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A New Industrial Policy for Northern Ireland

Paul Mac Flynn

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Nevin Economic Research Institute (NERI)

31/32 Parnell Square
Dublin 1
Phone + 353 1 8897722

Email: info@NERInstitute.net
Web: www.NERInstitute.net

Carlin House
4-6 Donegall Street Place
Belfast
BT1 2FN,
Northern Ireland
Phone +44 28 902 46214

A NEW INDUSTRIAL POLICY FOR NORTHERN IRELAND

Paul Mac Flynn, NERI (Nevin Economic Research Institute), Dublin, Ireland.*

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ABSTRACT

The term industrial policy is most often associated with economic history from the end of the Second World War until the late 1970's. In reality this period only refers to a particular form of industrial policy usually associated with nationalisation and planned industrial development. In truth, industrial policy describes a wide range of activities concerning the state's role in affecting change in the private sector. While the methods of state intervention may have changed, the motivation for intervention has not. Since the 1980's policy has become more indirect and broadly focused. Enterprise policy as it is now known has come under much more scrutiny as many economies struggle to rebuild following years of recession.

A key policy focus for the Northern Ireland Executive over the last number of years has been to eliminate the gap in productivity with the rest of the United Kingdom. It is widely acknowledged that the private sector in Northern Ireland is underperforming and that higher value added activity is needed to boost overall output. A large portion of industrial policy has focused on providing financial incentives to companies to locate new investment or expand existing operations in Northern Ireland. These policies borrow heavily from the perceived success of the Republic of Ireland, but their appropriateness for Northern Ireland is open to question.

Changes to the status of Northern Ireland for State Aid purposes will severely limit the ability of the state to provide such financial assistance and this has opened a discussion on how to support industry in the future. This paper sets out a proposal whereby the state's financial intervention would instead be committed to fund innovation in key sectors of the economy. As opposed to indirectly nudging investment, the state would actively enable the transformative advances that could shape Northern Ireland industry for decades to come.

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Paul Mac Flynn, NERI

INTRODUCTION

In any mixed economy there are a myriad of ways in which “public” and “private” sectors are interlinked and interdependent. The public sector obviously depends on revenue generated by the taxation of activity in the private sector, but the private sector is also deeply reliant on public sector support. The public sector assists the private sector by upholding the law, by guaranteeing currency, by providing basic infrastructure like roads, railways and much more. But beyond basic building blocks of the economy, governments of all kinds provide even more support. They provide generous tax breaks, investment incentives, loan guarantees and in some cases direct financial assistance. In the past governments went even further in promoting specific industries, championing particular firms and taking ownership of others. The broad term for this state intervention is industrial policy.

Why do governments intervene in the private sector? For the most part governments intervene in the hope of boosting employment or economic growth. There have always been contrasting opinions as to the effectiveness of state intervention and these debates have shaped the evolution of industrial policy from the Second World War to the present day. The “when, where and how” of government intervention has changed significantly over that time but the “why” has not.

Northern Ireland is a small regional economy that has for many years suffered a consistent productivity gap with the remainder of the United Kingdom. It is not alone in this. Many of the UK’s regions in the North of England, Wales and Scotland suffered sharply from the de-industrialisation of the 1970’s and many have not yet fully recovered. Now, through the Stormont Executive, Northern Ireland has the ability to set its own industrial policy and set its own ambitions for the economy. The NI executive has stated that closing the productivity gap is a central goal of its industrial policy.

Northern Ireland’s industrial policy broadly reflects the current policy consensus among most developed, western economies. It also borrows heavily from the experience of the Republic of Ireland over the last few decades, however it would not be controversial to propose that the performance of the Northern Ireland economy has fallen somewhat short of the expectations, even accounting for the effects of the global financial crash. A thorough appraisal of industrial performance in Northern Ireland leads to questions about how appropriate and efficient current policies are and whether the role of the state has been correctly defined. This paper examines these issues in full and outlines an alternative perspective on industrial policy in Northern Ireland.

This paper is structured as follows; Section 2 deals with the history of industrial policy in the UK and Europe, and the “neo-classical” consensus that has emerged in industrial policy today. Section 3 examines the history of industry and industrial policy in Northern Ireland and evaluates its performance. Section 4 outlines a new approach to industrial policy based

innovation and investment while section 5 concludes. The lessons of the past and present outlined in section 2, and the outcome of current policies in section 3 motivate the discussion of a new approach in section 4.

A HISTORY OF INDUSTRIAL POLICY

There is no agreed definition of what industrial policy is and this leads to some difficulty in characterising the historical experience of it. For some it encompasses any and all government efforts in support of economic development and industrial activity. For others, industrial policy is only associated with more direct government efforts to boost production in manufacturing and other industries in the 1960's and 70's (Foreman-Peck, 2010). Those policies are considered to have been replaced by the more detached or 'laissez faire' policies of the 1980's and 90's called "enterprise policy". Whatever nomenclature is used, there is agreement about the nature of policy change that occurred between these two time periods. The shift has been between two broad types of industrial policy.

Horizontal policies describe economy wide measures that seek to incentivize activity such as R&D tax credits or non-selective financial support for SMEs. Vertical policies are those which aim to selectively support particular firms in order to build up an industry or enable domestic firms to compete globally. In reality government intervention has always been a mix of both policy instruments. It is argued by some that the shift from vertical to horizontal that occurred in industrial policy merely reflects the broader shift to a more neo-classical view of the role of the state in the economy. However the reality may be more subtle than that.

The current neo-classical consensus asserts that state intervention should be limited to instances where the market does not produce the optimal outcome - market failure. There are three broad market failure scenarios:

- Asymmetric information or incomplete markets
- Economies of scale
- Externalities

Asymmetric information describes a situation where there is a mismatch of information between consumers and producers, which disrupts the flow of business between the two. There are two basic forms of information asymmetry; adverse selection and moral hazard. Both situations have unobserved behaviours or actions that prevent one party of a contract from making a trade. Examples include the market for health insurance and the market for used cars (Abbring et al., 2003 & Akerlof, 1970). In both these situation, government regulations and institutions can bring about more optimal solutions. In industries with high fixed and already established firms, new firms may be discouraged from entering as they do not possess the same economies of scale. Government subsidies can be provided to entice entry and thereby boost competition. (Cohen, 2006).

