily than gains' when individuals make decisions in a state of uncertainty (Ito et al., 1998). As limited financial resources make it more difficult for SMEs to outsource technical and managerial competences, the risk 'of getting it wrong may

be a real threat to the survival of an SME.' (Brown, 1997) In effect, loss aversion plays a major role in the willingness of SMEs to engage in innovation related activity.

4.2 Effect on Attitude

Obstacles associated with funding and loss aversion have fostered a collective apathy towards innovation development, despite innovation being a widely recognized critical success factor in the long-term growth and stability of regional economies. Furthermore, 'Actions to increase entrepreneurial motivations and skills are thus important not just for increasing the pool of people interested in and capable of starting and running a business, but also for shifting the nature of business activity in the districts towards opportunity rather necessity entrepreneurship and towards incremental innovation' (OECD, n.d) Due the lack of emphasis on attitudinal and cultural shifts toward innovative behavior, the majority of SMEs have a narrow understanding of both the markets and growth opportunities that subsequently affects both motivation and the capacity to innovate.

While many theoretical studies acknowledge the significance of cultural elements such as attitude in the success of enterprise activities, very little associated empirical research results are associated with public policy. Culture cannot be measured in a systematic way, as it 'acts as a background variable that manifests itself in attitudes and patterns of behavior.'

4.3 Link to Policy

The capacity to innovate as related to attitudinal views has led researchers to place increasing importance on internal factors associated with psychological underpinnings of human capital within a firm. Yet, this is not reflected in modern innovation policy that does not 'focus directly on the improvement of attitudes per se, but on an improvement of the framework conditions relevant to the business foundation.' The reason for the focus on improvement of framework conditions instead of the root of the problem can be linked to the theory behind the R-H model of business performance management. The R-H model directly lends to the behavior of the government and policy participants. At its simplest, the government acts as the principal and voucher recipients act as the agent. The principal seeks to maximize value of money - which is the 'difference between the monetary value of the agent's output and the payment required to induce effort from the agent' (Neely, 2011). By this logic, policy objectives must have direct measurability.

In effect, the most critical question associated with policy evaluation is if those participating can prove improvement in a cost-effective manner. As truncating, 'pressures worldwide mount to reduce the size of governments and expand private sector and nongovernment involvement, it becomes increasingly important to justify public spending and ensure that the funded interventions are achieving intended objectives.' As a result, 'it is easy to focus too much on so-called "hard" support, such as finance, premises and start-up counselling, and too little on "softer" support for encouraging the right skills and motivation' (Cooney, 2012).

The gap between targeted support and cost-effective support is apparent in a recent vouchers program that funded SME's in Manchester, UK that had applied to invest in creative projects.

The evaluative study found that 'the firms who were awarded Creative Credits enjoyed a short-term boost in their innovation and sales growth in the six months following completion of their creative projects. However, the positive effects were not sustained and twelve months after the completion of these projects there was no longer a statistically significant difference between the groups that received the credits and those that didn't' (Bakhshi et al., 2013)

Due to the nature of policy design around R&D support mechanisms, evaluative studies around the impact and effectiveness of policies to support collaboration for R&D and innovation are forced to largely concentrate on the diffusion phases of innovation including adoption and implementation, while not addressing the importance of the initiation stage of innovation. The lack of research on how to target the attitudinal aspects of innovation behaviors in peripheral regions has led to a substantial gap in academic literature regarding regional economic development. There has been an absence of primary source data available to derive significant conclusions regarding the importance of attitudes and preconceptions around innovation in peripheral regions.

5 Data Collection Methodology and Focus

In order to bridge this gap, Invest NI distributed an online survey to the 576 firms who were voucher recipients over the course of 2008 to 2011-2012 to capture both the Innovation Voucher Program's impact on the economic and cultural environment as well as to ensure the Innovation Voucher Program reflected its original objectives in practice (Invest Northern Ireland, 2012). In 2014, Invest NI conducted a follow up evaluation consisting of telephone interviews of program participants. This effectively complemented initial survey data by providing a clearer picture of Innovation Voucher Program evolution and effectiveness from both an economic and innovation development perspective. The nature of data collection focused on the following matters:

