Implementation of *The Capabilities and Innovation Perspective: The Way Ahead in Northern Ireland* – Informed Commentaries

NORTHERN IRELAND ECONOMIC COUNCIL

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FOREWORD

The Council's research monograph *The Capabilities and Innovation Perspective: The Way Ahead in Northern Ireland* by Professor Michael Best was published in December 2000. Professor Best's study was intended to provide an innovative framework around which an economic strategy for Northern Ireland could be built. The various recommendations espoused by Best call for a fundamental change in the conduct and focus of industrial policy. While some of these recommendations (such as the creation of a single industrial development agency and the change in focus of industrial assistance) have been implemented, others have yet to be addressed.

The Council remains convinced that Best's contribution to the economic policy debate in Northern Ireland should be kept to the fore. With this in mind, the Council invited six experts from the local economy to each provide a commentary, which would describe what Best's work means for them and present their views on how his ideas could be implemented in their respective fields. This Occasional Paper contains the collection of essays, together with a Council Overview that summarises the various interpretations.

I wish to take this opportunity to express my gratitude to each of the six contributors for providing these invaluable insights into how Best's study impacts upon key policy areas within the Northern Ireland economy.

JANET M TREWSDALE OBE
Chairman

COUNCIL OVERVIEW OF THE COMMENTARIES

In December 2000, the Northern Ireland Economic Council published a research monograph by Michael H Best, University of Massachusetts Lowell, entitled *The Capabilities and Innovation Perspective: The Way Ahead in Northern Ireland*. The accompanying Council Statement, which was published with the research monograph, outlines the rationale for commissioning that research and summarises the research findings.

Principally, two factors lay behind the Council's decision to commission the monograph. First, it was necessary to explore new innovative policies that might create the environment in which a step-change in economic performance could take place. Such a step-change would be required in order to bring about a reduction in the persistent gap between Northern Ireland's living standard and the average living standard for the United Kingdom (UK). Second, the Council wished to develop a better understanding of how technology, particularly information technology, can lead to higher productivity and, in addition, it wished to explore the implications of the "new economy" for a small region such as Northern Ireland.

The Council believes that Best's work provides an innovative framework around which an economic strategy can be built. To successfully utilise this framework and create such a strategy will, however, require key players in the economy (namely policy-makers, business, trade unions and education representatives) to implement the various recommendations espoused by Best and to co-ordinate their actions with regard to the business model, production capabilities and skill formation.

This collection of essays provides the views of six experts from key areas in the economy. The authors describe what Best's work means for them and give their interpretation of how his ideas could be implemented in their respective fields. Each contributor was asked by the Council to interpret Best's work from a specific viewpoint. Professor John Bradley (Economic and Social Research Institute, Dublin) presents his interpretation from an academic perspective. Mr Mark Ennis (CBI) and Mr Philip Gilliland write their essays from a business perspective. Mr Jim McCusker (Northern Ireland Committee of the Irish Congress of Trade Unions) analyses Best's work from the trade union point of view. Professor Sir George Bain (Queen's University of Belfast) presents his response from a university perspective. Finally, Mr Victor Hewitt (Department of Finance and Personnel) gives a policy-analyst's view of Best's work.

The six essays provide an interesting array of interpretations of Best's study. Most of the essays highlight common themes, such as the need for a cultural change, openness, clusters and partnerships. However, the focus of each essay is, predictably, different.

Professor John Bradley

Professor Bradley's response focuses primarily on the implications of Best's work for industrial policy design. He begins by placing Best's capability triad within the prevailing policy background, looking at the policy limitations for a small peripheral region like Northern Ireland and the impact of policy autonomy on regional development. He then proceeds to discuss the policy agenda behind this "new and sophisticated strategic framework" and explores a number of ways of making the capability triad work for Northern

Ireland. In summary, Professor Bradley believes that regional policy-makers must develop an understanding of how national policies can impact (both negatively and positively) upon the regional economy, and try to direct any policy autonomy they possess at addressing the weaknesses that are shown up by Best's capability triad. Professor Bradley points out that Best's policy proposals "do not resemble the usual detailed shopping list of very specific policy recommendations", but he hopes that, at the very least, policy-makers will use "triad-compatible" practical policy initiatives.

Mr Jim McCusker

Mr McCusker's commentary is a clear endorsement of Best's monograph. Sustainable development - via an economic policy framework that aims to upskill the workforce, increase productivity and lead to higher living standards - does, according to the author, "chime in with the aims of the trade union movement". McCusker believes that Best's monograph provides the means to achieve the imperative step-change in economic performance and, in doing so, it addresses the widely-criticised gap between goals and means that was evident in *Strategy 2010*. While noting the need to focus on entrepreneurial firms, McCusker challenges Best's conclusion that Northern Ireland lacks an entrepreneurial culture, given the resourcefulness shown by businesses and individuals when seeking public funds.

On the issue of open system networks as advocated by Best, McCusker highlights the need for these systems to incorporate not just firms, government and education, but also employees and their trade unions. His essay concludes with a number of practical policy recommendations.

Mr Mark Ennis

A main feature of Mr Ennis' response is his innovative analogy of Best's capability triad with the three legs of a stool (the three legs depicting: the business model, skill formation and production capabilities). Ennis argues that, if the seat of the stool (the entrepreneurial firm) is to balance, not only should the legs be provided in equal measure, but the ground beneath the stool (the infrastructure – communications links, energy, information and communication technology, etc) should be solid. Although Ennis embraces Best's New Business Model, he points out that it says little about companies using market knowledge to develop growth strategies. From the capability standpoint, Ennis suggests that Northern Ireland companies need to know their markets and have the capability to develop a strategic plan that provides the framework to create unique competitive advantage.

While agreeing with Best that open systems will foster innovation and continuous improvement, Ennis notes that to develop such systems in Northern Ireland will require a cultural shift. For the latter to take place, he argues that companies in Northern Ireland must be told of the benefits of open systems (ie, savings and growth).

Government intervention features quite prominently in Ennis' interpretation of Best's work. While accepting what Best proposes in terms of production capabilities and technology management, Ennis looks to government agencies to provide support for companies to

develop production capabilities and the necessary integrated business models and open systems. With regards to skill formation, Ennis accepts that it is up to business to "harvest the crop of new graduates" but, he argues, "it is government that must fund the planting and cultivation of those crops".

Mr Philip Gilliland

From a business perspective, Mr Gilliland sees Best's monograph as the next step on from Porter's cluster analysis. Best, he argues, demonstrates that to understand successful clusters, one must understand the dynamics of the individual entrepreneurial firm. Gilliland believes that the Capability Triad will help policy-makers identify what are genuinely entrepreneurial companies and that, to a certain extent, Best's work shows policy-makers how to encourage entrepreneurial firms and how to generate a cluster.

In light of Best's findings, Gilliland notes a number of specific points that he believes policy-makers should address. For the purpose of this overview, it is worth listing some of the insightful policy recommendations that come from this business perspective.

The author says that "open systems networking" will evolve naturally but, he argues, there is room for some State encouragement (for example, the encouragement of trade associations). Furthermore, he questions policy-makers' approach to the creation of "New Economy" industries. Would it be better to "nurse the transformation of a traditional industry from the Old Economy to the New Economy than to seek to create a new *and* New Economy industrial cluster"? On the subject of clusters, he proposes that policy-makers might consider developing essential cluster corridors/partnerships with the Republic of Ireland. Additionally, he suggests that policy-makers should devise ways in which to tailor the Triad to non-manufacturing industrial clusters.

In view of Best's discussions on production capabilities and skill formation, Gilliland proposes that the status of industrial engineering should be raised, and that the current narrow focus of education must be addressed. Good political leadership, he argues, must engage middle-class Northern Ireland to participate in the knowledge-based industrial economy. Finally, the author suggests that policy-makers should understand that productivity will not change without greater engagement of graduates in the field of industrial entrepreneurialism.

In summary, Gilliland's response embraces Best's Capability Triad theory and seeks to pinpoint specific actions that the author believes will, if addressed, help foster the correct conditions for the Northern Ireland economy to make the much needed step-change.

Professor Sir George Bain

Sir George's response reflects a university viewpoint on the implications of Best's monograph for higher education and its role in the new economy. The author recognises that Best's report is "a most valuable contribution to the debate on how economic growth in Northern Ireland may best be fostered and developed through the activities of knowledge-intensive businesses and industries". While acknowledging the contribution of the research monograph

to the economic growth debate, Sir George also highlights what are, in his opinion, omissions by Best. For example, he argues that Best's capabilities approach does not "fully address the constraints faced by the Northern Ireland economy in terms of size and location".

Sir George notes that the monograph does not provide "any suggestions as to how to develop a culture of entrepreneurship". In addition, he argues that no advice is offered on how Northern Ireland should further develop its technology management capabilities. He also considers that Best's study is weak in its exploration of the role of higher education in facilitating networking.

Sir George's criticisms highlight important questions that require discussion and answers. However, Best's monograph was intended to provide a framework model for strategic policy-making; it is *not* a detailed economic strategy for Northern Ireland. The Council hopes, therefore, that Best's monograph will influence the future direction of industrial policy in Northern Ireland on a broad level while, simultaneously, stimulating debate on the finer details – some of which have been teased out in Sir George's essay.

Mr Victor Hewitt

Mr Hewitt's commentary seeks to do two things. First, he explores the background to the capabilities approach to firm behaviour. Second, he focuses on the practical application of Best's approach to workable industrial policy in Northern Ireland.

Hewitt's essay encapsulates the conventional neo-classical theory of the firm and its development over time. He points out that it has provided the theoretical foundation for the key instruments that are currently used by government for economic intervention. However, Hewitt also notes the deficiencies in the conventional theory, which have led to the development of this new theoretical approach – ie, the 'capabilities perspective'.

Whilst the author acknowledges that the capabilities approach is a "more positive approach to understanding the internal working of the firm", he also notes its weaknesses. For example, he highlights its inability to be used as a predictive tool, and its heavy reliance upon case studies since the capabilities approach is difficult to generalise or model.

Hewitt suggests that the concluding part of Best's study (which criticises economic policy in Northern Ireland for focusing on the wrong drivers) is the most challenging aspect for policy-makers. He argues that Best's criticism – while theoretically plausible – does not take into account the "administrative structure" that is required in reality. While current economic policy in Northern Ireland may not align precisely with Best's proposals, Hewitt points out that there has been a shift in policy focus aimed at reducing traditional subsidisation in favour of building capabilities through knowledge creation.

Other issues raised by Hewitt include the incompatibility between the open networking proposed by Best and the idea of promoting clusters as advocated by Michael Porter. The author also highlights the difficulty faced by policy-makers in separating the role of inward investment from job creation. While Best suggests that inward investment should be used to

enhance new principles of production and organisation, Hewitt (although accepting Best's theoretical argument) suggests that a balance between capability enhancement and job creation is necessary for inward investment policy in Northern Ireland, and that the former is unlikely to have precedence.

In his commentary, Hewitt demonstrates a thorough understanding of the capabilities approach, despite acknowledging Best's work as a "complex report" that "does not make easy reading". Hewitt concludes his review by querying the ability of Best's work to be translated into effective policy instruments. Although a radical transformation of Northern Ireland's economic policy framework is not expected in the near future, the fact that Northern Ireland policy-makers have been alerted to the capabilities perspective, and have a clear understanding of Best's approach, augers well for Professor Bradley's aspiration that policy-makers might, in the future, use "triad-compatible" practical policy initiatives.

Implementation of *The Capabilities and Innovation Perspective: The Way Ahead in Northern Ireland* – Informed Commentaries

by:

Professor John Bradley

Mr Jim McCusker

Mr Mark Ennis

Mr Philip Gilliland

Professor Sir George Bain

Mr Victor Hewitt

1 AN ACADEMIC PERSPECTIVE BY PROFESSOR JOHN BRADLEY

Introduction

Luck plays a large part in industrial strategy. The expected external conditions needed to support success do not always conveniently arrive, and their absence may frustrate otherwise admirable policy initiatives. Nor is the true significance of the internal elements of a strategy always fully understood even by its own designers. But luck and chance, however random, can be handled best within well thought out and coherent frameworks that take full account of the nature of the external environment (opportunities and threats) as well as realistic views of domestic capabilities (strengths and weaknesses).

What Professor Best offers us in his capabilities and innovation perspective - henceforth, the capability triad - is a new and sophisticated strategic framework for the development of industrial policy. In the Council's recent report (Best, 2000), he has applied this framework to Northern Ireland, but of course it is equally relevant to other regions and countries. His latest book, *The New Competitive Advantage* (Best, 2001), uses it to explain the revival of the Massachusetts Route 128 technology complex and the rise of the electronics industry in Malaysia.

Why do we need such frameworks? There is an old Gaelic proverb that says: "An té nach bhfuil láidir, ní foláir dó bheith glic", or, "If you are not strong, you had better be smart". In the quest to break free from narrow, dependent and reactive policy mind-sets, frameworks such as Porter's diamond or Best's capability triad do not provide all the answers. But they certainly help small economies to be smart when time is pressing and when financial and human resources are limited. They are absolutely essential if one wishes to bring focus and synergy to the disparate policies that make up broad industrial strategy in a region like Northern Ireland.

Conceptual frameworks and policy design, implementation and renewal usually evolve in parallel with each other. Frameworks are rather like maps that tell you where you are, where you need to go, and the direction that you must take in order to get there. Policy design and implementation deal with the messy business of gathering resources, making pragmatic choices, overcoming obstacles, and bringing the team along with you to your ultimate goal. To confuse these separate but interrelated elements of strategy, or to emphasise one at the expense of the other, will almost certainly lead to failure. Having a wonderful map, but of a route that would take you over impassable terrain, is useless. Wandering aimlessly in the wilderness bereft of any maps is equally futile.

Based on a reading of Professor Best's recent report, how should one give advice to policy makers in Northern Ireland as they face into the challenge of designing and implementing a more dynamic industrial strategy? More particularly, how might the key elements of *Strategy 2010* be refocused using the capability triad as a guiding framework? Before examining the rich policy agenda behind the capability triad, it is useful to place it within a wider encompassing policy background. First, we need to understand the role of public policy, with complete openness and frankness about the severe limits within which public policy as well as private initiatives operate in a small peripheral region like Northern Ireland. Second, we need to acknowledge the many problems that arise from the legacy of traditional industries in

Northern Ireland, but in a way that encourages rather than hinders the creation of a regional growth dynamic driven by new as well as transformed sectors. Only then is it fruitful to turn to a critical evaluation of the likelihood of whether the ten proposals listed by Professor Best in his report, which arose out of analysis based on his capability triad, will produce a step change in Northern Ireland's industrial performance as well as wider spill-over social and developmental benefits.