The most important and the most common market failure in industrial policy is existence of externalities. Externalities describe the situation where the actions of one company have an effect beyond their own operations, positive or negative. Pollution created by factories is a negative externality, but there are positive cases too. Public goods are positive externalities - something which is both non-excludable (others cannot be prevented from benefiting) and non-rivalry (consumption of it by one does not reduce its consumption by another). There is no incentive to create a public good and so governments intervene. R&D is a prime example of a public good and the state intervenes to impose property rights which enforce excludability in the form of patents.

In some cases however it may be more beneficial for R&D output to be non-excludable, so that an entire industry might benefit from innovation. In these circumstances the state may provide an incentive to compensate the innovating firm for their initiative. Subsidies may also be appropriate for other investments such as up-skilling workers. In a free labour market, workers may move from firm to firm, taking with them the benefits of a firm's investment in human capital with them. Once again a form of incentive or inducement may be most appropriate. However market failure prescribes the need for state intervention, but it does not define the nature of that state intervention differs case by case.

The theory of market failure is often used to explain how we have arrived at the current consensus set of horizontal policies such as patents, subsidies and incentives. However the theory of market failures does not exclude or recommend against the use of vertical policies. Nationalisation of an industry could be justified as state intervention in order to remedy an externality. The system of firm specific subsidies and incentives that were used to build up so-called "National Champions" could be justified as tackling economies of scale. In reality governments of today are still in the 1970s intervening in the economy for the same reason they were 40 or 50 years ago, but the theory of market failures does not explain why the method of intervention has changed so much. Historical events, rather than the evolution of economic theory explain the shift in industrial policy.

While there are differences in timing across various economies, two distinctive stages of industrial policy can be identified. The first phase runs from the end of the Second World War until the late 1970's and the second phase from 1980 until the present day. The following paragraphs will give an outline of industrial policy in Europe and the UK during these times and what changed between the two.

Phase One – 1945-1979

Phase one is the period most closely associated with the term "industrial policy". Born out of the reconstruction effort that followed the second world war, governments of every kind took a much more active and activist role in the private sector economy. This began with programmes of nationalisation in key industries and progressed to the state support for indigenous firms commonly referred to as "national champions".

Grabas & Nützenadel (2013) describe this period as a golden age for European economic and industrial growth. Industrial policy was seen as both a tool of reconstruction and a method of converging to the US level of productivity growth which had surged ahead of Europe before the war. Industrial policy in this era was most effective for the peripheral economies of Europe, such as Greece, Portugal and Spain but not the Republic of Ireland.

State ownership featured in many economies in the early period from 1945 onwards, particularly in France, Italy, the UK and the Scandinavian economies. State ownership had varying success rates across different countries, with the most successful nationalisations taking place in industries with the greatest potential for technological innovation and catch-up. Owen (2012) highlights the success of the state-owned motor car industries in France and Germany, Renault and Volkswagen respectively. Interestingly European trade liberalisation and the introduction of European competition is said to have improved efficiency and competitiveness among state-owned car companies whilst also limiting the role of political interference. More broadly the evolving European customs union is thought to have encouraged specialisation in state ownership on the basis of perceived comparative advantage.

This chimes with the experience of the Italian steel industry in the mid-1960's. FINISIDER was a state owned steel company that successfully challenged private sector competitors in Italy, bringing down steel prices by over 40% and forcing the entire industry to modernize production processes (Grabas & Nützenadel, 2013). The establishment of the National Hydrocarbon Agency in the 1950's also brought together disparate sections of the Italian energy sector into a state-owned entity which became a pioneer in the oil industry both at home and abroad and which contributed significantly to Italian national income at the time (Yergen and Stanislaw, 2002). Some form of national development planning was a feature of nearly every western European economy with the exception of West Germany which resisted any form of state planning until the mid-1970s. This was mainly due to the historical context of fascist era economic planning and the centrally planned economy of East Germany.

West Germany was the least interventionist state in the form of nationalisations or state enterprises, but it was far more aggressive in state subsidies particularly in relation to the coal industry (Foreman-Peck, 2006). Such was the level of support to that industry by 1975, the total spend in West Germany on subsidies was equivalent to the total of French financial industrial support. At the same time state subsidies in Sweden accounted for over 5% of total manufacturing output (Grabas & Nützenadel, 2013). Subsidies were also significant feature of both the French and Italian policies, but they were used to best effect in Spain which has the highest growth rate of manufacturing output in Western Europe from 1965-75.

The story for the UK is slightly different, while similar policies of state ownership, state subsidies and national development plans were the cornerstone of UK policy, the experience of the UK economy over the same period was quite different. Three of the state-owned or state-supported industries most identified with the failure of British industrial policy in the era were aerospace, computing and motor cars British Leyland Motoring Corporation in particular. In aerospace and computing, two of the main reasons British industry remained behind were the lack of large enough market, while the lack of foreign competition is blamed for the failure of state-owned car companies (Owen, 2012). Both of these problems could have been ameliorated had the UK been an early participant in European integration.

Phase Two – 1979-present

The second phase of industrial policy saw a shift across Europe away from heavy state involvement in the economy. In France, there was a choppy transition between both phases of industrial policy. A centre-right government had begun a programme of deregulation and liberalisation of industry in the mid 1970's but this was stalled due to a change of government in 1982. A left-wing government led a short-lived programme of sweeping nationalisations but a sharp recession in 1982 caused a sudden U-turn in government policy. Modest privatisation took place until the return of a right-wing government in 1995 which then divested the French state of most of its remaining large commercial interest in technology, resources and car industry including Renault. However industries such as energy and defence remained under control.

The UK provides probably the starkest illustration of the transition between both phases of industrial policy. The Conservative government elected in 1979 not only reversed all of the nationalisations implemented by the previous government, but went further in privatising key utilities and infrastructural industries. As Owen (2012) points out this not only opened up utility markets to competition but also ended the obligation that state-owned enterprises had to use British owned suppliers. This was a significant shock to the manufacturing sector in the UK, one from which the sector yet to recover from.