- Structure/Focus of initiative (voucher recipients, size of firm, firm lifecycle stage)
- Performance against objectives (see objectives)
- Quantitative performance (firm success rate, employment, turnover, degree of additionality, value for money)
- Qualitative viewpoints on program impact at firm-level (preconceptions regarding innovation, degree of satisfaction with level of support, outlook on future firm performance)

To assess the economic outcomes on both a micro and macro level, each survey measured employment, turnover, value for money and the degree of additionality. Most importantly for our research, the survey also asked qualitative, opinion-based questions to gauge the how the Innovation Voucher Program affected participants' current outlook on business operations because of their interactions with Knowledge Providers. There are a number evaluative studies based on past and ongoing efforts around government sponsored R&D support measures in OECD countries, but . We examined research on an innovation vouchers program in the Netherlands as well as a study that examined nine R&D support mechanisms across nine GEM (Global Entrepreneurship Monitor) countries to provide a supplementary commentary on our findings.

In alignment with previous studies, the following survey data incorporated traditional, quantitative variables that generally serve as criteria for determining the success of an R&D support program. Additionally, we have incorporated qualitative attitudinal questions to highlight the

research gap that currently exists in the impact and effectiveness of policies to support collaboration for R&D. This survey data is the first data driven element in a multi-part study to prove that the short-term economic boost of a vouchers program does not result in the attitudinal shift needed to create a long-term innovative culture.

6 Limitations

We acknowledge limitations within the scope of our methodology. Primarily, the dataset did not include those who are not accepted to be a part of the Program, which will be critical in ongoing efforts to evaluate the longevity of Program effectiveness (i.e. whether those who received vouchers were more likely to engage in innovative activity after Program end). The nature of self-reported data limits the ability to derive significant, statistical conclusions, but as there is little research around policy inclusion of attitude-based objectives, we believe this data provides a first step to establish correlation. From a longitudinal perspective, additional time between Program end and survey distribution would have beneficial to determine the ability of the Program to mitigate entrenched attitudinal views toward innovation development, but this will be a major consideration in future evaluative studies of the Vouchers Program.

7 Survey Data

The online questionnaire received a 27.8 percent response rate, with an additional 9.5 percent recorded as partial responses. As the average response rate for external surveys is 10-15 percent, the survey data gathered from participants in the Innovation Voucher Program provides significant value to our research. In terms of respondents' respective employment sizes and geographic location, 98.2 percent of respondents primarily represented firms from County Antrim and County Down that employed less than 50 workers (Invest Northern Ireland, 2012). The majority of respondents represented firms established for less than three years, more than nine years or pre-start up. The survey determined that 55 percent of respondents were Client Managed companies of Invest NI, and the remaining 45 percent Non-Client Managed Companies which broadly fit the initial objective to have the Program function on a 60/40 spectrum.

7.1 Reported Barriers to Innovation

In conjunction with previous literature, survey participants responded that the most common barriers to innovation were access to finance, lack of personnel to execute innovation activities, the high cost of direct innovation, and lack of information on technology (Invest Northern Ireland, 2012). The Innovation Voucher Program was designed to overcome these barriers to innovation by providing a range of support activities that would ultimately aid in correcting market failure in Northern Ireland.

7.2 Satisfaction with Innovation Voucher Programme

Over 40 percent of respondents revealed that, they were new to any type of innovation activity prior to the Innovation Voucher Program, and nearly 50 percent of respondents stated that they did not interact with Knowledge Providers prior to the Innovation Voucher Program. Overall, 90 percent of respondents reported being either very satisfied (59 percent) or satisfied (39 percent) with the content and delivery of the Innovation Voucher Program, including performance, range of activities and equality. A sample of people that were not part of the Innovation Voucher Program but fell into one of the three following categories were also surveyed: (1) had been rejected during the application process; (2) had chosen to not pursue the Innovation Voucher Program after being accepted, or (3) they had not been aware of the Innovation Voucher Program but could have potentially benefited. This additional sample largely responded that it had not fully comprehended eligibility requirements or that there had been too many restrictions on the timing of calls.

7.3 Interaction with Knowledge Provider

At its core, the Innovation Voucher Program connected SMEs in Northern Ireland with Knowledge Providers. According to the survey, respondents were largely satisfied with Knowledge Provider's ability to *meet* needs, the Knowledge Provider's *understanding* of firm's needs, the level of communication between the firm and Knowledge Provider, and the quality of the end product/service the Knowledge Provider delivered. 85 percent of survey participants reported being either satisfied or very satisfied with the overall quality of innovation support from the firm's specific Knowledge Provider (Invest Northern Ireland, 2012). Knowledge Providers' expressed that a number of voucher recipients had unrealistic expectations about what could be delivered given the time frame and financial parameters which would largely explain the remaining percentage of Innovation Voucher Program participants who responded that they were dissatisfied.