Designing industrial strategy in small regions

Professor Best's capability triad contains a synergistic combination of insights drawn from the economic theory of the firm and the historical evolution of business structures and practices. The triad is based on the interaction of three distinct but interrelated elements: a business model, production capabilities and skill formation. The *business model* element of the triad describes how entrepreneurial firms can grow, based on the creation of new firms through technology diversification, inter-firm networks within open systems, and regional specialisation based on technological capabilities. The *production capabilities* element of the triad integrates ideas from operations management and strategy into a logical system of production models that drives home the lesson that competitive strategy and productive systems are bound together. The *skill formation* element of the triad provides a vital input to innovation and serves to facilitate the synergistic interaction and reinforcement of all three elements. Finally, an important implication to emerge from Best's analysis is that any overall programmes in the area of industrial strategy require the close integration over time and space of the change programmes that need to take place within each of the elements of the triad.

Perhaps the most daunting aspect of the capability triad is that it treats the scope for public policy as being almost completely and seamlessly blended into the detailed mechanics of change processes that occur within private firms. In this framework, as well as in Porter's diamond, public policy and private entrepreneurial actions do not operate in isolation from each other, but become mutually reinforcing. Only in one element of the capability triad - skill formation - is there some scope for a separable and transparent role for public policy, namely, to ensure that the right mix of education and skills is produced to accommodate the changing demands of the economy as it develops. Even here, the links between public and private activity are crucial. For example, a recent ESRI study (Denny *et al*, 2000) showed that for different types of training intervention, those closely linked to the market were most effective in combating unemployment while in contrast, training of a more general nature did not, on its own, appear to have an enduring beneficial effect.

An obvious question to ask is how the capability triad, if indeed it is a universal process, has operated to produce phenomenal growth in some regions (Route 128 and Malaysia), but less in others (Northern Ireland). On the one hand, how much is due to domestic policy initiatives, where there may be some degrees of freedom and scope for action? On the other hand, how much is due to autonomous localised systems that operate within the private sector (operations systems, entrepreneurial skills, social capital), which are less amenable to direct policy influence? In the case of Northern Ireland, an initial fear might be that the capability triad acts as a closed system that explains success or failure, but – rather like meteorology and the weather – does not permit one to have much influence over the outcome. Any such fear is

unfounded, and the logic of the capability triad provides both structure and content to strategy design.

In attempting to set an appropriate policy environment in Northern Ireland, there are some inescapable facts of life that need to be faced. First, within the UK fiscal union, there is generally a level policy playing field. Of course, this does not always operate to the benefit of Northern Ireland. Having to apply UK corporate tax rates means that Northern Ireland is at a disadvantage relative to, say, the Republic of Ireland[1]. The fact that the UK has decided to stay outside the euro zone for the time being means that a strong sterling presently places Northern Ireland firms at a serious competitive disadvantage in the wider European marketplace. On the other hand, the fact that Northern Ireland does not have to finance its regional public sector deficit out of its own tax resources, and benefits from large financial transfers from London, permits it to engage in a deeper and wider range of public expenditure programmes. One such policy, the provision of a high rate of subsidy to private firms, has short-term benefits in terms of attracting inward investment and safeguarding jobs, but almost certainly operates against the rise of a regional growth dynamic in the longer run. Although Professor Best does not dwell on the minutiae of economic policy-making in Northern Ireland, he does draw attention to the danger that a grant-seeking culture will drive out risk-seeking entrepreneurship.

Professor Best's earlier work contained in *The New Competition* (Best, 1990) dwelt at length on the phenomenal success of the northern Italian regions – centred on Emilia-Romagna – in contrast to the very poor performance of the southern region of the *Mezzogiorno*[2]. What this illustrates is that one is unlikely to be able to explain away inter-regional differences in economic performance simply in terms of differences in fiscal, monetary, or other conventional state-wide policies. History plays a role, as does geography, and conventional policy can act as a compensating mechanism. But it requires a framework like Best's capability triad to get to the root causes of regional success and to suggest systematic remedies for failure.

Best's analysis, taken together with earlier work of the Council (Dunford and Hudson, 1996) suggests that regional development is most successful where two conditions hold:

i. A sufficient degree of policy autonomy is available that permits freedom of action to address local problems;

ii. Economic and business policies are designed and implemented in tandem: the first to design an attractive environment in which business can flourish; the second to recognise

[1] We ignore the fact that there is a modest freedom of action in Northern Ireland to modify rates of corporation tax temporarily, for certain classes of firm.

[2] The *Mezzogiorno* region of southern Italy has given its name to a phenomenon of underdevelopment and dependency that arose originally when the much richer northern Italian regions gave generous long-term income transfers to the south, which had an unintended side effect of locking the south into a low efficiency, low productivity, low entrepreneurial dependency.

and exploit profitable opportunities where they exist, and to feed back information to policy-makers where problems and obstacles are identified.

This process is difficult to operationalise if there is an inadequate stock of research-based knowledge or a failure to draw comprehensively from the available pool of research. Sovereign states, guided by good research, can use economic policies to influence the environment within which businesses can function efficiently, even though their freedom of action has diminished as fiscal and monetary power is ceded to supranational organisations like the European Union. Regions like Northern Ireland have even less policy autonomy and must take almost all key aspects of the economic policy environment as set externally by the state of which they are part. But regions are not completely powerless when it comes to policy making, and can sometimes use industrial policies to distort conditions in their favour relative to the other regions of their nation state. Nevertheless, policy-makers in regions would be well advised to attempt to understand how national economic policies affect them differentially. In the past, the tendency in Northern Ireland has been to call for some form of "compensation" to offset actual or perceived disadvantages within the UK. Unfortunately, such "compensation" often comes in the form of financial transfers from the core regions to the periphery regions that can blunt regional competitiveness, prevent change, and engender dependency.

The challenge facing regional policy-makers is to understand how national policies can have both positive and negative regionally asymmetric impacts, while acknowledging the extremely constrained scope for designing off-setting region-specific policies within the context of the nation state. One possible reaction is for regional policy-making to become inward-looking and to focus on intra-regional distributional issues. A much healthier reaction is for regions to become more outward-looking and to engage with the more complex, political and fluid rules of the global marketplace as they seek to optimise gains from local policy initiatives.

At the risk of oversimplification of what are very complex issues, what a comparison between recent performance in the Republic of Ireland and Northern Ireland shows is that the intelligent combination of economic policy and business strategy can generate huge synergies in terms of rapid national growth and convergence. To achieve these synergies requires a degree of economic policy autonomy that can be used, for example, to protect workers who lose their jobs in declining sectors and who require extensive retraining for other occupations. But more importantly, policy autonomy needs to be directed at addressing weaknesses shown up by frameworks such as the Porter diamond and the Best capability triad.

Legacy sectors and the regional growth dynamic

Before considering Professor Best's policy prescriptions, a simple overview of the present structure of Northern Ireland manufacturing may be useful, and a portfolio analysis is presented in Table 1.1. Some key characteristics of the present portfolio are as follows:

(i) Food Processing is the predominant sector, both in terms of output share (30 per cent) and employment share (19 per cent). The average annual growth over the eight year

period 1991-99 was only 3 per cent in value, which is equivalent to almost zero growth in volume.

TABLE 1.1

Sectoral portfolio in Northern Ireland manufacturing: 1999

	Sales 1999 (£ million)	Sales share: 1999	Sales 1991 (£ million)	Average annual growth rate: 91-99	Employment numbers 1999	Employment share 1999
Food, Drink & Tobacco	3,019	29.9	2,390	3.0	19,878	18.8
Electrical & Optical Equipment	1,384	13.7	384	17.4	11,310	10.7
Transport Equipment	1,268	12.6	652	8.7	12,278	11.6
Textiles, Clothing & Leather	936	9.3	849	1.2	19,411	18.3
Other Machinery & Equipment	582	5.8	328	7.4	6,795	6.4
Rubber & Plastics	555	5.5	319	7.2	7,180	6.8
Chemicals & Man-made Fibres	490	4.9	450	1.1	3,528	3.3
Basic Metals & Fabricated Metal Products	455	4.5	221	9.4	6,253	5.9
Paper & Printing	447	4.4	297	5.2	6,779	6.4
Other Non-Metallic Mineral Products	393	3.9	256	5.5	5,331	5.0
Other Manufacturing n.e.s.	287	2.8	113	12.4	4,085	3.9
Wood & Wood Products	278	2.7	192	4.7	2,982	2.9
Total	10,094	100.0	6338	6.0	105,810	100.0

Source: Northern Ireland Sales and Exports, ONS, various issues

(ii) Electrical and Optical Goods is the second largest sector in terms of output share (14 per cent), and fourth in terms of employment share (11 per cent). This is a very high growth sector (about 17 per cent per year in value).

(iii) Transport Equipment is the third largest sector in terms of output share (13 per cent), and displayed relatively high growth (9 per cent per year in value).

(iv) Textiles and Clothing has the fourth largest output share (just over 9 per cent), but a much higher employment share (18 per cent), characterising it as having low

productivity. Average annual growth was only just above 1 per cent in value, so was negative in volume.

(v) For all the other sectors, both output and employment shares are small, and range from a high of 6.8 to a low of 2.7 per cent, with output growth rates clustering closely about the average of 6 per cent per year in value terms.

In summary, Northern Ireland manufacturing is very heavily concentrated into a small number of sectors. The predominant specialisations are in a high growth, high technology sector (Electrical and Optical Equipment); a medium growth, medium technology sector (Transport Equipment); and two low growth, low technology sectors (Food Processing, and Textiles and Clothing)[3]. These four sectoral groupings account for 66 per cent of gross output and almost 60 per cent of employment in manufacturing. The remaining sectoral groupings have an output share of 34 per cent, but are relatively labour intensive, accounting for 40 per cent of employment.

If we are to use the capability triad framework to design an industrial strategy for Northern Ireland, how is one to handle, say, the Textiles and Clothing sector? In terms of the product life-cycle model of Raymond Vernon (Vernon, 1979), this sector has long been in a declining phase. Its rate of decline has undoubtedly been slowed by the use of large scale grant aid to prop up ailing firms whose sudden collapse might have destabilised the local economy. But, unfortunately, the sector failed to modernise in the way that might have preserved it from further erosion of competitive advantage.

In the absence of exceptional innovation characteristics (such as those displayed by a firm such as Benetton in Northern Italy), the Textiles and Clothing sector has very limited options in its present form. Far from displaying any exceptional capabilities, the competitiveness of this sector in Northern Ireland has been deteriorating for many decades. There are only a few large firms that can benefit from scale economies in pursuing low cost competitive strategies, assuming that such strategies were desirable. Local design capabilities were never very strong at any time, but in recent decades have been neglected as the large firms engaged in supply contracts with UK retail chains. Wage costs have been driven up to UK levels, and a relatively low rate of productivity growth has resulted in high unit labour costs. The availability of high rates of subsidy has served to prop up an otherwise ailing sector and reduce the urgency for rationalisation, change and renewal. Finally, the decline of the sector precludes any major role for inward foreign direct investment, which is more likely to seek out lower cost labour in the less developed periphery of the east or south of the EU, or in Asia.

There are appropriate end-game strategies for such declining sectors (Harrigan and Porter, 1998). The conventional business strategy for a declining sector has been to "harvest", ie, to cease any significant investment activity, maximise cash flow, seek as much public

[3] In the case of the Republic of Ireland, the predominant specialisations are in two very high growth, high technology sectors (Electrical and Optical, and Chemicals) and one traditional (but quite capital intensive), slow growth sector (Food Processing) (Bradley, 2001).

subvention as possible, and eventually divest. However, Harrigan and Porter suggest a less one-dimensional approach to strategy for declining businesses, illustrated in Figure 1.1.

FIGURE 1.1

Strategies for declining businesses

	Has competitive strengths for remaining demand pockets	Lacks competitive strengths for remaining demand pockets
Favorable industry structure for decline	*Leadership or niche*	*Harvest or divest quickly*
Unfavorable industry structure for decline	*Niche or harvest*	*Divest quickly*

Source: Harrigan and Porter (1998), p.114

(a) A market share *leadership* strategy is one where a company attempts to reap above-average profitability by becoming one of the few companies remaining in the industry. Leadership permits more control over the process of decline, but does not reverse it. The tactics of achieving a position of leadership include ensuring that other companies retire more rapidly from the industry, perhaps by reducing their exit barriers or by raising the stakes and forcing competitors to reinvest.

(b) The objective of a *niche* strategy is to identify a segment of the declining industry that is likely to maintain stable demand or decay more slowly, but which permits high returns to be made.

(c) In a *harvest* strategy, management tries to get the highest cash flow it can from the business, while undergoing a controlled divestment.

(d) Finally, a *quick divestment* strategy is one where the company is sold in the early stages of decline. Divesting quickly will force a company to confront its own exit barriers, such as its customer relationships and corporate interdependencies.

Although Figure 1.1 is designed from a firm perspective, it offers useful insights even in the case of a whole sector in a region like Northern Ireland. The Northern Ireland Textiles and Clothing sector would appear to have competitive strengths in certain demand pockets and the structure of the industry appears favourable, suggesting a *niche* or *leadership* strategy. The strategy recommendations made by the Clothing and Textiles Working Group (Department of Economic Development [DED], 1998, pp.27-42) appear to suggest moving in that direction. Examples include a continuation of the policy of acting as high quality, low cost suppliers to UK and US retail chains; the development of customised products and services; the development of a range of branded products, perhaps in association with the fashion niche in

the Republic of Ireland; and specialisation in a range of technical textile products. A crucial role for government policy is identified, in terms of support for innovation, design, production, marketing and training. The need to develop such a strategy, even in a declining sector, brings one back to the capability triad and its accompanying policy agenda, to which we now return.

Making the capability triad work in Northern Ireland

Immediately after he took over as CEO of General Electric in 1981, Jack Welch set out to develop and implement a new company strategy. He centred GE's approach on a key assumption of military strategists:

> "They did not expect a plan of operations to survive beyond the first contact with the enemy. They set only the broadest of objectives and emphasised seizing unforeseen opportunities as they arose. Strategy was not a lengthy action plan. It was the evolution of a central idea through continually changing circumstances" (Welch, 2001, p.448).

The central idea proposed by Professor Best is that industrial strategy in Northern Ireland should be guided by the capability triad. Towards the end of his report he sets out ten proposals for how such a strategy might be taken forward, and we illustrate these in Figure 1.2. For the purposes of exposition, three proposals are portrayed as being directed mainly at improving the business model aspect of the triad; three at the capability development element; and two at the skill formation element. Of the remaining two proposals, one concerns a general need to link improvements in all elements of the triad; and one concerns a very specific need for synergies between technology management and skill formation.