West Germany faced less change between Phase one and two as it had limited state ownership compared with its European neighbours. The system of state subsidies actually increased in the 1980's in the mining and minerals sector. The telecoms industry was as privatised with the encouragement of the European Commission, but Germany struggled to attract new investment and entrepreneurs especially in the emerging technology market of the 1990's (Owen, 2012).

Overall most countries that provided heavy subsidies gradually began to move toward less selective criteria. R&D subsidies, which had formed a part of the suite of selective state subsidies available to firms, were broadened as the main channel for state support. The European Union played a significant role in directing European countries toward less selective subsidies and horizontal industrial policies more generally. This culminated in the 1990 Communication *"Industrial policy in an open and competitive environment – Guidelines for a Community approach"*. This document outlined that the EU's favoured form of national industrial policy was that which created a "framework and conditions for growth". This also laid out the EU's policy against "State Aid" or support from the state which artificially or selectively supports particular firms (Maincent & Navarro, 2006). The EU and its regulation of State Aid became the largest single inhibitor of vertical industrial policy. In Europe state aid is seen not as a impairment to national industries or growth but as a constraint on the development of the single market. The outcome of this policy was that vertical aid in the EU decreased by 23bn from 1995-2003, while horizontal aid now makes up over 95% of state aid in 8 EU countries, (Gual & Jódar-Rosell, 2006). In the UK as of 2006, horizontal aid accounts for over 90% of total state aid (Crafts & Hughes, 2014).

Irrespective of the microeconomic impact of some of privatisations and the reorientation of state supports in the period since 1980, Phase 2 signalled a significant reduction in productivity growth across Europe compared to phase 1 (Grabas & Nützenadel, 2013).

Reasons for a shift

As the previous section highlights, there was no one decisive moment or event which shifted the method of industrial policy in the early 1980's. At a global level the oil shocks of the late 1970's caused significant economic downturn which punctured a period of relative prosperity from the post-war era. The rise of Japan and further competition from the far east throughout the 1980's challenged many of the European 'national champions' that had been built up in phase one. Finally the collapse of the Soviet Union led to significant doubt about the ability of state initiative to deliver prosperity.

The impact of these global economic shocks led many to question the models of industrial policy of phase 1. Phase 2 saw not only the privatisation of failed state enterprises but also profitable and innovative ones, especially in the UK, by governments who were ideologically opposed to any state ownership. In latter years, even some right wing governments began to question the merits of privatisation. In 2004 there was some disquiet in France when the privatised Astrom engineering company, the producer of the TGV trains, came into financial difficulty and near collapse. The right-wing French government seeking to protect a significant French company made a deal with the EU competition authorities to rescue the company and preserve employment (Owen, 2012). European governments in the past mainly supported selected firms out of nationalism rather than out of any economic ideology. The reaction of the French government to the possible loss of a significant national firm shows that while the methods of state intervention have changed, the mind-set has not.

State ownership of commercial and industrial firms in the late 1950's and 60's was carried out to boost overall national growth and to converge productivity levels. State ownership was never an end in itself. The efforts of the EU Commission to end all state sectoral or vertical assistance in the cause of the common market eradicated a role for national governments to directly affect growth. So far no other policy tool has stepped in to fill this void.

The lessons to take from Phase 1 policies are that when state ownership or state support was used to aid an industry that was in its infancy or one that required significant research investment to become competitive, the results were impressive. When examining the current challenges of growth in Europe and Northern Ireland, this experience should be instructive.

INDUSTIRAL POLICY IN NORTHERN IRELAND

Section 2 outlined the definition of industrial policy and its evolution over the last 60-70 years in the UK and Europe. The industrial policy of Northern Ireland today broadly reflects the settled consensus view, although Northern Ireland's economy faces more challenges in its economic development.

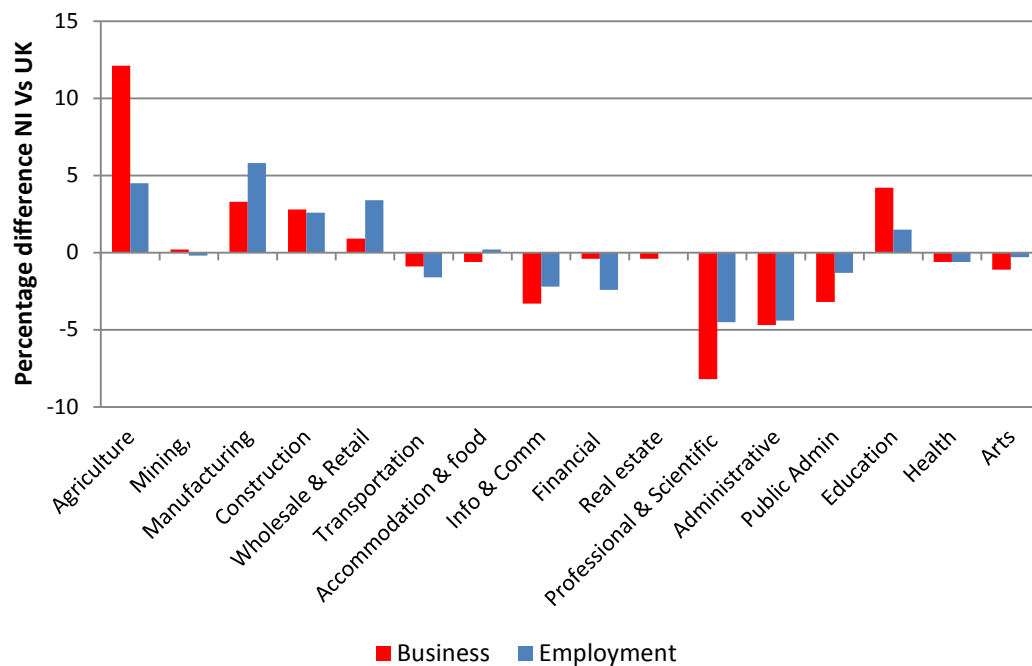
Northern Ireland in the 1960s was an economy dominated by a manufacturing sector which employed over 180,000 workers, with textiles, clothing and food and drink processing accounting for the largest share (Bradley & Best, 2012). Harland & Wolff was Northern Ireland's single largest employer, followed by the aerospace company Shorts Brothers. Both companies experienced periods of nationalisation but under very different circumstances. Shorts was