40 percent of respondents stated that they chose to interact with a specific Knowledge Provider because there had been a previous engagement with that particular Knowledge Provider (Invest Northern Ireland, 2012). The overwhelming majority of respondents reported that they allocated some portion of the awarded voucher to services supplied by the Knowledge Provider and were subsequently satisfied with the overall quality of innovation support from the Knowledge Provider. Additional respondents chose a Knowledge Provider based on a recommendation from a client/colleague or due to convenient geographic proximity, which lends itself to the idea of liability of distance. Knowledge Providers located in Northern Ireland took on a significantly greater number of projects than Knowledge Providers in the Republic of Ireland due to the proclivity of voucher recipient to contact a local Knowledge Provider as well as the willingness of the local Knowledge Provider to assist.

According to participating colleges, contracts signed through the Department of Employment and Learning do not allow for the degree of flexibility required to 'facilitate commercialization of knowledge.' This decreases the ability of individuals to assist with the Innovation Voucher Program, which may further exacerbate the economic lag associated with spatial separation.

7.4 Perceived Limitations of Program

In terms of the Innovation Voucher Program's broader impact at firm level, respondents generally felt that they were constrained by application deadlines because of unpredictability in relation to business need (Invest Northern Ireland, 2012). As a result, participants believed services provided by Innovation Voucher Program should be available to firms' year round with the ability to apply for different voucher amounts by potentially applying for fewer vouchers valued at higher amounts. Stakeholders stated concerns about a significant amount of first time voucher recipients who falsely assumed they would automatically receive a second and third voucher. Expectedly, 43 percent of respondents desired to have unlimited support via the Innovation Vouchers as opposed to maintaining the current three voucher limit.

7.5 Reported Outlook on Business Performance

At firm level, survey respondents were asked to estimate the impact the Innovation Voucher Program had on turnover, market conditions, competition and overall degree of benefit in 2010-2011. It should be noted that questions were based on short-term impact, while respondents generally believed that support activities could have a long-term benefit on firm performance.

Regarding turnover, 39 percent of respondents reported that rate of turnover generally remained the same while 23 percent of respondents shared that there was a higher level of turnover and an addition 31 percent was not sure how activities supported by the Innovation Voucher Program affected turnover (Invest Northern Ireland, 2012). In order to identify net turnover, it was key to factor in economic displacement.

At its simplest, the purpose of the Innovation Voucher Program was to provide an overall boost to the Northern Ireland economy. If firms that were awarded vouchers detract business from local competitors, then there is zero net benefit to the regional economy. In order to assess the relationship between turnover and displacement, the survey asked how market conditions in a firm's area of business have changed over the last three years as well as the geographic location of the firm's main competition. There was little consensus as 45 percent of respondents stated that market conditions have declined moderately/strongly, 17 percent identified market conditions as about the same, and 34 percent reported that conditions either improved moderately or strongly (Invest Northern Ireland, 2012).

Respondents were asked to compare current figures and future predictions around profit and employment costs, to evaluate the perceived impact of support activities made available through Innovation Vouchers over the next three years (Invest Northern Ireland, 2012). The majority of firms reported no change in profit and wage expenses, but expected an increase in profit, wages and employment levels over the next three years. By in large, respondents identified little to no change in short-term turnover, market conditions and overall benefit. 42 percent of respondents expect gains from turnover to be 'realized for five or more years as a result of participation.' An additional area of consideration in the survey was the effect on employment as a result of participation in the Innovation Voucher Program. The majority of firms identified changes in employment as nonexistent at the time of the survey which is typical for firms who have received recent financial assistance or are in the early stages of establishment.

8 Analysis

Through exploration of survey results over the evaluation period from 2008-2014, we can identify that attitudes toward innovation in Northern Ireland fit into the greater context of the impact and effectiveness of policies to support collaboration for R&D and innovation, and therefore need to be considered in future policy design. Based on the quantitative evaluation of the Program, Project Managers successfully met initial objectives to stimulate innovative activity, but there is no evidence that the Program had a positive impact on attitudinal views that recipients had toward innovation development.