How are policy-makers likely to react to Professor Best's ten proposals? Some, hopefully, will buy into the organising framework and direct their energies towards the search for what one might call "triad-compatible" practical policy initiatives. This is not an easy way to make policy, but it holds out the promise of success, based on Professor Best's detailed and insightful review of policy formulation in countries and regions that are not too dissimilar to Northern Ireland but have been markedly more successful.

But perhaps it is best to be frank and admit that another reaction of policy-makers in Northern Ireland is likely to be one of frustration that Professor Best's proposals do not resemble the usual detailed shopping list of very specific policy recommendations that tend to dominate orthodox policy documents such as *Strategy 2010*[4]. For example, how helpful is it, they may well ask, to be exhorted to "concentrate on entrepreneurial firms"? In isolation, such a recommendation is only a pious aspiration. But in the context of the matrix of proposals focused on the three interacting elements of the capability triad, this recommendation opens the floodgates for detailed policy work on how it should be implemented in practice.

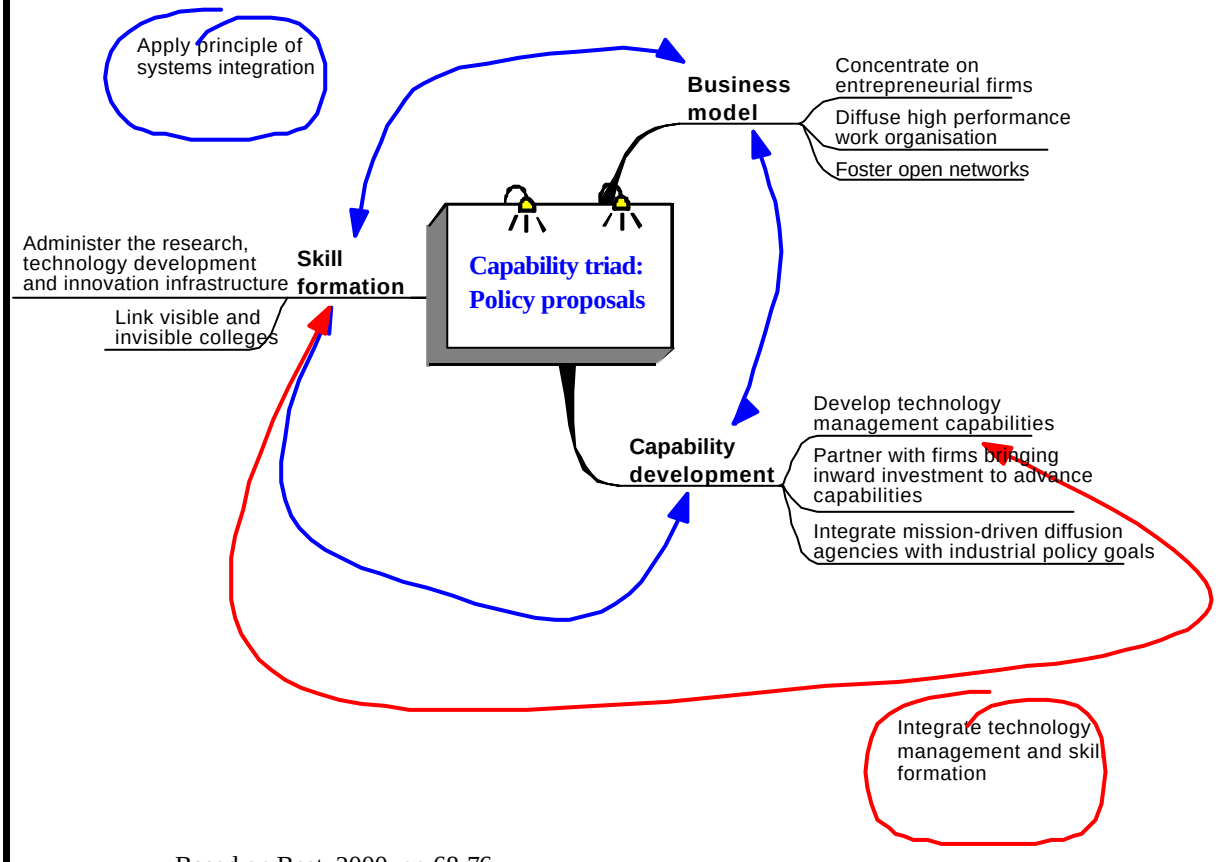
How many of the existing firms in Northern Ireland are entrepreneurial, or could become so in the future? The answer, on the basis of Professor Best's admittedly limited hands-on

[4] The 62 detailed policy recommendations of *Strategy 2010* are conveniently listed in NIEC, 1999, pp.21-27.

review, must be very few. Should the newly created *Invest Northern Ireland* industrial development agency attempt to pick entrepreneurial winners? Conventional economic advice exhorts leaving this task to market forces. But Professor Best's review of policy design and implementation in the Massachusetts Route 128 area, and in Malaysia, as well as his comments on policy in the Republic of Ireland, provide convincing evidence that there is indeed a crucial strategic organising role for government in order to ensure that conditions favour the growth of a population of entrepreneurial firms. At the very least, such a role should be used by governments to avoid implementing policies that work against the rise of entrepreneurial firms, such as maintaining a system of grants that bails out failing firms or attracts firms into sectors where the preconditions for open networking do not exist. At best, it should encourage policy-makers to send clear signals about the characteristics that they wish to foster in a future desirable industrial structure, in much the same way as Jack Welch initially coupled the "hard" central idea of being No. 1 or No. 2 in growth markets with intangible "soft" values to get the "feel" that would define the new GE culture (Welch, 2001, p.106).

FIGURE 1.2

Policy proposals linked to the Capability Triad



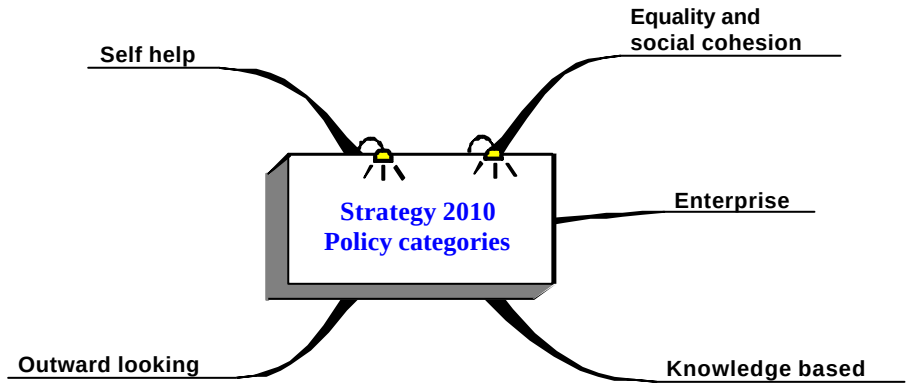
Based on Best, 2000, pp.68-76

Turning to the second recommendation in Figure 1.2, how should public policy be designed to "diffuse high performance work organisation"? To put it bluntly, here the role of government is almost always going to be dominated by the role of the market. As firms move up the production capabilities spectrum, they tend to be rewarded by higher profits and increased market share. But this proposal can be made into one element of a public policy filter in order to judge the advisability of targeting a firm or a class of firms for policy attention. Also, a policy of "fostering open networks" (as in the third recommendation in Figure 1.2) will address the barriers that Northern Ireland's mainly small firm (SME) economy faces in moving up the production capabilities spectrum towards best industrial operations practice. Here, for example, the pioneering work of the Joint Business Council of the CBI in Northern Ireland and IBEC in the Republic of Ireland in fostering cross-border, inter-firm networking urgently needs to become a core element of SME strategy if Northern firms are to become competitive in a global market-place.

One could examine all of Professor Best's remaining policy proposals, teasing out the scope for direct and indirect policy design in the context of Northern Ireland industrial strategy. But there is not space in this short essay to do so. We conclude with some brief remarks about the relationship between the organising framework of the capability triad and the framework used in classifying the policy recommendations contained in *Strategy 2010*. It will be recalled that the *Strategy 2010* recommendations were classified under five headings (Figure 1.3).

FIGURE 1.3

Main policy categories in *Strategy 2010*



Many of the individual recommendations contained in *Strategy 2010* could sit quite comfortably within the framework of the capability triad. For example, those relating to skills and education (a sub-set of "knowledge based" in Figure 1.3) incorporate some of the ground work needed to tease out the institutional detail of one element of the triad for the specific

needs of Northern Ireland. The three sub-categories contained within "Outward looking" in Figure 1.3 (infrastructure linkages with other regions; the European Union; and fostering global perspectives) are primarily targeted at the open networking aspects of the business model element of the triad.

But useful as the *Strategy 2010* list of recommendations is, it suffers both from the absence of an organising framework to provide a check-list of essential components of the strategy, as well as from the lack of any reasonable indication that the interactions between these components would be likely to generate a regional growth dynamic. This is precisely where the capability triad scores. In order to advance the debate on industrial policy in Northern Ireland, it is essential to map the *Strategy 2010* analysis and recommendations into the triad framework, retaining and re-classifying only what is essential. Many benefits would flow from such a mapping. The completeness and closure of the strategy would be easier to check. The nature of the required accommodating fiscal, monetary, social and other policies would become more transparent and provide a logical framework for future dialogue and debate with the UK policy authorities. A rich database of international industrial experience (from Route 128, Malaysia, the so-called Third Italy, and the Republic of Ireland) would become easier to access and use as benchmarks to evaluate Northern Ireland's progress. And finally, since the capability triad speaks the language of practical business but draws its organising rigour from economic theory, it will become more difficult for the proponents of these two complementary perspectives to continue to ignore each other or to waste time in further fruitless debate.

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2 A TRADE UNION PERSPECTIVE BY MR JIM McCUSKER

By focusing a new shaft of light on the Northern Ireland economy, Professor Best's monograph gives us the opportunity to secure the step change in our economic performance, which the Chairman of the Northern Ireland Economic Council, Janet Trewsdale, sets as a key objective in her foreword to Professor Best's work.

The monograph is welcome on two counts: first it provides us with an incisive analytic tool, but secondly and, more importantly, it gives us a new direction for public policy.

Many of Professor Best's findings and conclusions chime in with the aims of the trade union movement. Our goal, which is shared by many others in our community, is to raise living standards. This requires a strong regional policy. A principal component of this policy must be to increase substantially the number of well paid and sustainable jobs. To realise this aim we need, among other things, to upskill our workforce from the shop floor through to the boardroom, but paying particular attention to the technician level. Many branches of the public services have a crucial contribution to make in achieving this aim.

Sustainable development is, in the view of the trade unions and many others, also a key requirement of an effective regional policy. In this regard also the public sector has a key role to play, but all the players in our economy have an obligation to help in this process. Experience elsewhere proves that social partnership is vital if we are to achieve the more cohesive and inclusive society, which is needed to sustain economic progress.

The need for a step change

The need for a new approach is clearly evident from table 1 in the statement of the NI Economic Council on the report. It shows that while there was a step change, relative to the economy of the United Kingdom (UK), from 1960 to the 1970s, since then we have stagnated. This is in marked contrast to the performance of the economy of the Republic of Ireland (ROI).

Table 1 in the Council's statement also indicates that the comparison with the UK economy may underestimate the size of the task that faces us. Comparing Northern Ireland with the United States of America shows that there has been virtually no change over 30 years. The comparison with the German economy shows some evidence of progress, but it could not be described as a sustained step change.

The analysis of the growth of the Northern Ireland economy provided in the statement of the NI Economic Council shows that even our past modest rate is not sustainable. Therefore, we need to strike out in a new direction to raise labour productivity.

Without doubt there is a need to lift our horizons. *Strategy 2010* projects the vision. However, *Strategy 2010* does not supply the means for realising its vision. According to Professor Best, the problem is the lack of connection between the goals and the means in *Strategy 2010*. By addressing this gap he creates an opportunity which we cannot afford to let pass.

As the NI Economic Council says, Northern Ireland needs "a substantially high growth rate". The key message of Professor Best is that to shift Northern Ireland in to this higher economic plane "involves synchronising the 3 elements of the region's Capability Triad – business model, production capabilities and skill formation – into an interactive dynamic by which each advances together". Later on 5 challenges are identified arising out of the application of the capabilities and innovation perspective. Professor Best states that:-

> "Each of these challenges must be addressed if the economy of Northern Ireland is to achieve the goal of rapid growth".

Business model

In Professor Best's assessment the Northern Ireland business model does not measure up well. While the Northern Ireland firms that have been successful in exploiting niche markets are important to the economy as it currently stands, they are not the engines for rapid growth. Stressing the need to focus on entrepreneurial firms rather than capital accumulation, he concludes that past industrial policy of subsidising capital investment is therefore suspect. Further on this point is developed by saying that:-

> "Subsidising investment in manufacturing enterprises has turned out not to be a means for advancing innovation".

There is no point in harping back to past glories such as the linen and shipbuilding industries because Professor Best advises that they do not offer models to drive productivity-led growth and innovation.

Complacency about the current business model is reinforced by wrongly identifying the challenge as a lack of enterprise culture. The allegation that we lack an enterprise culture is doubtful, given the ingenuity displayed by business and individuals in devising means to maximise their draw-down of public funds.

At various times Professor Best refers to the importance of "incessant change", and a process of continuous improvement. He associates these processes with entrepreneurial firms, which is the business model he advocates. While he outlines the characteristics of the entrepreneurial firm it is difficult to see how to operationalise them. His approach to foreign direct investments gives us some clues.

The case for promoting entrepreneurial firms carries with it the implication that some will fail. This will be difficult to accept because public attention will concentrate on failures and look for scapegoats. However Professor Best claims even in the failure of individual firms, the process raises a region's capabilities and skill base. Thereby its potential is enhanced.

Production capability

Making the point that international firms may or may not be entrepreneurial firms, Professor Best says the challenge is to identify firms well advanced on the production capabilities

spectrum. He acknowledges that foreign direct investment can quick start the process by introducing new principles of production and organisation to a region. Later on he puts it another way:-

> "The purpose of foreign direct investment is not to increase employment and internal investment, but to foster regional growth dynamics and transformation growth".

Triggering the regional growth dynamics according to Professor Best means developing institutional means for fostering the diffusion of new practices. Unfortunately it is not entirely clear what these institutional means might be. However the institutional matters arise out of the consideration of the production capability and skill formation elements of the Capability Triad.

In so far as it may be necessary in future to channel public resources to individual firms, the message is that only those at the top of the Production Capabilities Spectrum should figure, irrespective of whether they are indigenous or foreign.