nationalised twice, latterly during the Second World War for military reasons, remaining under government ownership until it was sold to Bombardier in 1977. It survives today as Northern Ireland's largest manufacturer with combined employment of almost 6,000 and turnover in the region of £570m. Ironically 1977 was also the year that Harland & Wolff was taken into government ownership along with many other UK ship-building firms at that time in an industry rescue. Harland & Wolff, unlike other firms, was not however subsumed into the British Ship-building Corporation and it was privatised in 1989. Today it survives as a manufacturer of off-shore renewable energy technologies, but with a workforce of only 250 and a turnover of £32m, a fraction of the size it was in 1960. Textiles factories in Northern Ireland expanded throughout the 1960s with significant foreign direct investment and many became specialised in production of synthetic materials such as viscose rayon. However globalisation of the textile industry saw factory closures that began in the 1990s and very rapidly contracted the sector which now employs only 1400 people in Northern Ireland (NISRA, 2014a).

Even with significant population growth, today manufacturing in Northern Ireland only employs 85,000 or 10% of total employment. Interestingly the evolution of the manufacturing sector in Northern Ireland contrasts sharply with the picture in the Republic of Ireland. Between 1960 and 1990, while manufacturing employment declined by over a third in Northern Ireland, it increased by over a quarter in the Republic. Many attribute this decline in Northern Ireland to a period of civil unrest, but actually the Northern Ireland economy was merely following the trend of other UK regions at the time (Bradley & Best, 2012). Deindustrialisation in the 1980's shifted the UK economy toward a heavy reliance on the service sector, with the share of manufacturing output in the economy falling from 30% in the 1970s to 14% in 1997 and 10% in 2013 (House of Commons Library, 2014). In Northern Ireland manufacturing output has fallen from 21% in 1997 to just 12.7% in 2011 (ONS, 2013).

Today the structure of Northern Ireland's economy broadly reflects that of the UK as a whole, with some important exceptions. Northern Ireland is dominated by small enterprise with 99% of businesses employing less than 50 people, the same percentage as the UK. However while 43% of UK total employment is accounted for by small businesses, the figure in Northern Ireland is 58%.

**Chart 4.3 Comparison of Business and Employment Structure
NI v's UK 2014**



Source: Business Population Statistics (BIS, 2014)

Chart 4.3 compares Northern Ireland and the UK by the sectoral make up of businesses and employment. Northern Ireland has a much larger Agricultural sector as a share of total businesses, and also has a larger Retail sector. The rest of the UK has a much larger share of businesses in the Professional & Scientific and Information and Communications sectors. There is a similar pattern in terms of employment, except that Construction and Manufacturing account for higher percentages of total employment in Northern Ireland. The latest figures for the industrial breakdown of Gross Value Added in 2011 show a similar pattern (ONS, 2013).

In terms of ownership, 97% of firms operating in Northern Ireland are domestically owned, although domestically-owned firms account for just 75% of overall employment (NISRA, 2014c). While not as large as in the Republic of Ireland the foreign owned business sector is important for Northern Ireland especially in relation to Research and Development.

Table 4.2 Output per Employment NI V's UK 2011

	NI	UK
Agriculture	14.7	27.3
Energy and Water	42.4	125.5
Manufacturing	42.0	49.5
Construction	30.0	40.3
Distribution, Hotels and Restaurants	29.8	34.8
Transport and Communications	47.0	59.1
Banking, finance and insurance	70.5	89.9
Public admin, Education and Health	31.7	29.6
Other	28.0	28.3

Source: ONS (2014) Annual Population Survey, ONS Regional GVA Income Approach (2013a)

Gross Value Added per head in Northern Ireland is just 75% of the overall UK figure (ONS, 2013). Public expenditure in Northern Ireland accounts for nearly two-thirds of total output, and various groups (Confederation of British Industry, the Institute of Directors, etc) consider this to be a drag on growth and productivity. However public spending per head in Northern Ireland in 2013 was £10,876 compared to £10,152 (HMT, 2014) in Scotland which has a GVA per head that is 93% of the UK average (ONS, 2013). If high public expenditure is not a source of sub-optimal productivity in Scotland why would it be in Northern Ireland? As can be seen in Chart 4.3 the private sector in Northern Ireland has greater activity in sectors that are on average lower value added and lower productivity across most sectors as seen in Table 4.2.

Current Industrial Policy in Northern Ireland

The Northern Ireland Executive produced an 'Economic Strategy' outlining its industrial policy in 2012 which placed an emphasis on attracting high level Foreign Direct Investment with a particular focus on Research and Development (NI Executive, 2012). The document points to the success of the Nordic countries in achieving growth through high levels of investment in innovation, but also to the examples of Singapore and the Republic of Ireland who prioritise low corporate taxes and light business regulation. Throughout the rest of the Economic Strategy document horizontal policies are heavily prioritised although there remains a commitment to some vertical policies. On Research and Development, the Economic Strategy document highlights the need to move away from direct government support for individual research projects, and instead target such support at SME's that lack the ability to carry out R&D independently.

R&D in Northern Ireland has performed particularly well over the last number of years. Since 2006 total R&D expenditure has increased in cash terms from £330m to £643m in 2013 or by 65% in real terms. Total R&D spending in Northern Ireland represents 2.2% of Gross Value Added in 2013 which was above the EU 28 average of 2.02%. However, Government Expenditure on R&D (GERD) in Northern Ireland represents 2.5% of total R&D, far below EU 28 average of 12%. Denmark and Sweden have a similar level of GERD to Northern Ireland but both countries have larger than average Higher Education Expenditure on Research and Development (NISRA, 2014c).