While studies regarding regional innovation have historically focused on the more tangible phases of innovation, the survey distributed to voucher recipients largely reflects on the initial preconceptions SMEs have about innovation. In accordance with previous literature, peripheral regions such as Northern Ireland do not have a strong history of innovative tradition which is supported by the figure that 40 percent of voucher recipients were new to the idea of innovation activity (Invest Northern Ireland, 2014). While their survey responses showed expectations of benefits 2-5 years in the future, there was no indication that recipients recognized immediate benefits around knowledge creation, which as a function of human capital, is a critical factor in ongoing innovation efforts.

As previously noted, there 'are few studies that refer to the determinants of positive or negative attitudes toward business foundation,' and in effect, little research on how to address them from a policy standpoint because attitude-based objectives are extremely difficult to measure scientifically (OECD, n.d.). We understand that the most common barriers to innovation experienced by respondents was the availability of finance/cost of finance, lack of qualified personnel, lack of information on technology and the direct cost of innovation being too high. We know this fits into the hypothesis presented by Coronado et. Al (2008) that the most influential factors around aversion to innovation on a global level include cost of R&D, absence of qualified personnel, technological competition in the sector and level of financial indebtedness. What we don't know is to what degree these obstacles have created entrenched attitudinal views towards innovation that cannot be solved by point in time financial assistance. As evidenced by both survey results of the Innovation Vouchers Program and comparable programs in other regions, we do know there is a correlation.

Piloted in 2004, the Dutch Innovation Vouchers Program identified this very issue. Like the Innovation Vouchers Program in Northern Ireland, the Dutch program aimed to bridge the divide between 'science and industry,' in order to promote productivity and economic growth through innovation activity. The program provided vouchers at a maximum value of EUR 7,500 with a six month expiration with no additional contribution required by SMEs. The CPB Netherlands Bureau for Economic Policy Analysis conducted an interview based evaluation after one year and two years following the program, and discovered that voucher winners did not realize more innovations than their counterparts who did not receive a voucher (Van der Steeg, 2010). Additionally, voucher winners did not attempt to carry out any more assignments related to innovation than those who did not receive vouchers within the period of one and a half years after the program. The reasons reported were further investment in innovation related activities were cost and lack of confidence in capability of performing own research.

As noted in the Dutch program evaluation, the objective was ultimately to, 'lead [voucher participants] to water and pay them to drink' (Angrist, Lang and Oreopoulos, 2006). Why weren't voucher participants willing and/or able to carry out additional activities following program end? One theory is that that generic innovation systems are highly knowledge intensive, but knowledge creation to support certain areas of business becomes costly and extremely specific to territory (Fischer et al., 2000). As knowledge spillovers are concentrated near the source as a function a spatial proximity, regional SMEs are unable to influence innovative activity at a macro level (Fritsch and Franke, 2003). As a result, there is a greater emphasis placed on the individual firm's capability rather than industry capability in regional economic development. These marginalized spillover effects around knowledge creation in regional economies force firms to invest their own financial resources to recognize the effects of innovation, which they simply do not have the means to do.

A second theory is the nature of R&D support programs may place a larger emphasis on the diffusion phases of innovation instead of honing in on the development of an SME's ability to frame and evaluate opportunity. Autio, Kronlund and Kovalainen (2007)'s research on High-Growth SME support initiatives in nine GEM (Global Entrepreneurship Monitor) countries utilized 'successful' examples of policy initiative purely focused on entrepreneurial firms. While the sample itself was non-random, it offers a representation of what is considered 'top-end of the policy spectrum' (Autio et al., 2007). The review largely focused on policy organization, policy objectives, and lessons learned from experience. One interesting aspect about this study is it found that the common denominator among the successful policy initiatives were that they were 'quite new.' While the research commented on the fact that while the newest initiatives may have not fully proven themselves, the expectations for ongoing success were high.

This leads to the question of whether the quantitative calculation of success in the short-term can be extrapolated into a longer-term projection of success. As argued by Negassi (2004), the success of innovations in firms not only depends on size and market share, but also the intensity of R&D and quality of human capital. These factors greatly affect 'longer-term economic outcomes in a peripheral region given the limited absorptive capacity of firms in such regions and uncertainties around the longer-term sustainability of public R&D investments' (Hewitt-Dundas and Roper, 2011). While any given program may boast a positive ROI, degree of additionality and positive job creation, intensity of ongoing R&D and investment in human capital is an essential component in increasing the longevity of perceived components.