Professor Best argues that industrial policy should focus on networks and inter-firm relationships. While the argument is persuasive, it is difficult to see where the balance should be drawn between entrepreneurial firms and networking, although he says that the two reinforce each other.

On the question of what type of networks should be favoured, Professor Best advocates open systems. He finds that regions with open system networks have low barriers to entry for new, specialist firms. Northern Ireland does not seem to measure up well to this specification. The tradition of the family firm and not allowing others to know your business breeds, at least suspicion of new entrants, if not hostility towards them. This barrier must be overcome because easy entry for new specialist firms drives down the time for technological change, which is essential to the aim of rapid growth. This suggests that the balance of public resources should be skewed towards open networks.

If open networks are to be successful, the partnership must not only be between firms, government and education but also with employees and their trade unions. Social partnership in ROI has been an important factor in its extraordinary growth. Such partnership is a necessary ingredient of the concept of the "invisible college" which Professor Best promotes.

A damning comment is made by Professor Best that aversion to technological change in Northern Ireland runs deep in the business community. Among other examples to justify this remark he cites the fact that technological change does not figure in the policy recommendations of *Strategy 2010*. Driving home his point Professor Best says that a low growth, low productivity, low innovation economy has powerful reinforcing barriers to change.

Allied to this is the attitude of regarding technology as just another commodity. It is more important to view it as a capacity which cannot be bought and sold and must be integral to

each firm. This leads to the view that as a new industrial policy takes root it should increasingly favour open networks which facilitate technological change.

Facilitating technological change is not sufficient in itself. No amount of R&D investment without advances in technology management capabilities, etc will stimulate growth according to Professor Best. This view links into his conclusion that the extent to which a firm has made the transition to a High Performance Work System (HPWS) is one hallmark of the entrepreneurial firm. The interesting observation is also made that HPWS can also be applied to government departments and if applied successfully could enhance the credibility of public servants applying the new industrial policy.

The transition to higher technology management capabilities involves, among other things, applying advanced production principles to "low tech" sectors. Professor Best goes on to say that the regional innovation process assists in sustaining growth even though wage levels are high and the final product is "low tech". This reinforces the point made above that in future industrial policy should be based primarily on the production capability of the firm or network and not on whether a firm is located in a "high tech" or "low tech" sector.

The clear inference in Professor Best's work is that the firms which achieve the entrepreneurial level will enjoy a leap in direct labour productivity. Such leaps are the requirement for the step change in Northern Ireland's economy that we all desire. A low wage economy is not the answer. Raising productivity enables higher wages to be paid. This positive shift explains the emphasis on skill formation.

Skill formation

The judgement of Professor Best is that firms, individually and collectively, focus on the short run, whereas skill formation is long run. Consequently manpower planning at the government level is essential to the successful development of technology management. The statement underlines this point that human capital development is the most important contribution that policy-makers can make to rapid growth.

Professor Best is complimentary about the base of the educational system in Northern Ireland and in particular the range of engineering, science and IT courses provided relative to our size. However he observes that we have relatively few active industry/university partnerships. We do have best practice models but not enough. In other words we have the vital research base in science and engineering to develop a competitive advantage in knowledge intensive capabilities. We must do more to realise this potential.

Investment in skill formation is no easy option. Professor Best highlights its high cost. Only the government has both the funds and the legitimacy to make educational restructuring and investment on the scale involved. The difficulty is that the government is not the leader, but the third partner – the others being business and educational institutions. Achieving the right balance between the 3 partners is not easy. Beyond its immediate needs, business is not good at predicting its future requirement. Encouragement needs therefore to be given to the

Department for Employment and Learning to continue to give this area of its work a high priority.

The requirement for the education system to be responsive to the skill needs of rapidly growing firms is well illustrated by Professor Best, but he makes the criticism that colleges of further education enjoy little guidance in manpower development planning. Later on he broadens this out to say that manpower planning is a striking omission from government vision statements.

The failure to give sufficient priority to skill formation contrasts sharply with the ROI. Indeed the Department of Trade and Industry's White Paper on Competitiveness is quoted where it states that, on a per capita basis, the ROI benefits from an annual output of electronic engineering graduates at 3 times the UK level.

The gap with the ROI is further illustrated by the statistic that, over the period from 1997 to 2003, its supply of graduates is expected to be 5,400, of whom 2,200 will be diploma or certificate level technicians. The comparison with Northern Ireland is stark. We expected to supply less than 1,900 over the period 1997 to 2001, with about 1,000 of these being from the further education sector.

Engineers are not the only source of technological knowledge. Professor Best cites the example of machinists who with no formal training have advanced production capabilities. The key is developing all personnel to see and take advantage of production opportunities by matching them to capabilities. This is an example of Professor Best's "invisible college" at work.

The importance of turning the spotlight on the technician level arises again when Professor Best talks about realising investment in R&D. The critical factor is mid-level skills. All of this points up the crucial role of the institutes of further education. In addition, the Northern Ireland Centre for Competitiveness (established in 2001) should play an important role in developing "the invisible college".

Warning that there will be losers as well as winners out of the process of change that he advocates, Professor Best says that the benefits and costs of upheaval must be spread. Thus not only is skill formation essential to the process of change, it must also be used to ease the process of transition. A virtuous circle has to be created so that individuals in communities that invest in skill formation are in a better position to anticipate, respond to and benefit from change.

Integrating the change programme

In calling for the integration of change programmes in business model, production capabilities and skill formation, Professor Best is critical of what was, at that time, a separation of these three elements in institutional arrangements. Stressing the importance of interaction between capability development and skill formation, he seems to suggest that an overarching industrial policy is more appropriate.

In 1994 the NI Economic Council proposed that there should be an annual report to set the strategic direction of the agencies of the then Department of Economic Development. Given the changes since then in departmental structure and the establishment of the new single agency (Invest NI), it is vital to realise the benefits of Professor Best's work. The Northern Ireland Executive should draw up a 3-year rolling corporate plan to set the strategic direction of its economic development policy for all agencies of government. This should be supplemented by annual business plans. It is important that all three elements in the Capabilities Triad receive equal attention and appropriate funding. Skills formation should not rest at the bottom.

Policy Recommendations

To realise the aim of a step change in the economic performance of Northern Ireland, the following action should be taken:-

(i) the Northern Ireland Executive should draw up a 3-year rolling corporate plan to set the strategic direction of its economic development policy;

(ii) irrespective of whether they are indigenous or foreign or whether they are "low tech" or "high tech", only firms at the top of the Production Capabilities spectrum should receive assistance from public funds;

(iii) public resources should be skewed in favour of open networks which embrace social partnership and facilitate technological change;

(iv) government should give higher priority to assessing the requirement for future work skills and give more guidance to the institutes of further education on manpower development;

(v) the concept of the "invisible college" should be fostered by concentrating on mid-level skills and the Centre for Competitiveness should play an important role in developing this concept;

(vi) the benefits and costs of the process of change must be spread and the role of skill formation in this process be deployed fully.

3 A BUSINESS PERSPECTIVE BY MR MARK ENNIS

The work around the formation of *Strategy 2010* and initiatives such as the Northern Ireland Centre for Competitiveness support Professor Best's view that to achieve growth Northern Ireland industry needs to move away from low value added businesses that compete primarily on price, to high value added, knowledge based business. Common sense dictates that third world countries in the Far East, India and Africa, where £1,000 can be an annual wage as opposed to a monthly wage, are going to dominate low technology industries. We have witnessed the impact of this upon the traditional industries within Northern Ireland, particularly in textiles. However recent growth areas could follow the same pattern. Take for example 'call centres' a major employer in Northern Ireland. From a growth and employment perspective, Northern Ireland will benefit as long as the ratio between wages and the abilities of employees is low compared to other countries, eg USA. As wages grow however we are at increasing risk from lower wage economies that have developed similar capabilities eg India. We compete in a global market. If we are to continue to grow or maintain the call centre or any other business we have to continually upgrade the product utilising our knowledge base through technology management.

Knowledge can be widely defined to include knowledge of markets, products or processes or a combination thereof that can deliver unique competitive advantage. Best focuses on products and processes under the label 'Technology Management'. The business enterprise holds that knowledge thereby making it a key agent for change. The engine that will drive change and growth and create wealth is the entrepreneurial firm and, as Best points out, our technically educated students are the high-energy fuel that feeds the entrepreneurial firm. I deliberately use the word 'students' because the word 'graduates' tends to be linked solely to universities and misses those who have come through another route, be it educational or through businesses. Capturing this skill base in all its facets will be a key element of sustainable growth.

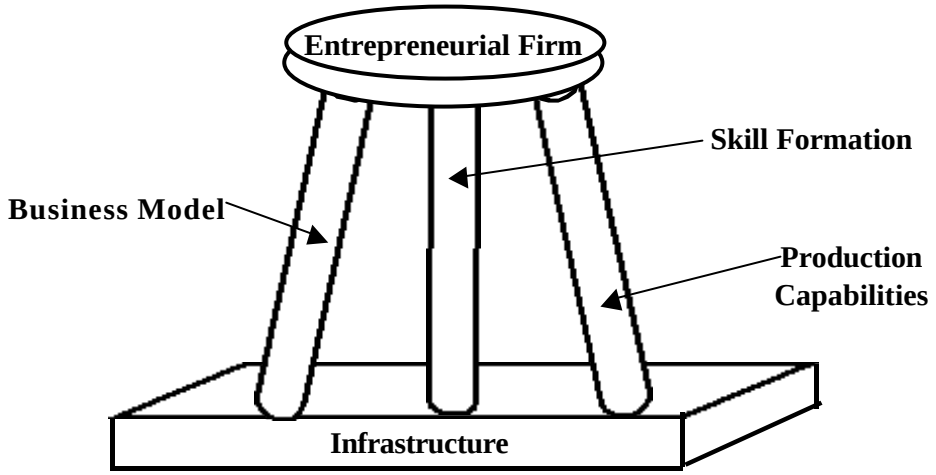
Best points out that an enterprise culture is formed through a critical mass of entrepreneurial firms and then expands this theme into what creates an entrepreneurial firm. This assumes however that the infrastructure which will form the foundation for building entrepreneurial firms exists. If we depict a stool as an image for Best's Entrepreneurial firm (see Figure 3.1), then its three legs are what Best describes as the 'business model', 'production capabilities' and 'skill formation' – all of which we will explore later. However, no matter how well the stool is made, if the floor on which it stands, ie the infrastructure, is incomplete or uneven then the stool may still fall over.

A good infrastructure not only provides the basic essentials for business, such as energy, water and waste management, but is also critical for the entrepreneurial firm in that it provides communication links, ranging from an efficient and effective road, air and rail system to broad band capacity that promotes networking – which is a key element of Best's enterprise culture. Unfortunately, Northern Ireland's infrastructure has been significantly underfunded for the past 30 years. Failure to address this infrastructural deficit will adversely impact productivity, labour mobility and communication and significantly increase the costbase of entrepreneurial firms, thereby suffocating the enterprise culture before it even has a chance to breathe. Given the level of underfunding (CBI estimates it will take a minimum additional investment of £200m per year for 10 years), the Executive must develop and

implement innovative funding methods involving the private sector, including Public Private Partnerships. While it was omitted from the Best report, a strategy and an implementation plan to upgrade the infrastructure must be a key element in the creation of an enterprise culture. It must therefore form a central platform in the Executive's 'Programme for Government' over the next 10-20 years.

FIGURE 3.1

Ennis' Interpretation of the Capability Triad



Having established the need for a solid and level platform on which to build the entrepreneurial firm, we need to look at the three legs of the stool that support it. The three legs represent capabilities that the entrepreneurial firm needs if it is to realise its full growth potential. These capabilities can then be expanded to promote strong regional growth. Like any stool, the legs must be grown or extended in equal measure otherwise the stool becomes unstable and falls over. So what do the three legs represent and how do we ensure they are provided in equal measure? Best labels the legs as:

The business model
Production capabilities
Skill formation

The Business Model

Best elaborates on the development of various business models each of which was appropriate to a particular time in industrial development. From a Northern Ireland perspective, he maintains that the current dominant model, with a few notable exceptions, is inappropriate

and that we need to move to a new model. The old and new models are summarised below (Box 1).

BOX 1

Traditional vs New Business Models

Traditional	**New**
• Price led competitive strategies	• Market/product led competitive strategy
• Product design, product development and technical innovation are all discreet elements and outside manufacturing	• Research, design, product development and manufacturing are fully integrated
• No investment in high performance work systems	• Dependent on high performance work systems
• Ad hoc investment in research and development	• Continuous investment in research and development
• Little networking	• Part of an internal/external open system network
• Low investment in training	• Investment in employee development and life long learning

The old model leads to firms taking business on price which ultimately results in reduced margins, reduced investment into research and development, technology and training and the ultimate demise of the company.

The new model, based on a knowledge of customer needs, matches market opportunity with unique production capabilities, which support new technologies that in turn create new market opportunities and profitable growth.

Best points out that the goal of an entrepreneurial firm is to develop the organisational capability to differentiate its products in the market place and to establish a market niche and an ongoing relationship with its customers. Success requires continuous product redesigns and development capability. Best focuses on product led businesses and the integration of design and manufacturing but says little about the market knowledge/strategy dynamic. This is a serious omission.

With some notable exceptions, most entrepreneurial companies develop growth strategies based on matching core competencies with an intimate knowledge of the market place and their customer base. This was certainly the case when Boxmore developed from a general carton manufacturer in the early 90s to the leading European supplier of pharmaceutical packaging by the end of the decade. Customer and market knowledge enabled Boxmore to develop a strategy that provided a framework in which the business systems of the

organisation could be integrated. The strategic framework provided the context in which Boxmore felt confident to invest in product development, manufacturing systems and, most importantly, people. It provided the framework in which it could network with customers, suppliers and, to a limited extent, competitors. As markets develop and shift over time so do the company's strategies. Development of unique capabilities or core competencies can also in turn lead to new strategies. From a capability standpoint, Northern Ireland companies need to know their markets and have the capability to develop a strategic plan that provides the framework to create unique competitive advantage. Once created they must have the ability to continually re-invent strategy. As Gary Hamel, in his book 'Leading the Revolution' states, "Strategic innovation is the capacity to re-conceive existing business concepts in ways that create new value for customers, wrong foot competitors and produce above average growth".

Best emphasises that a key element in the new business model is the development of open systems. Open systems encourage the spread of ideas both from a firm perspective and a regional perspective. Such systems foster innovation and specialisation and provide an opportunity for disruptive innovation in addition to continuous improvement. While open systems exist in Northern Ireland to a limited extent, eg the aerospace sector, the development of such systems in a wider context is probably one of the greatest challenges to creating an enterprise culture in Northern Ireland. Open systems take time to develop and implement and more importantly require a significant culture shift. There are formidable barriers to the development and implementation of open networks that would require specific external support to overcome including:

A company's short-term performance focus: it takes time and investment to establish a network be it a supply chain network or a more comprehensive open network.