Table 4.3 R&D expenditure as % of total in 2013

	Business	Government	Higher Education
Northern Ireland	75	2	23
United Kingdom	65	7	26
Rep, of Ireland	72	5	23
Spain	53	19	28
France	65	13	21
Germany	68	15	17
Denmark	65	2	32
Finland	69	9	22
Sweden	68	4	28
EU28	64	12	23

Source: NISRA (2014c) Northern Ireland Research and Development Statistics 2013, Eurostat (2014) Research and Development Statistics 2013

75% of all Business Expenditure on Research and Development (BERD) in 2012 was carried out by foreign-owned firms and 87% of it was carried out by firms with more than 50 employees (NISRA, 2013). Just over 3% of BERD was basic research, and some 78% of it was concentrated in the engineering and allied industries. In 2013 60% of total R&D expenditure was undertaken by the 10 largest companies and the total amount of expenditure in the Aerospace or Transportation sectors are not reported as the figures would be disclosive, due to the small number of firms in that sector in NI. (up to £180m of BERD is contained within these two sectors). In summary the majority of BERD is secondary research carried out by a small number of large, foreign-owned firms in the engineering sector. This outcome is important because it indicates that while Northern Ireland is attracting significant R&D expenditure, it is perhaps work that might ordinarily have occurred elsewhere but which came to be located in Northern Ireland due to policy. Indeed the Northern Ireland Audit office confirmed that in 2011, 57% of the total amount of R&D supported by Invest Northern Ireland, was awarded to FDI companies, and consequently the commercial benefits did not remain within Northern Ireland (NIAO, 2012). If industrial policy was aimed purely at employment effects, such an outcome might not be concerning, but this does impact on productivity.

In addition to Invest NI support, R&D companies can also take advantage of UK wide horizontal policies such as R&D tax credits. Whilst research from HMRC (2010) finds tax credits can be effective in increasing the total volume and value of research and development carried out by companies, the same research finds no evidence that R&D tax credits encourage the initial decision to undertake any specific R&D. A company will choose to carry out R&D on the basis of expectations about future demand and climate of technological progress in the sector. Tax credits also constrain government from being specific about the nature of the R&D being carried out. Governments regularly identify sectors in which they wish to see growth and often they will highlight the innovative capacity of that sector. Mazzucato (2014) points out that if government wants to achieve innovation in a particular sector, it is far more efficient to commission the technology that will produce it rather than to disperse subsidies or tax breaks to firms in the hope that such innovation may appear.

SMEs

The other focus for Northern Ireland R&D policy in the NI Executive Economic Strategy (2012) is small and medium sized enterprises. As noted earlier, the Northern Ireland economy is dominated by small firms. It is understandable that government policy would be aimed at stimulating investment and innovation among small firms as they are Northern Ireland's largest employer. However, less certain is the extent to which small firms can realistically achieve the scale of innovation required to deliver the productivity boost desired by policy makers.

The predominance of SMEs in contemporary industrial policy can be traced, at UK level, from 1979 onwards. A 2013 paper for the Federation of Small Businesses outlined UK government policy towards small businesses since 1979, before which, they argue, there was scant state support. They note that government efforts from 1979 to 1988 focused on increasing the quantity of small businesses and generally boosting individual entrepreneurial activity. This consisted of horizontal policies like tax incentives and loan guarantee schemes that attempted to bridge the divide between small businesses and the banking system. An increase of 1.2 million small firms during this period is seen as a policy success. From 1988 onwards there was a shift from quantity to quality and a focus on increasing the value added of small businesses. The success of this policy initiative was less clear. While the number of small business initiatives doubled in the time period, there was no discernible boost to productivity or the growth rate of output.

While there are almost 118,000 small and medium sized businesses (less than 250 employees) providing employment for over 385,000 in Northern Ireland, their capacity to innovate and increase productivity is lacking in scale. Government resources are limited and even more so since the financial crash of 2008. While the financial commitment of the state to SME's has grown over the last number of years, their capacity to deliver increased productivity has not. Small firms on average have less capacity for training, lower median wages and a lack of managerial experience particularly in family firms (Mazzucato, 2014). Whilst small firms are important and a significant source of employment, to view them as an engine for productivity growth and innovation is a mistake.

Moreover the employment benefits of SMEs can often be overplayed. Small businesses account for over 99% of firms in Northern Ireland, but they only account for 59% of total employment while 72% are sole traders. As Mazzucato (2014) points out, when a sole trader hires one employee, that business has doubled its workforce, whereas if a company employing one thousand people hires an additional ten, it will only have increased by 1%. All of this is not to say that industrial policy should become more focused on large firms at the expense of smaller firms. Support should be focused on firms owing to their innovative capacity, not their size.

Selective Financial Assistance

R&D tax credits - which cost the UK Exchequer £1.4bn in 2012/13 (HMRC, 2014) - and schemes aimed at small businesses are two significant horizontal policies Northern Ireland. However, vertical policies have not gone out of fashion altogether. Some remain in the mix of industrial policy. One of the most common UK vertical policies is the enterprise zone. It is classified as a vertical policy because it favours an area or region over another, even though most of the policy benefits for business would be described as horizontal (capital allowances etc.). While the first enterprise zone in Northern Ireland was proposed in December 2013, the most ubiquitous

vertical industrial policy in Northern Ireland to date has been Selective Financial Assistance (SFA).

SFA is a programme that offers grants to firms either choosing to locate or expand in Northern Ireland. The grants can be made to cover capital investment, employment, interest relief or R&D. As noted in the previous section, EU guidelines on direct government assistance to private sector firms are tightly regulated under rules for “State Aid”. Northern Ireland has “Assisted Area” status so SFA has been considered as Regional Aid and so exempt from State Aid rules. SFA consumes over half of Invest Northern Ireland’s total budget, but its performance as a key industrial policy needs to be scrutinised.