While continued self-investment is a healthy expectation for firms in growth economies, SMEs in peripheral regions often do not have the luxury of investing limited financial resources in the unknown, which is supported by basic behavioral finance theory that the weighted probability of potential gains falls short to the weighted probability of potential loss. As innovation "cannot be easily justified by average financial returns to investment" due to the degree of uncertainty related the costs, it becomes highly unrealistic that a single investment at firm-level will create a self-sustaining innovative environment. In effect, Autio et al. (2007) suggests that in the future, policy initiatives need to target improvement of motivation, opportunity evaluation skills and self-efficacy of the entrepreneur in order to maintain a growth process in the firm.

The idea that human capital is an essential component when accounting for a firm's capacity to innovate is not new in the academic literature, but often only solved for in the form of

employment creation (Negassi, 2004, Malul 2012). Pollard (2003) argues that the 'most direct, easily discernible relationship between financial infrastructure and local economic development is a quantitative one of employment creation,' but it appears that these spatial separations are largely exacerbated by a more qualitative factor around the idea that there are few accessible resources to continually benefit from knowledge transfer. In effect, there needs to be a larger emphasis on the direct correlative effect between increase in employee qualifications and an increase in willingness to innovate.

As a function of human capital, the key input in innovation is stock of knowledge capital, which is limited by time constraints provided by any regional economic development scheme (Fritsch and Franke (2003). As 'the first venture idea is only seldom the one that provides the platform for future growth,' there is a critical need for the SME to develop the ability to frame and execute opportunities outside of the Program (Autio, Kronlund and Kovalainen, 2007). In effect, the maximization of economic impact greatly depends on fostering ongoing learning around the emergence phase challenges, rather than the diffusion phases on innovation in a peripheral environment.

9 Conclusion

Historically, policy objectives were set based on what could systematically be measured, not what truly needed to be measured based on what theory says about the importance of attitude in innovation development. Policy objectives that concern attitudinal views and in turn, culture, would need aim to optimize a broader range of innovation characteristics and involve less tangible interactions and feedback loops between the actors engaged. These knowledge transfer objectives necessitate a more sophisticated policy design in order to optimize the full range of potential benefits arising from the collaboration. In turn, this poses a greater challenge for evaluating the success of such policy interventions since many of the outcomes and impacts are subtler and less evident through simple metrics.

While the Program's initial objectives remain valid, Northern Ireland's geographic separation from more centralized hubs in the UK adds an extra dimension of complication in innovation policy due to uncertainty-related costs (Boeh and Beamish, 2012). Assessment of economic impact and value for money was largely founded on the Program's ability to address initial objectives in the context of meeting target figures, to quantify the increase in knowledge regarding innovation across Northern Ireland's small enterprise sector, to identify overarching regional economic benefits and to conclude on the level of additionality and displacement, but there was little evidence that the Program could create sustained innovative behavior at firm-level. Current policy in the UK does not reflect the firm-level need to see the longitudinal gains in engaging in innovation activity. While the life of any direct measure to support R&D within a particular firm is fundamentally limited, targeting the innovation culture at its core is essential to the long-term qualitative shift in attitudinal views toward innovation.

As SMEs provide nearly two thirds of private sector employment in the EU, it is vital to not only alleviate the social underpinnings but also the psychological underpinnings caused by spatial separation and a inherently smaller resource base (Costa, Panyik and Buhalis, 2013). A greater emphasis needs to be placed on the initiation stage of innovation as resource provision and

consulting services may be more appropriate for high-growth SMEs. The continued lack of 'innovatory tradition' in peripheral regions leads to the idea that the critical success factor in the realm of localized innovation lies in the preemptive, attitudinal stages of the innovation cycle. In effect, targeted objectives need to not only support 'pre-launch' but the exposure to opportunity and the process of opportunity framing as well (Coronado, Acosta and Fernandez 2008, Angrist, Lang and Oreopoulos, 2006). This paper acts as a first step in a multi-part study to examine behavioral finance in the context of regional economic development in an effort to quantify the long-term impact of attitudes on economic growth in peripheral regions.

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