Lack of internal support: it takes the full support of the business. The first step should be to create an integrated business organisation. If this does not exist there needs to be close co-operation between functional departments.

Performance measures and reward systems: current reward systems are likely to be tied to the current business model. This again points to the need for an overall strategy that ties in the organisational and reward systems.

Poor use and understanding of technology: internet technology and its business applications are relatively new and still not well used or understood.

Lack of trust: networks or supply chains require a readiness to exchange financial, tactical and operational information. It is not in the Northern Ireland psychology to give up information easily.

Apart from providing training and investment support for new technologies, how do we get business in Northern Ireland to make the cultural shift? The first action is to spell out the benefit. Frances Howarth, an e-business research director with Aberdeen Group, in an article entitled 'The Collaboration Dividend' maintains 5% could be added to the revenues of UK

companies if they worked closer together. The Aberdeen Group predicts that e-procurement alone could reduce order fulfilment cycles by 70%, administrative costs by 50-70% and inventory costs by 25-50%. E-procurement is only a small part of what a network can deliver but, as Best indicates, savings are not the impetus here – it's growth. The momentum has started. The aerospace and defence sector organisations have long worked to share information and collaborate. The major retailers such as Tesco and Sainsburys have major initiatives on-going for supply chain networks. The UK government under the banner "UK On-line" plans to bring all departments and at least 75% of relationships with the public on-line by 2005. According to the latest UPS European Business Monitor survey of Europe's leading 15,000 companies, 84% of UK companies have introduced new on-line systems, practices and procedures in the last year. Northern Ireland business needs to be a part of that momentum. A useful acronym to spell out the implementation steps for building a network is 'PROFIT': Participation, Resilience, Open standards, Foreign fields, Ideas and Technology.

Participation
Step one is to identify your most valuable partners. Networks don't happen unless those with a vested interest are involved from the outset. Start small and build trust and transparency into the information and process flows. Involve all staff who would have regular contacts.

Resilience
From an internal perspective, assess your own business systems and get buy in from your in-house team. Integration of internal business processes is paramount.

Open Standards
From an outward looking perspective, look inside the organisation you are going to network with and see how well you fit from a cultural, strategic and technical viewpoint.

Foreign Fields
Northern Ireland is a small marketplace; therefore we need to look outside across borders, laws and cultures if we are to achieve significant growth. This means having the ability to operate in a multi language and multi currency environment. The Internet opens up opportunities on a global scale.

Ideas
Ideas are the currency of an Enterprise economy. As Best points out, one of the dilemmas that face entrepreneurial firms is choosing which ideas and capabilities to pursue. Being part of a network enables you to pass on and receive ideas. Therefore, technological innovation with a specialised firm that is part of a network of firms with complementary capabilities will create opportunities for others in that network.

Technology
Technology ties all the strings together. Technology refers both to the specific technology developed within the firms that will be the engine for growth and the technology that drives the network systems which offers high levels of availability, security, scalability and flexibility.

From an UK perspective the infrastructure and drivers are in place and networking will bring about major improvements to the UK's productivity figures and boost GDP growth. Northern Ireland business needs to be a part of this. We need to switch from the old business model and embrace the vision and innovation of the new model.

Production Capabilities

Northern Ireland has a long history and tradition of innovation. Our universities and a number of companies continue that tradition generating ideas and intellectual capital. Why does this not result in significant growth? One major obstacle already discussed is the lack of networks. A second obstacle and the second leg of Best's entrepreneurial stool must be our production capabilities.

Our traditional production model has tended to be top down with highly structured organisations and independent functions. This model may have supported long run or high volume production with low input costs especially labour, but this is no longer appropriate for today's market. Firstly, the demand for better living standards means in the context of the global economy we no longer have low labour costs. Secondly, product life cycles have never been shorter. You only have to look at the PC market to see that. As the customer gets more sophisticated they become ever more demanding. The same is true from packaging to computers from manufacturing to the service sector. To survive we need flexible, innovative production capabilities. Most importantly, the production systems must be totally integrated with the other systems of the business. As Best points out, shorter product life cycles need reduced design to manufacture cycle time as this determines the pace of change a company can sustain. This in turn creates the need for both shorter manufacturing cycle times and a shorter development time to introduce technological innovation into the product. Driving down manufacturing cycle times means quicker response times, more reliable service and delivery, higher inventory turns and better quality, i.e. continually improving productivity and profit. The re-investment of profits creates the funds for R&D, which in turn increases the rate of introduction of new technologies. New technologies result in improved or new products, which in turn require new or modified manufacturing systems. This new production capability/competitive dynamic is achieved through what Best calls technology management.

To be successful technology management requires structural changes within the business. The organisation structure must facilitate the development of multi-functional teams and high performance work systems. This enables the shift from technology management focused solely on research and development to the new dynamic that integrates R&D and production. Technology management is as much about the capability to develop and introduce new technologies, machines, materials and methods to improve production performance and capability as it is about developing new products themselves. Northern Ireland agencies provide good support for research and development into new products, but this needs to be expanded to provide the same level of support to develop production capabilities and the necessary integrated business models and open systems. Ulster Carpet Mills, which operates in the traditional textile sector, is an excellent example of a local company with an integrated business model that has utilised innovative production processes to develop new products and

markets. With 1,500 people it has grown to be the world's second largest manufacturer of Axminster carpets.

In terms of inward investment, we should certainly target companies that bring with them or that have the ability to generate networks and are exemplars in the integrated business model. This offers the quickest route for Northern Ireland to introduce and develop this capability. Benchmarking with these companies and with best in class needs to be widely promoted and encouraged. Government needs to motivate and pump prime the much-needed cultural change by providing investment incentives and by creating the environment to stimulate enterprise. With a relatively high cost base, Northern Ireland needs the ability to offer incentives through taxation policies, which should be targeted to boost the innovative capability of industry. This could be achieved through enhanced R&D credits, tax breaks for employers who introduce best practice and accelerated depreciation credits especially for investment in business systems that support open networks.

Skill Formation

The remaining leg of the entrepreneurial stool is skill formation. Best believes Northern Ireland's educational system offers a basis for competitive advantage with considerable potential. However, we must utilise that potential and ensure our investment in education is maintained. Every firm in Northern Ireland has access to R&D partnering with universities, yet CBI evidence highlights that most of their research centres are under-utilised. The Plastics Polymer Research Centre at Queen's is a good example; it is a fantastic resource for any plastics company, but is only utilised by a handful of companies. We must break down the barriers between SMEs and our universities if we are to take advantage of our educational competitive edge. Programmes that encourage graduates to be involved with companies such as The Teaching Company Scheme should be heavily promoted.

There is also a need for much greater linkage between business and the colleges of further education. Nortel's recent development with the East Antrim Institute is an example of what can be achieved. We need to develop those linkages if we are to maintain a competitive edge. The Republic of Ireland is projected to produce 3,100 technology graduates and 2,200 diploma level technicians in the period 1997-2003. In comparison, we will produce 825 graduates and 1,000 technicians. We are in danger of falling behind. It is up to business to ensure that we harvest the crop of new graduates, but it is government that must fund the planting and cultivation of those crops. We need increased student places for technical, engineering and science courses in our universities and our colleges of further education, now.

Entrepreneurial firms are also "learning and teaching firms" which contribute to skill formation. They incorporate what Best refers to as invisible colleges. This relates to learning that happens within companies in the course of people's work. This is usually recognised in the form of company development programmes and NVQs often under the Investors in People scheme. However, the practical skills developed under the old apprenticeship schemes have not developed as well under GNVQs. This practical knowledge base, a source of productivity improvements in the past, needs to be re-addressed under the NVQ system. We need to raise awareness and ensure that equal status is given to GNVQs as it is to their formal equivalents,

GCSEs and 'A' levels, particularly by the universities. Both business and universities need to recognise the importance of key skills. Growth involves the expression of all types of knowledge, but the key to pulling it all together is the need for overall manpower planning. We need a plan capable of integrating second and third level education, university research, technology development, and industrial innovation. The Executive is the only body with the scope and authority to accomplish this. Manpower planning therefore needs to be a second major platform in the 'Programme for Government' in addition to being at the heart of our industrial policy.

Since the publication of Professor Best's report, we must congratulate the Executive on the progress made to establish a single agency Invest Northern Ireland (INI). The drive to establish the capabilities articulated by Best and the necessity for strategic planning capabilities as highlighted above need to play a key role in the new agency's vision and its goals and objectives. However, the development of Northern Ireland as a high growth region cannot be left to INI alone. It requires the full support of the Executive. Only the Executive can deliver on the infrastructure deficit, only the Executive has the capability for overall manpower planning and only the Executive can co-ordinate unified actions from departments as diverse as education, planning, regional development and trade and industry. The danger is that the Executive will not take up the overall co-ordination role but rather will allow local issues to cloud its vision. Let us hope the recent decision to make the erection of telecom masts a local planning issue, which potentially could set back the implementation of broadband technology by 2 years, is not a foretaste of a nation set for bureaucracy and stagnation instead of leadership and growth.

4 A BUSINESS PERSPECTIVE BY MR PHILIP GILLILAND

Best says the purpose of his Report is "to lay out an economic perspective to guide policy makers". The purpose of my essay is to lay out my business perspective on his economic perspective; I will also suggest some practical steps as to how a policy based on this approach might be implemented. My views are my own and do not reflect the views of my employer. They are explicitly contextual in that they draw on my experience and perception rather than exhaustive research.

Best's approach to analysing the ingredients of successful technology-based industrial economies has much to commend it. It marks a move-on from Porter in that he demonstrates that to understand successful clusters one must first understand the dynamics and economic development importance of individual entrepreneurial companies within a cluster. So this is an important piece of work that allows both policy makers and industrialists to view at close quarters a plausible model for an industrial economy to deliver market-beating productivity growth. There are however contextual comments on this work that policy-makers might wish to consider.

I fundamentally agree with Best's view of the goal of industrial policy: "Only an industrial policy which facilitates the development of the capabilities which constitute entrepreneurial firms and cluster dynamics offers the potential to advance the region's competitive advantage in high value added activities." Put negatively, if our industrial companies do not transform themselves into the New Economy, given the reality of the modern communications-fuelled intensely global world, New Economy companies from elsewhere will destroy them in the market place. More positively put, clusters of genuinely entrepreneurial companies will "hot-house" together and spawn value-adding offspring, thereby producing self-generating and competitive economic development. Why? The dynamics of human intellectual self-exploration and interaction naturally mean that three highly intelligent individuals in a room will produce more ideas (and productivity growth) than one on his own.

The catches are: what are genuinely entrepreneurial companies, how do you get them, and how do you generate a cluster? Understanding Best's Capability Triad answers the first of these questions and goes some way to resolving the other two: you get a functioning cluster when the Triad works. The Triad consists of the Business Model, Production Capabilities and Skills Formation.

As regards the Business Model, we should all know by now that competing on cost as a Northern Ireland manufacturer is not a sustainable business strategy. At the very least a company must (a) rebalance its portfolio to sell some premium priced product, and/or (b) sustain the cost competitive product by investing in the knowledge and technology to outsource its commodity product globally. Best focuses on (a). But policy makers should remember that (b) is also sustainable: the global consumer requires commodity product and someone has to produce it; and with investment in information technology, production capability knowledge, marketing and a global frame of mind, Northern Irish companies can and do produce sustained productivity growth using this route.

In relation to (a) above, what Best describes regarding sustained and rapid productivity growth is not just about the fact of selling premium priced product, it's about developing a

work culture of being continuously first to market. How? By using technological advancement in product development, using various forms of high performance/continuous improvement work systems, and by marrying innovation with productivity (i.e. design with manufacture). This type of work culture should be appropriate to any industry, service or manufacturing. Best's tools are tilted towards manufacturing industry, for which they are sound, but it must be noted that there do exist types of design-led, value adding, first to market product development that do not necessarily involve technological development within the product, such as leading the fashion market. To achieve the requisite work culture within our collective work psyche, we in Northern Ireland have to be sufficiently confident to be comfortable to lead the world, not to follow. Policy makers might remember that such confidence comes from a state of mind as much as from technical skill formation, upon which I shall elaborate below.

Best correctly places much store by "open-systems networking" ("An industrial development strategy for Northern Ireland must be based on entrepreneurial firms and open-systems networking; the two reinforce one another"). I consider some form of networking to be an essential ingredient of the cluster "hot-house". The issue is, how as a matter of policy can open-systems networking be created? Seeking to oblige companies to "do the right thing" for economic development would not work. Companies do not exist to create economic development, they exist to be businesses. Culturally most businesses welcome state support but shun state interference – the dividing line might change with the day of the week. My view is that networking (open-systems or otherwise) will naturally evolve through mutual dependency, but might be gently assisted by state encouragement of trade associations or some other vehicle to provide a focused form of networking. By way of contextual example, the Northern Ireland textile industry is relatively large in size but has relatively modest levels of effective open-systems networking. My view is that this is due to modest levels of mutual dependency: although sizeable, the sector is very diverse, and many players have external suppliers and customers and do not compete against each other. Hence textiles functions only modestly well as a cluster as Best would describe it. The Italian model, by contrast, appears to work as a genuine cluster because of the critical mass of mutual dependency and competition: to generalise, collectively the Italian industry has one broad market, the "Made/designed/styled in Italy" origin brand.

Whilst on the subject of textiles, Best correctly refers to the possibility of traditional industries being "New Economy" industries when talking about regional specialisation. This is a point that should be strongly reinforced. Policy-makers might consider whether it would be easier to nurse the transformation of a traditional industry from the Old Economy to the New Economy than to seek to create a new *and* New Economy industrial cluster. This is appropriate particularly to agriculture and textiles, where cluster critical mass could be achievable. The demand for food and clothing is set to continue for some centuries; the challenge is to manage the metamorphosis of clusters before the global New Economy arranges their demise.