Northern Ireland is not alone in using SFA as other regions of the UK operate similar policies known more generally as Regional Selective Assistance (RSA). Griffith, Devereux & Simpson (2006) looked at the effectiveness of RSA, and found that it can have a small positive impact on the decisions of firms to locate, but that this effect is conditional on many other factors such as urbanisation and the existence of similar firms at the location. Criscuolo et al (2012) find that while RSA grants can have positive investment and employment effects, there is less of an impact on productivity. Furthermore, they find that the majority of positive employment effects tend to be for smaller firms. Girma et al (2007) find significant employment effects for grants to firms in the Republic of Ireland, and domestic firms in particular owing in part to positive spill-overs from increased foreign direct investment. Gual & Rosell (2006) examining the EU experience, find that the benefits of this type of vertical aid tends to encourage rent-shifting in the short term, and distort the single market. These findings help explain the EU’s adversity to such schemes more generally.

In Northern Ireland the performance of SFA has also come under scrutiny in recent years. Hart & Bonner (2011) modelled the impact of Invest NI assistance from 2001-2007 and found that while turnover may have increased from assisted firms, there was no significant overall employment effect. Two commissioned reports in recent years from the Northern Ireland Audit Office (NIAO) and SQW a consultancy firm, have examined the performance of Invest NI and SFA in particular. The NIAO (2012) report found that in terms of employment created, only 8.5% was “fully additional”, meaning a large amount of the employment gains would have taken place without any assistance. They also found that between 2002 and 2007 there was limited or no productivity growth from assisted firms. This was due to the low value added nature of the new jobs created. A report by SQW (2013) to the Department of Enterprise, Trade and Investment also found that SFA was not always the funder of last resort and that projects it funded could have sought assistance from regular channels. Even if Invest NI went beyond a market failure reason to grant assistance, the report also found that there was limited targeting or selectivity with regard to financial assistance and that this possibly played a part in the quality of the jobs that were secured.

Although there has been some success in boosting employment current policies have clearly lacked a focus on productivity and that has significant implications for the potential of the Northern Ireland economy in the long term.

A NEW POLICY FOR NORTHERN IRELAND

The prospect of convergence to UK levels of productivity is today as elusive as it was in the 1990s. NI's industrial policies have failed to deliver the desired scale of economic growth and in recent years much of the policy focus has shifted toward changes in the rate of corporation tax in Northern Ireland as a means to achieve this productivity convergence.

Whether a reduction in corporation tax could deliver a significant boost to the Northern Ireland economy is beyond the scope of this paper, but clearly such a policy may suffer from many of the same faults as Selective Financial Assistance. In effect it would seek to "buy in" economic success rather than inculcating economic growth by increasing the productive capacity of the domestic economy. Policies such as SFA may have been appropriate at a time when Northern Ireland needed to negate the impact of the conflict on inward investment. The same policies may not be appropriate for the task of converging productivity.

At its heart, closing the productivity gap between Northern Ireland and the rest of the UK is a question of economic growth itself, and how it can be achieved. In theory there are three sources of economic growth; increases in the availability of labour, capital accumulation and technological change (Burda & Wypolz, 1997). The returns to capital and labour suffer from diminishing marginal returns and investment is needed just to stand still, real progress in economic growth comes from technological change. A boost in overall productivity will come from a step change in technology that is created within Northern Ireland.

Investment in research and development is regularly used as the metric to judge the innovative capacity of economies, and recent statistics would suggest Northern Ireland is performing well on that front. However not all knowledge accumulation is the same and overall R&D spending levels do not give the full picture. The nature of research and the areas in which it happens are just as important. Mokyr (2005) posits that "technological advances are determined not so much by the stock of human capital as by its distribution". A government policy concerned with raising productivity should therefore be a policy aimed at enabling technological progress in the areas where it is needed.

The Risk-Taking State

Mazzucato (2014) outlines the case for an 'entrepreneurial state'. The book rejects many of the horizontal policies that permeate the current industrial policy consensus, but more importantly it sketches a role for vertical industrial policies that have already shown their worth. The entrepreneurial state straddles two historical phases of industrial policy; it involves the state targeting specific industries and sectors, but lacks the exclusivity or partiality of nationalisation or national champions that dominated Europe from the 1950s until 1980. If those policies could be described as "picking winners", then the entrepreneurial state could be described as "picking races".

Mazzucato goes on to describe how government financed research laid the basis for the technological advancement behind modern pharmaceuticals, bio and nanotechnology and even the iPhone. Whilst the private sector may carry out much of the final stages of development, including commercialisation, the roots of these technological advancements are to be found in state funded basic research. In the US 67% of research and development is carried out by the private sector compared to 26% for the federal government. However in terms of basic research

the situation is almost reversed, 67% of basic research is carried out or funded by the federal government compared to 18% for private businesses. Basic research tends to be both the most risky and most uncertain, but government investment in basic research has given rise to nearly all of the General Purpose Technologies of the last fifty years. As Mazzucato points out, it was a US Department of Defence research network (Arpanet) that laid the foundations for the internet. The internet was not what they had in mind when they started out, but basic research brought about a technology that now pervades every sector of our economy. In essence this shows how certain vertical policies can have horizontal benefits. Supporting particular industries can lead to advances in technology that benefit the many industries. Nanotechnology is expected to be the next general purpose technology, but it was heavy government investment over the last two decades that brought it to the point where private investors and companies are beginning to see opportunities.

The examples of state entrepreneurialism in the United States are obviously on a scale that is not applicable to many other economies but the theory still holds – and there is still scope for more limited government financed research in niche areas. State intervention in the private sector is often framed in the context of a market failure. However there was no clear market failure that prevented the internet from being developed by private firms, it's that the prospect of internet as a marketable product did not exist. Without the basic research carried out by the Department of Defence, no amount of incentives or tax credits could have brought the internet about.

The role of an entrepreneurial state should not be to supplant or replace business investment; it should lay the foundations for the next wave of business R&D. The state is the only economic actor with the ability to take a long term and multi-sector view of research and development. For Northern Ireland to adopt a similar strategy implies moving from incentivising and nudging innovation to directly bringing it about. The scale and scope of ambition of the Northern Ireland Executive to close the productivity gap will require bolder policy solutions and a radical re-assessment of the role of state intervention in the economy is needed.

A new policy for Northern Ireland

In July 2014 changes to Regional Aid significantly curtailed the scope of Invest NI to operate Selective Financial Assistance in the future (Invest NI, 2014). Rather than a challenge, such changes present a unique opportunity for a reformulation of Invest NI's assistance. This agency could be refocused to use its available resources to launch a state investment initiative or 'innovation fund' using SFA funds to channel investment within the key growth sectors the Executive have already identified. Invest NI has a total grant and programme budget of £123m. Selective Financial Assistance expenditure in 2014 is estimated to be somewhere in the region of £50m although this is down from a high of £68m in 2009 (Invest NI, 2014). However, Invest NI also has a significant financial commitment to research and development of somewhere in the region of £25-30m per year. Together with existing annual government R&D expenditure of £15m, this could become a fund for basic research within key growth sectors.

The funding could be divided between a fund to provide support for basic research and one to accelerate investment in the most promising opportunities that emerge. In essence this would split research and development funding into two separate stages allowing basic research to be

more broad based and open-ended while also earmarking money for development of the most promising innovations.

Based on the nature of the innovation itself and the sector in which it is based, work could be commissioned through universities, small firms, large firms, state bodies or a combination of any of these. Block and Keller (2008) find that many of the most successful US innovation in the last number of years have been achieved through a academic and industrial collaborations and spin-off firms.

This 'innovation fund', if created, would account for almost two thirds of Invest NI's business assistance expenditure, with the remainder of funds still directed towards smaller programmes for business development, start-ups and exports (some of these programmes were criticized on the grounds of efficiency and value for money in the NIAO report). As mentioned earlier, the NI executive, in its Innovation Strategy, has already outlined the potential growth sectors for the Northern Ireland economy. Research challenges and innovation opportunities are abundant in all of these sectors. The Northern Ireland Science and Industry Panel has already examined some of these sectors in detail.

Agri-Food

Within the Agri-food sector there are key areas that require significant research from nutrition to satellite imaging and precision farming. In the food processing sector the recent fruits of innovation in the areas of pasteurisation and sterilization are already permeating within the industry, but the next wave of technology also beckons. At present in the Northern Ireland Executive there is already an appreciation of the research challenges within the sector. The DARD Research Challenge Fund seeks to promote research among SMEs in the sector and encourage "industry-led consortia" to carry out research. An "Innovation Fund" would represent a more focused and intensive effort on behalf of the state to realise such potential.

The Agri-food sector is one of the most energy intensive sectors of the economy, but one which also has a significant capacity to contribute toward energy production. Biofuels and agricultural waste could become important domestic sources of energy. To date there have been attempts with ethanol and sugar cane based biofuels, but the research has suffered from policy uncertainty and this has smothered a lot of investment in recent years as it has in other areas of sustainable energy.

Sustainable Energy

The case for alternative sustainable energy is accepted by nearly all policy-makers either on the basis of energy security or environmental and climate concerns. The renewable energy sector in many developed countries has received significant state support usually in the form of horizontal subsidies. In the US, wind energy has benefited from a tax credit for energy generation since 1992, but just as wind is reaching parity with gas in terms of efficient electricity generation, political disagreement over whether to renew the credit may deter the next round of investment that would make wind energy finally fully competitive. The efficiency of such a horizontal approach to state support has been questioned (Alzate, Barrera & Garcia, 2011) but moreover, the fickle nature of such state support often leads to a sub-optimal level of investment in renewables.

Mazzucato (2014) contends that some of the most important developments that have been made in renewable energy have come from Chinese investment. This is attributed to the policy commitment of the Chinese government, but more importantly the finance made available by the Chinese Development Bank to the solar power industry which has enabled it to achieve significant technological progress over competitors. Policy certainty is a pre-requisite for investment, and a financial commitment from the state is the best way to achieve that.

Cowell et al (2013) show that devolution within the UK has aided Scotland, Wales and Northern Ireland to achieve more on renewable energy than the UK as a whole. Whilst forms of renewable energy such as tidal, on-shore and off-shore wind energy have received state support in the past, a financial commitment by the Department of Enterprise Trade and Investment to the riskier elements of research and development in the sector such as anaerobic digestion in waste and biomass energy could open significant potential for Northern Ireland.

Health and Life Sciences

Health and Life sciences are another key growth sector outlined in the NI Executive's Innovation Strategy. The performance of the industry at UK level has been comparatively good. The NHS has played a key role in providing clinical trials and testing for new drugs and treatments in the pharmaceutical sector. However as Mazzucato (2014) points out the success of the UK is somewhat eclipsed by the performance of the US. The key achievement of this industry is built on the success of the National Institutes of Health (NIH), still the world's largest funder of medical research. Most, if not all, of the breakthrough drugs developed by US pharmaceuticals are minor derivatives of drugs developed through NIH programmes or with NIH funding. Once again, the state's role as a key investor in early stage, basic research is the key to building a successful and innovative industry base. The National Institute for Health Research (NIHR) in the UK established in 2006 is attempting to emulate this success, but the financial commitment is still somewhat behind the US, even adjusting for scale. The 2012 Budget for the NIHR was over £1bn, while the NIH for that year was just over \$30bn, more than 5 times the per capita spend.

Northern Ireland has long sought to emulate the creation of high-valued added pharmaceutical sector such as that in the Republic of Ireland. Pharmaceuticals is, per-employee, the most research intensive sector in Europe (Eurostat, 2013) and within the university sector there is already a research capability that could be expanded to develop projects of benefit to the public health system in Northern Ireland such as mental health and the ageing society.

The Gain for the State

A strategy that is based on nurturing R&D rather than procuring it in through tax incentives, will also tackle concerns about the quality of jobs being created in Northern Ireland, an issue identified in both of the evaluations of the SFA scheme. In terms of attracting further investment, most of the evaluations of direct financial assistance find that an existing R&D base and presence of similar firms are more important location deciders than any such financial inducements.