In his recommendations Best encourages Northern Ireland to "network with the fastest growing region in Europe, the ROI." Northern Ireland could enjoy opportunities to provide lower technology spin-outs whilst building our technological capabilities. To expand upon

this point policy makers might consider the balance between (a) the size a cluster must be for it to function, (b) the size of Northern Ireland and (c) the required number of clusters within an economy for it to mitigate its risk of exposure. Given the pre-existence of a mass of economic activity in both agriculture and textiles, how much room is there for several newer clusters with critical mass within Northern Ireland? It would appear to be a given in Best's work that policy making autonomy and cluster development should not be separated. What therefore are our choices? Should we be developing cluster corridors or cluster partnerships with key regional neighbours? Probably yes. Given the requirement to retain a strong degree of political direction over economic policy in its macro sense, whilst not dismissing partnerships with English regions or Scotland, policy makers might consider developing essential cluster corridors/partnerships with the ROI. Why? – (a) Although bigger than us they are smaller than England and have the political autonomy to be more fleet of foot when it comes to ongoing re-tailoring of economic policy to suit regional needs than English regions or Scotland; (b) for the reasons Best outlines they need us more than do England or Scotland (subject of course to the vagaries of the impending recession); (c) they are close; (d) there is more political will towards such relationships; (e) their step change experience is something that we wish to emulate.

Best values highly the development and continuous improvement of Production Capabilities. For manufacturing companies this is an essential tenet of their productivity enhancing culture; indeed it would stand to reason that such businesses must take on board these principles to survive. It would be wrong however to be prescriptive about the choices of appropriate production system: by the very nature of the continuous evolution of the marriage between innovation and productivity (design to manufacture), appropriate production capability technology also will continue to evolve. The key policy point here is to raise the status of industrial engineering within formal and on-the-job skills formation. From the experience of the clothing industry, cutting edge production capabilities form an important piece of intellectual capital in building successful global manufacturing businesses, as well as sustaining innovation for home based product. As a critique of the Triad, however, we should remember that not all productivity-enhancing, wealth-generating industrial sectors pertinent to Northern Ireland involve manufacturing (for example, the hospitality sector).

As regards Skill Formation, it stands to reason that you cannot have a knowledge based industrial economy without knowledge based people. Best places much emphasis on science and engineering on the basis that economies that have achieved the sort of step change transformation that we require have done so on the back of technology based industries, and investment in science and engineering should drive a science and engineering led industrial economy. In my view Northern Ireland policy makers need to assess which industrial sectors are our target sectors, as a wholesale concentration in these subjects may not be appropriate for all the sectors to be grown into the New Economy in Northern Ireland. Secondly Best might have assumed that a UK science/engineering graduate has had the same breadth of education as his US or ROI counterpart. If so this would have been an erroneous assumption. US engineering graduates will have completed many liberal arts disciplines at university as a part of their curriculum; our narrow focus of education must be addressed to assist in the rounding of our future leaders and entrepreneurs.

Best correctly cites the cost of investment in education. Northern Ireland political leaders should show courage in this regard. I understand that in 1989 when I graduated, 50% of all graduates from universities in ROI emigrated. Did the ROI get value for money from that "wasted" investment?

One part of Skill Formation not elaborated upon by Best, but which in my view is an imperative, is the issue of whether in Northern Ireland we are currently culturally predisposed to developing the best of our human resource to staff and lead the New Economy. It is well documented that we do not have a strong "enterprise culture"; yet we have solid school leaving academic achievement. But if productivity improvement as an economy is about getting more output per unit of input then we must improve the rate of participation in whichever wealth generating industrial sectors we wish to cluster. The issue is not just about social exclusion; at least as importantly it is about engaging the educated middle class. Law school has a higher perceived status than business school. World economy entrepreneurialism has a higher status in ROI than in Northern Ireland, a reverse of the situation at partition. Culturally middle class Northern Ireland prefers to play safe with the education of its young people. Why? There may be many reasons, but in my view one might be the cultural emasculation consequence of direct rule. Not lack of opportunities, despite the unattractiveness of entrepreneurialism during the Troubles, because for university graduates the geographical comfort zone for job opportunities has for many years been UK-wide. We (middle class Northern Ireland) are insular: culturally we have become victims of our competing one-issue political ideologies in that we believe in our smallness, our remoteness, our differentness. And we believe that the responsibility for providing industrial jobs is the responsibility of someone else, a distant parent. My causal analysis may be flawed, but the Triad will not deliver the productivity benefits we require until middle class Northern Ireland has been engaged and the real number of participants in the knowledge based industrial economy has increased.

Furthermore when Best states that Northern Ireland is "unable to absorb advanced technological skills" because of the fact of the emigration or diversification of the 1996/7 electrical/electronic higher education crop, he has not grasped the full cultural context. Middle class emigration is an ongoing reality – in my school there were maybe 50 or so boys in my year who went to university or polytechnic; only 4 or 5 did so in Northern Ireland. Location is not just about opportunity; it is also about choice. We have a cultural predisposition to choose our career and adult life venue, and the choice is not just about opportunity.

How do policy-makers engage middle class Northern Ireland so as to encourage talent into industry *and* to encourage talent into industry here? Good political leadership. Political leadership is essential to direct the Northern Ireland establishment to the primacy of an industrial entrepreneurial economic culture. This is not a job that our political leaders should seek to delegate to business leaders.

As regards harnessing the talents of emigrants, RTE recently re-screened a documentary from the 1980s called "The Road to God Knows Where" which took a cold hard look into the lives of Irish people under 30, both those in Ireland and emigrants. What appeared to come out was

despair at a perceived lack of ability of the then Irish political establishment to make their country a state that they could feel morally, ethically and economically comfortable to make their lives in. Since the programme was made the change in the ROI has been remarkable. Any lessons for us? Young educated Northern Irish people need to feel morally, ethically and economically happy to make their lives here. We need a "hearts and minds job". We need political leadership that exudes genuine cultural self-confidence, optimism and energy. We should not underestimate the negative effect on this constituency of unrelenting political negativity. I am 34, and the first visual symbol of political leadership to make me feel proud of my home was the Hume/Trimble joint hand raising at the U2/Ash concert before the referendum on the Good Friday Agreement. There are many more like me, and they all have locational choices. So political leadership is vital; lack of it will perpetuate the haemorrhaging of talent. (Luck assists too: ROI had World Cup success, U2 being world beaters but choosing to continue to live and pay tax in Ireland, high profile European Commissioners, Riverdance etc.)

By way of conclusion, Best has produced a description of an industrial model that can produce high productivity growth. He has shown us what it looks like: functioning clusters of entrepreneurial firms, world class production capability development; requisite skill types and skilling processes. He has shown us how poorly we fare against this model: patchy entrepreneurialism (with low innovation), poor productivity, high people wastage, lack of functioning cluster mass. He has correctly analysed existing industrial support as inculcating risk aversion.

To assist in the creation of the required functioning clusters with high productivity growth I have suggested the following macro imperatives: (a) a recognition by our political leaders of their responsibility to provide the sort of positivistic leadership that will help generate a society in which young educated mobile Northern Irish graduates would wish to make their lives; (b) a core understanding amongst policy makers that the required step change in our economy's productivity cannot be achieved unless we engage educated graduates in the field of industrial entrepreneurialism. I have also suggested that policy makers assess Best in the context of: (1) what clusters do we wish to enhance or create? (2) how many and which clusters must work in partnership with our southern neighbours to generate the requisite critical mass; (3) how might the Triad be tailored to non-manufacturing industrial clusters?

With these in mind there remains a fundamental conundrum at the core of the suitability of Best's analysis to Northern Ireland: how do you create entrepreneurial companies and open-systems networking? It is to varying extents within the state's gift to encourage the development of technology management capabilities, to foster the integration of technology management and skill formation, to integrate mission-driven diffusion agencies with industrial policy goals, to go some way to the linking of visible and invisible colleges, and to administer the research, technology development and innovation infrastructure. The answer lies in a combination of carefully tailored inward investment (partnering with firms bringing inward investment to advance capabilities, notably perhaps with ROI companies seeking local locational diversification) and encouraging existing companies in their ongoing process of metamorphosis along the lines of the Triad. One tool might be the introduction of Triad based

state assistance. But policy makers must remember that a step change in economic performance requires a step change in cultural predisposition.

5 A UNIVERSITY PERSPECTIVE BY PROFESSOR SIR GEORGE BAIN

Introduction

The Best Report provides a new, interesting and appropriate perspective on the prerequisites for the development of a successful knowledge-based economy in Northern Ireland. The developments associated with devolved government – particularly, the establishment of the Department of Enterprise, Trade and Investment (DETI) "super agency", Invest Northern Ireland – render the report particularly timely. Moreover, the impending decisions on the investment of the transitional EU funds and other infrastructure funds provide an opportunity to convert policies to practices designed to drive forward the knowledge-based economy.

We welcome the importance attached to higher education which is a key theme of the report, as the universities make an immense contribution to the skills and economic capability of Northern Ireland through the training of undergraduates and postgraduates. Many of the skills fostered and developed in students not only underpin and encourage self-development and personal fulfilment but are transferable and relevant to serving the needs of an adaptable, sustainable, knowledge-based economy at local, regional and national levels.

Higher education also plays a vital role in supporting the economy through the provision of leading-edge research. The universities constitute a major part of the research activity in Northern Ireland. Indeed, the achievement of sustainable economic development will depend, to a large extent, on their ability to pursue research and innovation of national and international standard and relevance. Research undertaken by the universities also has a critical role to play in inward investment. If Northern Ireland is to be successful in attracting inward investors, then it is essential that a high priority is given to protecting and enhancing the existing skills base and ensuring that Northern Ireland has the internationally recognised research infrastructure it needs to attract hi-tech, high-value investment. Investment follows excellence, and companies at the cutting edge want to be located close to centres of excellence. In today's global economy, business will locate where there is a highly skilled labour force.

The report clearly identifies the role of the universities in both supporting the research infrastructure and providing a supply of highly skilled graduates. We also welcome the recognition within the report of the importance of QUBIS Ltd, the Queen's technology transfer company, and the significant contribution that it has made to the Northern Ireland economy. The company has been extremely successful since its establishment in 1984. The combined turnover of the current and previous 27 QUBIS Ltd companies was £22.1 million in 2000 and is expected to exceed £31 million in 2001. QUBIS Ltd has promoted the development of entrepreneurial, innovative high technology spin-out companies for the last 17 years and the University is committed to expanding its role. The University's commitment to the establishment of the Northern Ireland Science Park (NISP) is further evidence of its dedication to promoting the development of entrepreneurial and innovative companies.

Role of Higher Education in the Knowledge-Based Economy

Before commenting on the validity of the approach outlined in the report, and the practical steps needed to implement it, we need to reflect on a number of important elements within

higher education that play a key role in supporting and developing the Northern Ireland economy. The University believes that the full extent to which higher education supports the local economy should be recognised.

University/Industry Co-operation

The report has a section referring to the industry/higher education innovation dynamics. This section should include a reference to the TCS (Teaching Company Scheme) which is an excellent exemplar of university/industry co-operation. Queen's and the University of Ulster operate the largest and most successful TCS programme in the UK, which allows young graduates to be employed by companies, and to be supervised by academics from the relevant university department. One of the benefits of the scheme is that university research and expertise is transferred to small companies. The TCS is a very useful bridge between academic departments and businesses as it operates on a one-to-one basis. There are 33 TCS projects ongoing between Queen's and local industry at this time. Projects with Wilsanco Plastics and Jordan Plastics were judged respectively as Best Overall TCS Project in the UK in 1999 and Best SME Project in the UK in 1998.

The University has a number of 'centres of excellence' which were established with support from the EU and the Industrial Research and Technology Unit (IRTU) to provide an effective interface with small and medium-sized enterprises (SMEs) and easy access to communal resources and services: QUESTOR (the Queen's University Environmental Science and Technology Research Centre), which is highlighted in the Best report, and the Polymer Processing Research Centre are good exemplars. The Northern Ireland Technology Centre (NITC) provides a valuable resource to the SME community for technical information, materials testing, instrument calibration and rapid prototyping of new products. At Queen's, collaborative pre-competitive research, sponsored by IRTU's START programme, is ongoing between Bombardier Shorts and Aeronautical Engineering, Franklin Textiles and Mechanical Engineering, Du Pont and Electrical and Electronic Engineering, Clarehill Plastics and the Polymer Centre, local poultry producers and Agriculture and Food Science, Courtaulds Lingerie and Mechanical Engineering, and Moy Park and Chemical Engineering. There have been 30 collaborative START projects with a total value in excess of £15 million between local firms and Queen's during the past 6 years, and Queen's and the University of Ulster have successfully operated R&D research training consortia with companies such as Seagate Technology and Nortel Networks Ltd. The Manufacturing Technology Partnership Ltd is another joint venture which seeks to encourage and facilitate small firms in using technology to develop and grow their business in an effective manner.

The Science Shop project, also jointly developed and run with the University of Ulster, links students to the needs of voluntary and community groups and provides access to the Universities' skills base for these groups.

Entrepreneurship in Higher Education

A key theme of the report is the emphasis on entrepreneurial firms as a powerful driver of growth. The universities have recognised the need to establish a culture of entrepreneurship

within Northern Ireland, and, in response, have established the Northern Ireland Centre for Entrepreneurship (NICENT). NICENT is an initiative by both universities to promote and develop an entrepreneurial culture not only in the student body but also among the research community. In responding to the Department of Trade and Industry (DTI) Science Enterprise Challenge, and with help from IRTU, the two Northern Ireland universities are working together closely in promoting this initiative. The key objectives for NICENT are to:

- embed an entrepreneurial culture in undergraduate and postgraduate students and the wider community;
- mentor best practice entrepreneurship and innovation in the creation of new businesses;
- maximise opportunities for interaction between entrepreneurs, students and business angels;
- manage all stages of the knowledge transfer process to support organic growth within the high technology sectors for spin-out and spin-in enterprises; and
- be a world-class exemplar for high technology enterprise development.

To augment the work of the Northern Ireland Centre for Entrepreneurship, Queen's has established a Chair of Innovation to focus on the international benchmarking of innovation of products and processes in business, and will be responsible for the dissemination of best practice to the business and industrial community in Northern Ireland. The fact that this Chair is being sponsored by the First Trust Bank and IRTU indicates the importance attached to promoting innovation in Northern Ireland by both business and government.

Queen's and the University of Ulster secured £2 million from the University Challenge Fund in 1999. The purpose of this funding was to provide both the opportunity and the resources to commercialise the respective research strengths of both institutions across a broad scientific and technological base. The fund has made company start-ups easier for entrepreneurial researchers at both universities. The new Challenge Fund investments have already attracted outside funds from venture capital companies.

Skills Base

The Northern Ireland universities have contributed enormously to the skills formation processes in the region. As the report rightly points out, Northern Ireland's educational system offers a basis for competitive advantage with considerable potential. The University has engaged with key policy makers and has adopted a strategic approach to the increases in the number of fully-funded student places. Recent expansion in student places at Queen's has largely reflected the recommendations of *Strategy 2010*, the NI economic strategy document. The University has responded to the need for more graduates in certain sectors of the economy. For example, the number of students undertaking degrees in the School of Computer Science increased by 116% between 1995 and 1999. This School exceeded its target for student recruitment by 30% in 1998 and 11% in 1999.

The nature of planning in higher education and training is essentially long-term, while the needs and demands of industry can change regularly and increasingly quickly as a consequence of technological advances. There is clearly a need for businesses and the

providers of education and training to foster mutual understanding of the needs of both sectors. Queen's University has in place a number of mechanisms to ensure that the views of employers are considered when determining degree content and many of the Schools, both in the Faculty of Science and Agriculture and the Faculty of Engineering, have close relationships with industrial partners. For example, the Schools of Chemistry and Pharmacy have close links with Galen, the School of Aeronautical Engineering works closely with Bombardier Shorts, and the Schools of Computer Science and Electrical and Electronic Engineering have close working relationships with Nortel and Fujitsu.

Proposals for the Way Forward

Best argues that conversion of the Northern Ireland economy from the current "price led competition" to the "product led competition" that characterises entrepreneurial firms and successful knowledge-based regional economies requires sustained and co-ordinated activity. That activity needs to accept the concept of the "capability triad" linking the business model, production capabilities and skill formation. The successful development of the regional economy then depends upon the extent to which these three components can be synchronised, are interactive, dynamic and advance together.

Adoption of the radical approach to the development of the regional economy commended by Best and set out in the report poses significant challenges to companies, agencies and institutions in Northern Ireland. It would mean a move from the use of capital subsidies to individual firms, greater emphasis on supporting inter-firm networking and the identification of the technology trajectories likely to underpin future developments. The potential impact of this transition is well illustrated by Best's "outline of the path forward". His "ten proposals" also serve to highlight those areas where change is already occurring. They do not, however, fully recognise the constraints faced by the Northern Ireland economy in terms of size and location.

Principle of Systems Integration

The report argues that by reorganising industrial policy according to the principles of systems integration, the goals of capability development and skill formation can become the focus of industrial policy activities. While the fundamental principle of this argument is correct, such a reorganisation of policy development in Northern Ireland will require a huge change in culture and is not a goal that will be achieved in the short-term.

The key to transformational growth is seen as being the integration of change programmes in the business model, production capabilities and skill formation. One example given is the need to integrate activity which is related to advances in information technologies. The report refers to the fact that advances in IT can stimulate design, product development and networking capabilities. The recent Queen's proposal for the development of an Electronics Communications Information Technologies Research Centre (ECIT) - which is a research institute, a technology transfer support centre and a training facility - will bring together in the Northern Ireland Science Park in Belfast the converging technologies of electronic engineering, computer science and telecommunications. This project could be regarded as

evidence that Northern Ireland is beginning to embrace the principle of systems integration. ECIT brings together Invest NI, the Department of Employment and Learning, the University and entrepreneurial companies.

Concentrating on Entrepreneurial Firms

We accept the need to concentrate on entrepreneurial firms - a need that is widely acknowledged as a key driver of economic growth. The challenge to Northern Ireland is how to encourage the creation of new entrepreneurial firms and how to encourage existing firms to become more entrepreneurial. The report does not offer any suggestions as to how to develop a culture of entrepreneurship in the Province. Queen's is confident that NICENT, the Chair of Innovation and NISP are all important activities that will contribute to the objective of developing entrepreneurship in Northern Ireland. It is vital that the universities work closely with government agencies if a strategy to encourage entrepreneurial activity is to be developed and implemented.

Diffusing High Performance Work Organisation

We are aware of the positive effects of the introduction of total quality management. Total quality management in Northern Ireland's larger companies is well established, as is highlighted in the report. For example, Nortel won the Northern Ireland Quality award in 1997. The challenge, however, is to encourage SMEs to introduce total quality management systems. SMEs will have to be persuaded of the benefits that high performance work systems will bring to their organisation if a total quality management ethos is to succeed in Northern Ireland.

Fostering Open Networks

Developing the concept that entrepreneurial firms are the drivers of regional growth, the report argues that networking capabilities foster the diffusion of design and as such represent an important infrastructure capable of enhancing innovation at regional level. The report recognises that the scale of Northern Ireland means that such networks will require partnering with enterprises in other regions. Thus, in developing the regional industrial policy, the emphasis needs to be on the network or inter-firm relationships rather than on the individual firm. This policy will reinforce the focus on entrepreneurial firms developing further the external and internal dynamics of those companies and their clusters.

The extent to which networks already exist in the Province is not examined in great detail. In particular, the important role that higher education has to play in facilitating networking has not been explored. At Queen's, the Chief Executives' Club brings together business leaders on a regular basis to discuss issues of common interest. Both universities have used funding from the Higher Education Reach Out to Business and the Community Initiative (HEROBC) to establish an Industrial Advisory Board, which has in its membership representatives of business and higher education.

Developing Technology Management Capabilities

Developing technology management capabilities is identified as a powerful policy tool missing from the vision documents in Northern Ireland. The report provides no advice or suggestions, however, as to how Northern Ireland should move to develop further its technology management capabilities, and it is essential that this omission is addressed as the region develops its policies to support industrial innovation.

Integrating Technology Management and Skill Formation

The report notes the potential competitive advantage of Northern Ireland's education system. The challenge for the education sector is how best to work with business and government to establish a shared vision and co-ordinate manpower planning at all levels. We have some difficulty with the concept of centralised manpower planning as it can often be difficult to identify those sectors that will expand or contract and how sustained expansion in specific sectors will be. We take the view that industrial policy should be based on pluralism, with initiatives in many sectors. Pluralism also underpins the ethos of the education offered by Queen's University, ie that students should have the opportunity to study a wide range of subjects and not just those that are seen directly to support the economy.

The University appreciates the need to work closely with business. But the nature of planning in education and training is long-term, while the needs and demands of industry can change frequently and increasingly quickly as a consequence of technological advances.

The University has in place a comprehensive academic planning process which is undertaken annually. An important part of this process is to identify potential new subject areas which the University could develop. Admissions targets are also reviewed and expansion is frequently targeted on subject areas that will directly support the local economy. For example, as already mentioned, there has been significant expansion in the number of students undertaking degrees in Computer Science.

Partnering Inward Investment Firms to Advance Capabilities

The report suggests that the principal purpose of foreign inward investment should not be its direct contribution to employment and investment within the region but rather its role in fostering regional growth dynamics and transformation growth. In fact, the exemplars cited (Seagate and Nortel) have contributed direct and indirect benefits to the regional economy. The extent to which the universities have inter-acted with both Nortel and Seagate would suggest that this phenomenon is well understood within the region's agencies and institutions. Moreover, this inward investment has provided a firm foundation for the establishment of a regional focus on ICT production capability and skills.

Integrating Mission-Driven Diffusion Agencies with Industrial Policy Goals

There is a strong argument for a vision of strategic capabilities development that will facilitate an undiluted focus on generic capabilities to foster what Best describes as transformational

growth. This does not imply support restricted to one "capability", but rather a recognition that industrial policy relates to generic capabilities and that companies take responsibility for the unique capabilities they require. The establishment of specialised "diffusion agencies" for generic capabilities such as Quality Management and Product Development are seen as possible models.

The University is already seeking ways of extending the QUESTOR model of an Industry University Co-operative Research Centre (IUCRC) to other generic areas. It is hoped that the development of QUMED, a non-bio-active medical devices technology IUCRC, will match the success of QUESTOR.

Linking Visible and Invisible Colleges

We agree that the higher and further education system has a key role to play in supporting the Northern Ireland economy. Collaboration between the local universities and further education colleges is the most effective use of resources. While such partnerships should be encouraged, it is also important that a mission for the further education sector is clearly established, to discourage "mission drift" towards the higher education sector. Collaboration and not competition should be encouraged between further and higher education.

Queen's has close working relationships with a number of further education colleges and several members of Queen's staff serve on the Board of Governors of these colleges throughout Northern Ireland. Furthermore, in 1995 the University opened outreach centres in Armagh and Omagh, the former a separate campus, the latter within Omagh Institute of Further and Higher Education and the Ulster Folk Park. The purpose of these centres is to promote university-level programmes of study in border county areas that in the past lacked higher education provision. Both outreach centres offer a range of courses provided through the Institute of Lifelong Learning and other professional areas of the University.

We view the introduction of foundation degrees as an important means of working more closely with the further education sector. Queen's has been developing foundation degrees in a number of areas and has recently launched foundation degrees in Creative Multi-Media with the North Down and Ards Institute of Further and Higher Education and in Web Technology with the Omagh Institute of Further and Higher Education.

Administering the Research, Technology Development and Innovation Infrastructure

We welcome the proposal which stresses the need for government funding commitments to university research and technology infrastructure in support of long-term growth. It is particularly important that the Northern Ireland universities receive increased funding for research if they are to compete with institutions in the UK and the Republic of Ireland. While government block grant research funding for universities in Great Britain increased by 38% between 1993/4-1999/2000, similar funding in Northern Ireland has actually been reduced by 2% over this period. The Irish Government recently launched a "Technology Foresight Initiative", making £560 million available over the next 5-6 years to build up infrastructure in IT and biotechnology. This funding is in addition to £240 million currently being invested in

university research aimed at making Irish higher education institutions "world class research centres".

The University also acknowledges the importance of maintaining enrolments in science and engineering subjects and it works closely with local schools to encourage students to study these subjects at university level in order to ensure that Northern Ireland has a continuous supply of highly skilled scientists and engineers.

Conclusion

The Best Report is a most valuable contribution to the debate on how economic growth in Northern Ireland may best be fostered and developed through the activities of knowledge-intensive business and industries. It identifies how the direction of current industrial and government economic policy must change, and it also sets out the strategic goals which will enable Northern Ireland to make the transition to a dynamic, knowledge-intensive and successful regional economic entity.

The various stakeholders must each play their part in facilitating change and the integration of the various elements which will impinge on future industrial policy. As for the educational institutions, they have wider responsibilities not only as imparters of knowledge but also as creators of knowledge. While higher education has a central role to play across a wide range of fronts, institutions must continue to evolve to enable new knowledge to be developed for future use. Apart from providing the specialised knowledge and training related to current and emerging technologies, universities have to be conscious of the need for constant renewal and response to far-reaching and continuing change.

Because of their contribution to the whole regional economy and society, the universities must be fully engaged as participants with government and businesses as well as with the new regional economic development "super agency", Invest Northern Ireland. They have an important input to capability and skills development and they also provide leading-edge research expertise. In addition, they foster entrepreneurial and other skills among staff and students through, for example, the NI Centre for Entrepreneurship, assisted by other university-industry collaboration which can help to improve technology management capability. For Northern Ireland to optimise the benefits of having top-class teaching and research universities, government must be ever conscious of the need to involve and engage with the universities. Queen's University is very mindful of its regional role and its aspirations in this regard can be summed up in one of its four "end goals" or key objectives, which is to "enhance the University's contribution to the economic, cultural and social life of Northern Ireland".

When planning the future economic strategy for the Province, the constraints within which the economy operates must be recognised and any strategy which is developed must be able to overcome and work within these constraints. Northern Ireland is a small region on the periphery of Europe and lacks some of the advantages of the rest of the UK or regions in the United States. It is still possible, however, to have a prosperous economy and sustained economic growth, as has been demonstrated in recent years by the Republic of Ireland. The

capabilities and innovation approach detailed by Best does not however fully address the constraints faced by the Northern Ireland economy in terms of size and location.

The future economic success of Northern Ireland will, to a large extent, depend on political stability. Since the introduction of the devolved administration, the economic prosperity of the Province has improved, as new and dynamic investors have been attracted to the region. If it is to enjoy sustained economic stability and growth in the coming years, there must also be political stability. The University has close working relationships with many of the Ministers and government departments and also benefits from working with local politicians who have a clear understanding of the issues relevant to Northern Ireland. Hence the Northern Ireland Assembly and the Executive have a critical role to play in ensuring a successful economic future for the region.

6 A POLICY PERSPECTIVE BY MR VICTOR HEWITT

Introduction

We start with an enigma. Firms are self evidently key players in the process of economic growth and development. Yet mainstream economics has paid relatively little attention to the internal dynamics of enterprises, the factors that make some firms successful and others not. In his stimulating report for the Northern Ireland Economic Council, Professor Best opens the 'black box' of how firms evolve using the methodology of capabilities and innovation management to shed light on this issue, with particular reference to the Northern Ireland experience.

This is a complex report. It does not make easy reading even for those who have a grounding in the subject. Policy makers in particular are faced with concepts and terminology which are unfamiliar but which they need to understand to get the benefit of Professor Best's work.

This short commentary on the report seeks to do two things. First, to explore a little further the background to the capabilities approach to firm behaviour focusing on its strengths and weaknesses. This is important because the theory involved is by no means universally accepted in the literature. Attention is then focused on the practical application of this approach to the development of workable industrial policy in the Northern Ireland context.

Background to the Capabilities Approach

The conventional neo-classical theory of the firm as taught to generations of economists has very little to say about the internal management of the enterprise or its dynamic. Instead the focus is on the transformation of inputs or factors of production such as labour and capital into outputs that are commodities or services, and how these are priced in particular types of markets. The heart of the analysis is built around a technical relationship, the 'production function' relating inputs and outputs and the structure of the markets, whether competitive or monopolistic in various degrees in which these are bought and sold.

In this rather stylised context little attention is paid to the internal organisation or behaviour of the firm for the good reason that there is no need to do so. Everything that is relevant such as the quantities and prices of inputs and outputs can be determined without reference to the existence of the management of the firm. Indeed, it was not until Ronald Coase's famous 1937 essay on "The Nature of the Firm"[1] that any sort of neo-classical justification for the existence of a firm as a human endeavour was articulated. Coase noted that in a world where a decentralised price mechanism was the best means of co-ordinating economic activity the only justification for divorcing some activities from this mechanism and lodging them in an entity called a 'firm' was that the transaction costs of using the price mechanism for these activities outweighed the benefits it conferred.

From Coase's conceptualisation of the firm as a contractualising body whose existence and behaviour could be thought of in terms of a search for means of minimising transaction costs there gradually emerged what was until recently the dominant school of thought in the

1 Coase, R. (1937) "The Nature of the Firm", *Economica*, 4, pp.386-405.

Economics of Organisation. Seminal contributions to this work were made by Oliver Williamson (1971) and Alchian and Demsetz (1972)[2].

There are many strands to this transactions approach to the internal working of firms but virtually all came down to the view that the problem of understanding how firms work is the problem of getting the proper alignment between incentives and behaviour.