The return to the State from investment in all these sectors can be secured in a number of ways. Across Europe, state investment banks enable governments to receive direct financial reimbursements for research funding they provide to key innovation sectors. The state can also sell access to patents for innovations that are secured through basic research it has funded. Similarly the State could also claim a royalty for any applied technological breakthroughs that emanate from state financed basic research (Mazzucato, 2014). Notably the current programme of financial assistance operated by Invest NI seeks no financial return from its grants or packages. In fact Invest NI, in reference to their R&D programme, explicitly rule out the possibility of financial claw back from grants saying “the concept of repayable assistance runs contrary to the objective of supporting R&D projects which address clear market failure”.

There are further options for government to recoup direct benefits from investment in the private sector, but this can never replace the indirect benefits arising from the impacts on the wider economy. Growth in the private sector and increasing productivity need to be featured in the tax system, and this is why a corporate tax regime is important. The plans at present to dramatically reduce corporation tax in Northern Ireland, like R&D tax credits, extend public support to industry with little or no public control over how and where that support is utilised. The policy also suffers many of the problems of Selective Financial Assistance, notably the practice of rent-shifting and the longevity of outcomes. Furthermore reducing corporation tax also severely limits the power of the state to reap the financial benefits that flow from its investment in the economy.

CONCLUSION

The aim of this paper was to broaden the discussion of industrial policy beyond the current consensus approach by highlighting the changing world economy which created it. Northern Ireland faces a significant challenge to converge with the rest of the UK in terms of living standards. Given the performance of the Northern Ireland economy over the last number of years, it seems only pertinent to question whether the current set of industrial policies can deliver such ambition.

This paper concludes that current policy has not delivered successfully in the past and nor does it appear likely to do so in the future. Re-examining the historical experience of industrial policy should motivate a broader discussion of what is possible in Northern Ireland. The sectors of growth which the NI Executive has highlighted will require significant investment over the next few decades. Mazzucato & Perez (2014) crystallise what the challenge for the Northern Ireland Executive is now, “the question for policy-makers should not be how to make it easier for businesses to invest, but how to stimulate their courage to do so”. The notion of an entrepreneurial state provides a framework for rethinking the state’s role in the private economy and how it can be more efficient, effective and enduring.

REFERENCES

- Alzate J.M., Barrera J., & A Garcia (2012) 'Regulatory Design and Incentives for Renewable Energy' *Journal of Regulatory Economics*, 41: 315-336.
- Best, M and J Bradley (2012) 'Cross Border Economic Renewal - Rethinking Regional Policy in Ireland' *Centre for Cross Border Studies*: Armagh
- Block, F & M.R. Keller (2008) 'Where Do Innovations Come From? Transformations in the U.S. National Innovation System, 1970-2006' *Information Technology and Innovation Foundation* ITIF: Washington
- Burda, M & C Wyplosz (1997) 'Macroeconomics – A European Text Second Edition'
- Cowell, R., Ellis, G., Sherry-Brennan, Strachan, P & D Toke (2013)' Delivering Renewable Energy Under Devolution' Initial findings summary report Cardiff University; Cardiff
- Criscuolo, C., Martin, R., Overmen., H & J Van Reenen (2012) 'The Causal Effects of Industrial Policy' *IZA Discussion Paper* No. 6326 IZA: Bonn
- Department of Business, Innovation and Skills (2014) 'Business Population Estimates' BIS: London
- Eurostat (2013) 'Europe 2020 indicators - Research and Development' Eurostat: Luxembourg
- Eurostat (2014) 'First estimates of Research & Development in 2013' Eurostat: Luxembourg
- Federation of Small Businesses (2013) 'Enterprise 2050 – Getting Enterprise Policy Right' FSB: London
- Girma, S., Görg, H., Strobl, E., & F Walsh (2007) 'Creating Jobs Through Public Subsidies: An Empirical Analysis' *IZA Discussion Paper* No. 3168
- Griffith, R., Devereux, M.P., & H Simpson (2006) 'Firm Location Decisions, Regional Grants And Agglomeration Externalities' *Advanced Institute of Management Research* AIM:London
- Gual, J & S Jódar-Rosell (2006)' Vertical Industrial Policy in the EU: An empirical Analysis of the effectiveness of State Aid' La Caixa: Barcelona
- Hart, M & K Bonner (2011) 'Data-Linking and Impact Evaluation in Northern Ireland' Aston Business School: Birmingham
- Her Majesty's Revenue and Customs (2010) 'An Evaluation of research and Development Tax Credits' HMRC: London
- Her Majesty's Revenue and Customs (2014) 'Research and Developments Tax Credit Statistics' HMRC: London
- Her Majesty's Treasury (2014) Public Expenditure Statistical Analysis 2014 London: Treasury.
- House of Commons Library (2014) 'Manufacturing: Statistics and Policy' House of Commons: London
- Invest Northern Ireland (2014) 'Annual Report' INVESTNI: Belfast
- Mokyr, J (2005) 'The Gifts of Athena' Princeton University Press PUP: Woodstock

- Mazzucato, M (2014) 'The Entrepreneurial State - Debunking Public vs. Private Sector Myths' Anthem Press: London
- Northern Ireland Audit Office (2012) 'Invest NI: A Performance Review' NIAO: Belfast
- Northern Ireland Executive (2012) 'Economic Strategy – Priorities for Sustainable Growth and Prosperity' NIE: London
- Northern Ireland Statistics and Research Agency (2013) 'Northern Ireland Research & Development Statistics' 2012 NISRA: Belfast.
- Northern Ireland Statistics and Research Agency (2014a) 'Labour Force Survey Quarterly Supplement' NISRA: Belfast.
- Northern Ireland Statistics and Research Agency (2014b) VAT and PAYE registered businesses in Northern Ireland: Facts and Figures from the Inter Departmental Business Register (IDBR) – Edition 17 NISRA: Belfast.
- Northern Ireland Statistics and Research Agency (2014c) 'Northern Ireland Research & Development Statistics' 2013 NISRA: Belfast.
- Office for National Statistics (2013) 'Regional Gross Value Added 2012 Income Approach' ONS: London
- SQW (2013) "It's more than just the money" –An Evaluation of Selective Financial Assistance in Northern Ireland 2004/05 to 2010/11 SQW: Cambridge