To the layman this must seem exotic stuff divorced from the real world of business but it would be a mistake to believe that this is so. Behind the key mechanisms that Government adopts for intervening in the economy lie processes that rest on these theoretical foundations. For example, if the neo-classical model of the firm and markets is accepted as a proper explanation albeit simplified and stylised of how the economy works then the principal reason why Government would wish to intervene in the economy is some form of 'market failure' which has caused private and social costs and benefits to diverge. This indeed has been the logic behind the raft of schemes and measures of assistance employed by successive administrations both in Northern Ireland and more widely in the UK and Europe over decades.

The conventional theory of the firm and its spin off in the economics of organisation has the virtue of a fair degree of internal consistency and the benefit of reasonably clear cut prescriptions for policy development. But there are also clearly deficiencies. It does not for instance have much to say about the dynamic properties of firm behaviour, including how firms grow and how and why their management take decisions. One example in particular highlights the weakness of this approach. It is generally assumed that there is a conceptual division between the productive capacity of the enterprise and its internal organisation. The former is characterised by the technological features of the production function mentioned earlier which are assumed generally available to everyone while the latter is concerned with matters such as marketing and internal hierarchy. A glimpse of the real world shows this to be untrue. The productive capabilities of a firm, especially one that is developing rapidly, will generally be closely bound with the ability of management to both understand and apply technology.

These weaknesses in the traditional theory of firms and markets have led in recent years to the development of a new theoretical perspective which has been identified generically as the 'capabilities view' or 'capabilities perspective'. It is this view that is at the heart of Professor Best's paper.

The Capabilities Perspective

In 1959 Edith Penrose published her seminal work 'The Theory of the Growth of the Firm'[3] which provided the intellectual foundation for the development of the capabilities approach.

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2 Williamson, O. (1971) "The Vertical Integration of Production; Market Failure Considerations" *American Economic Review*, 61, pp.112-123. Alchian, AA. and Demsetz, H. (1972) "Production, Information Costs, and Economic Organisation" *American Economic Review*, 62, pp.772-795.

3 Penrose, E. (1959) *The Theory of the Growth of the Firm.* Oxford University Press.

Penrose's approach to the theory of the firm was radically different from the prevailing neo-classical view. For a start it denied that the firm was built around the idea of a production function. Instead Penrose defined a firm as "a collection of productive resources the disposal of which between different uses and over time is determined by administrative decision". The emphasis on administrative decision as the means of disposing of resources is in stark contrast to the allocation of resources through the mechanism of prices, which underpins neo-classical thinking. Moreover Penrose denied that the firm could ever be in a long run equilibrium and hence her emphasis is on a theory of the growth of firms, a dynamic and not a static concept. Within the Penrosian firm entrepreneurs view the opportunities available in the external world and exploit them using the knowledge, including the production knowledge, they possess.

From these observations has developed a distinctive view of the firm that can be loosely characterised as, 'in a world where technical knowledge is not free or easily transferred, people and organisations have a limited range of things that they can do well'. The capabilities perspective is therefore about understanding what makes firms, and particularly successful firms, distinctive and self-perpetuating entities.

If a firm has access to a range of resources, or more precisely the services that those resources can provide and a base of knowledge on how uniquely those services can be combined to produce a valued output then there is a potential source of monopoly rent or economic surplus available to it.

One aspect of the capabilities perspective is therefore how to create and capture such surpluses and how to sustain the competitive advantage they provide. For example, imagine a company that for historical reasons has developed a particularly deep and unique understanding of some aspect of technology. Observant management may exploit this asset to move or expand the business into new areas and in the process deepen further the mastery of the technology. This is an advantage that competitors will not easily be able to replicate and therefore provides a foundation for long-term sustainable profit.

Professor Best's Approach

Michael Best is one of the foremost proponents of the capabilities view of the firm and its growth, so it is no surprise to find a close resonance between the theory outlined above and the theme of his report for the NIEC. At the heart of his analysis is a 'capability triad' of three key elements; an evolving business model embodying advances in business organisation, production capabilities and skill formation. All of these are represented in the conceptual idea of the 'entrepreneurial firm' whose dynamic is the pursuit of product led competition fuelled by its unique production capabilities. This is in stark contrast to what Best calls the old competition or business model where the firm competes on price with a heavy focus on cost minimisation and a reluctance to break new ground through product or process innovation. By pursuing new market opportunities through changes in its production capabilities, the entrepreneurial firm advances its technology, which further increases its opportunities for market development. Thus an entrepreneurial firm enjoys the dynamic

benefits of a virtuous circle linking production capabilities to advances in technology to new market opportunities to exploit and back to enhanced capabilities[4].

However, Professor Best goes beyond an analysis of the individual firm from a capabilities perspective to suggest how these entrepreneurial firms may network in such a way as to produce a cluster of growth. The essential argument here is that no firm can pursue every possible avenue of technical advance and new product development. Some possibilities have to be discarded. In isolation they will remain unexploited but within a structure where firms co-operate openly these opportunities need not be lost. This is the key according to Best to enhancing the growth potential of a region. Building on his earlier work Professor Best draws the analogy between the vertically integrated enterprise where all stages from conception to output are within the same hierarchical management structure and horizontal integration where firms may exploit their superior abilities in different phases of the production process so providing new opportunities for expansion of the base of entrepreneurial firms. This is what George Richardson who provided the modern terminology of the capability view referred to as "a dense network of co-operation and affiliation by which firms are inter-related"[5].

Professor Best goes on to expand at length on the components of this approach that he views as critical. The first of these is what he calls the 'production capabilities' of the firm which is a sort of shorthand for how the firm organises itself to optimise its production performance. There is no single model here and several examples are given to illustrate how different types of advances in production capability have been achieved by a range of companies.

The second vital component is the 'skill formation process' which those involved in economic development work will readily identify as the challenge of providing a sufficient pool of qualified people to sustain and expand the industrial base. Professor Best quotes the well-known examples of Silicon Valley in California and Route 128 in Massachusetts where virtuous circles linking the educational sector to high technology industry sprang up in the 1980s but he also emphasises the importance of embedding the skill formation process in the firm itself. This goes under a variety of descriptors such as the Japanese Kaizen approach or Total Quality Management. In all cases the key element is that the processes of thinking, planning and doing are integrated instead of being treated as separate and distinct activities. Quality is designed into the production process rather than being imposed through independent inspection.

Before turning to the issue of how the conceptual approach embodied in the capabilities perspective can be related to the Northern Ireland experience it is worthwhile pausing to consider its strengths and reflect also on its weaknesses.

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4 An early case study of a firm that is entrepreneurial in this sense was the experience of the Hercules Power Company, originally an explosives manufacturer that exploited its mastery of acetate technology to diversify and dominate new markets. Best provides many more recent examples.

5 Richardson, G.B. (1972) "The Organisation of Industry". *Economic Journal*, 82, pp.883-96.

The capabilities perspective is clearly a much more positive approach to understanding the internal working of the firm than its neo-classical counterpart. By approaching the issue from an entirely different perspective grounded in the nature of knowledge and how it relates to production rather than a focus on individual transactions and how best to co-ordinate them which characterises the traditional view of the firm, we gain new insights as to what makes firms perform. An entirely new research agenda has therefore been opened up through the capabilities approach.

On the other hand the theory does have weaknesses that should be acknowledged. Two in particular are troublesome. First, the capabilities perspective as it now stands has more of the characteristics of an explanatory device rather than a predictive tool. It is stronger in rationalising what we have observed to have happened in the real world than in allowing us to guess with reasonable confidence which firms will in the future be successful and which will not. The second and related issue is that compared to the neo-classical view the capabilities perspective has a weak foundation in microeconomics. This is reflected in the difficulty authors who use this perspective have in agreeing precisely what models are relevant and which parameters and variables are important. Because it is difficult to generalise or to model and estimate in this approach there tends to be a heavy reliance on the use of case studies of how particular firms have achieved success. Interesting though this is it is not a 'scientific' approach as the term is commonly understood and there is a significant risk in some instances of the capabilities view reducing to little more than a tautology.

Applying the Capabilities Perspective to Northern Ireland

A substantial part of Professor Best's report is concerned with assessing a sample of case studies drawn from Northern Ireland against the triad of business model (entrepreneurial firm)/ production capability/ skill formation. Overall his findings echo those of more conventional surveys. They do not make comfortable reading. Northern Ireland he concludes has a few companies that can be considered entrepreneurial in the sense of the capabilities perspective but not enough to make a critical impact on the regional growth dynamic. He finds some puzzling paradoxes such as the dearth of world-class software companies in a region with an excellent academic base in computer science and software engineering. On the other hand many of his findings are all too familiar, lack of investment in R&D, very limited networking among companies, an inward and risk averse business culture in many instances and an attachment to traditional and now obsolete working systems. In a particularly damning comment Professor Best describes an economy where high performance working systems are almost totally non-existent. This is despite the fact that the benefits they can confer have been known about for decades.

The situation is little better in the third leg of the triad, skills formation. A particularly worrying aspect of this component is the modest degree of interaction between the universities and firms. There are certainly some good examples where such co-operation is well embedded but Professor Best believes that this is the exception rather than the rule.

The Policy Context

For policy-makers the concluding part of Professor Best's study is the most challenging. In short he concludes that the policy environment which has grown up around the process of economic development in Northern Ireland has become part of the problem rather than the solution. At the risk of oversimplifying his analysis it may be described as a situation where policy to promote growth has been focused on the wrong drivers principally because the implicit business model it was based on was at variance with the realities of modern business. Subsidies mainly for capital investment have inadvertently, according to the Professor, created a dependant and reactive business culture in Northern Ireland.

This takes us back to the fundamental dichotomy between the basically neo-classical, market driven, view of the world discussed earlier in this paper and the capabilities and innovation perspective favoured by Professor Best. The present regime for industrial support in Northern Ireland is grounded more or less in the former with the justification for Government intervention resting on the idea that the region suffers from some forms of 'market failure' that prevent a coincidence between social and private returns. The latter believes that the internal dynamics of individual firms and especially firms that are 'entrepreneurial' in character and the networks that can be forged between them not necessarily through market transactions provide the true focus for policies to promote growth.

The final part of this paper looks at the policy prescriptions put forward by Professor Best as the way ahead.

In the move from theory to practice it is important to remember that industrial development policies do not operate in a vacuum. There is necessarily an administrative structure involved and in the public services this means rules, guidelines and procedures to protect public money and to maintain a consistent and fair approach to clients. Thus what may appear ideal in the abstract may have to stay in that dimension simply because it is not a practical proposition to implement it in the real world.

Policy Recommendations

Professor Best makes 10 recommendations to assist policy makers in taking forward the conclusion of the capabilities perspective.

1. Apply the principle of systems integration.
2. Concentrate on entrepreneurial firms.
3. Diffuse high performance work organisation.
4. Foster open networks.
5. Develop technology management capabilities.
6. Integrate technology management and skill formation.
7. Partner with firms bringing inward investment to advance capabilities.
8. Integrate mission-driven diffusion agencies with industrial policy goals.
9. Link visible and invisible colleges.
10. Administer the research, technology development, and innovation infrastructure.

Although some of the terminology in these proposals may not be familiar to those involved with economic development policy in Northern Ireland, many of the principles involved have entered the mainstream. The creation of INVEST NI for example was partly in response to the need to integrate more closely the activities of the various agencies sponsored by the Department of Enterprise, Trade and Investment (DETI).

Structurally this is a major step towards greater integration and the new organisation is committed to a more closely woven system of working with clients through its major internal Groups: Innovation and Capability Development; Entrepreneurship and Enterprise; and Business International; supported by an active Corporate Services Group.

Looking across the wider public service there has also been progress in co-ordinating the activities of those departments whose work infringes on the economic development process. The Programme for Government is one formal example of the desire to encourage cross departmental working between Government departments but other mechanisms such as the Economic Development Forum also have an important role to play in bringing together key players in the private and the public sector with a common interest in promoting further growth in the region.

Though current practice may not align precisely with Professor Best's proposals to concentrate on entrepreneurial firms and promoting open networks there is a conscious recognition that local companies need to be helped to raise their game to secure their future. One of the difficulties is of course avoiding the pitfalls which have often arisen when industrial assistance strays into the area of 'picking winners'. Experience has shown that this is not a productive exercise and policy is now firmly anchored in improving the climate for investment and innovation with tailored assistance where necessary for individual clients. On the issue of networks, policy to date has been considerably influenced by the idea of promoting 'clusters' advocated by Michael Porter. It is worth noting however, that the Porter thesis on the sources of competitive advantage does not sit comfortably with the capabilities and innovation approach. In fact it owes more to the neo-classical approach so there are clearly tensions in using the Porter cluster concept as the basis of networking and the open networking proposed by Professor Best.

In relation to the issues of diffusing high performance work systems, developing technology management capabilities and integrating these with skill functions there is clearly some way to go for most local companies and for a significant number the need to make a beginning.

These weaknesses have been acknowledged and a programme of work identified to address them reflected in the Economic Development Forum paper 'Working Together for a Stronger Economy' which was launched in 2002 by the then Minister for DETI, Sir Reg Empey. Among the ambitious targets set in that document are improvements in productivity (Gross Value Added per Employee) to exceed the UK average in manufacturing and reach 95% of the UK average for services by the year 2010 and to improve Research and Development expenditure per person employed from the 1999 level of 35% of the UK average to parity by 2010. Thus there is real evidence of the commitment by Government to shift the focus of the industrial development effort away from the traditional subsidisation of capital investment

towards the building of capabilities in knowledge creation and management in Northern Ireland businesses.

Finally, it is worth noting the role that Professor Best gives to inward investment as primarily for the enhancement of the growth dynamic within the context of the capabilities and innovation perspective. He explicitly warns against relying on inward investment solely as a vehicle for creating relatively efficiently a significant number of job opportunities. Within the confines of his theory and perhaps with a longer term perspective this may be a desirable situation but the reality is that policy makers have to take employment creation into account, especially in deprived areas, as one of the important issues driving economic development priorities. Striking the correct balance between enhancement of the capabilities of the industrial base and job creation is important but it is unlikely that the former will totally dominate decisions on inward investment for the foreseeable future.

Conclusion

Professor Best's monograph is an important landmark in the development of thinking on economic development in Northern Ireland. The capabilities and innovation perspective he brings to bear provides a fresh opportunity to examine the foundations of policy in this area in a new and productive way. This short paper has attempted to put this approach in the wider perspective of economic thinking on the nature of the firm and economic growth. In doing so the intention has been to bring out both the strength and weaknesses of this evolving strand of economic methodology.

In terms of the policy implications of Professor Best's work probably the most important issue is the degree to which the conclusions of the theory should and can be translated into effective policy instruments. The capabilities approach does not lend itself to simple add-ons to existing policy but rather the radical transformation of the policy framework to reflect a new and quite different economic paradigm. On this it must be said the jury is still out.

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00/4 A Response by the Northern Ireland Economic Council to:
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