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Paper Title:

- **'*Synergy*': Promoting Knowledge Transfer with Small to Medium Enterprises within a Framework of Social Inclusion & Community Outreach**

Abstract:

- This paper outlines the potential of new information technologies to Small to Medium Enterprises (SME), and describes the business and social fabric within which Northern Ireland's SMEs operate. The *Synergy* project seeks to introduce new and innovative technologies such as multimedia and the Internet to people, community organisations and SMEs in the socially deprived areas of West and North Belfast. *Synergy* is funded by the European Union (EU) Peace & Reconciliation programme and by university and industrial funding. The project provides facilities to enable: social inclusion; knowledge & technology transfer; and business incubation & development.

1. Introduction

Like their counterparts throughout the world, most Small to Medium Enterprises (SME) in Northern Ireland have only begun to explore the ramifications of the introduction of new Information Technologies (IT) such as the Internet, multimedia and intelligent systems to their businesses. Those organisations that are exploring the power of national and international networks for doing business - by gaining access to a world of information and knowledge too expensive and time-consuming to acquire by any other means, and by using electronic means to promote and to conduct their business - realise that the potential is enormous. In Northern Ireland, there are a few exemplar small organisations that do manage to turn their attention beyond the operational demands of daily business to use the emerging networking technologies to transform and improve themselves.

The potential for competitive advantage through these means exists, then, but the problem remains for small organisations of understanding the technology and beginning to implement it. This paper outlines an innovative project in a depressed area in inner city Belfast which is seeking to transfer these key emerging technologies to SMEs, and to provide training and consultancy so that these businesses can begin to see real benefit through the use of the information superhighway.

2. The Potential of New Technologies for SMEs

"The technological whirlwind sweeping us into the digital economy is relentless" [1]. The world of business and commerce is increasingly becoming global, the pace of change fuelled by relentless advances in computer technology. This is producing an

environment where knowledge and information are the basic building blocks of the economy, and in such a situation, every commercial enterprise is having to radically re-assess its mission and address the requirement for harnessing new technology for competitive advantage. Many organisations at this stage underestimate the extent to which the changing face of business will be transformed, with global networks challenging many inherent notions about national boundaries. The need to exchange information with customers, suppliers, and public sector and other organisations, and the means to do this easily, through digital networks, has the potential to completely change the way companies operate and, indeed, what constitutes a company [2]. The time is ripe for all businesses to begin to exploit the potential inherent in the new global, digital economy.

SMEs in particular have much to gain from the new Information Age. The role that such organisations have to play in the economy has been recognised, both by the European Union and the United States, and new emerging technologies make it both possible for existing SMEs to do business profitably, and to create new market opportunities for small start-up enterprises. It is vital that the take-up of these technologies is encouraged and developed as much as possible. Becoming interconnected through the use of the Internet is one vital element for SMEs.

Businesses are now more aware of the Internet than ever before, and are beginning to use the World Wide Web as a multimedia platform for a wide range of business functions. The numbers of people using the Internet, the phenomenal growth rate and the potential for electronic marketing and trade have all been very well documented. Commercial growth within the Internet is currently increasing at approximately 10 to

13% per month, and the commercial domain is beginning to dominate all other domains, with 42% of all domain names belonging to the commercial sector [3] The potential benefits of using the Internet for business purposes are particularly marked for SMEs, given the cost effectiveness of the functions available. The ways in which SMEs are beginning to use this new technology are outlined in the following sections.

2.1 Electronic Commerce

As security concerns are being addressed by advances in technology, more and more businesses are using the Internet to display their products and take electronic orders. A wide range of businesses now display their catalogues in electronic format, saving money on production costs and using the multimedia aspects of the technology to promote their products better. These are key benefits for SMEs, which have limited financial and other resources.

SME companies that are part of supply chains to large organisations, have been using Electronic Data Interchange (EDI) for many years. This arena may be revolutionised in coming years as the relationships between suppliers and receivers of goods are buffeted by the combined forces of the information superhighway and business process re-engineering. New alliances and trading partnerships are being formed, virtual companies now exist; and of particular benefit to SMEs, trade guilds and supplier pooling can give smaller companies a 'critical mass' that provides mutual empowerment for all involved parties. This is particularly true for SMEs that are reaching out across traditional boundaries, both geographical and political.

2.2 New Communication Capabilities

E-mail is fast becoming the communications medium for business. It is time-saving and cost-effective, leading to greater productivity and hence better profitability. It is a vital tool for today's SMEs. In addition, ISDN enables rapid exchange of design ideas in market areas ranging from engineering to high fashion, and facilitates video-conferencing between suppliers, parent organisations and new business leads.

2.3 Marketing

Many businesses are using the Internet to promote their services and products. SMEs benefit from this, in that they can stand up quite effectively in this medium against larger, more established organisations. In addition, a Web presence is an excellent, low-cost means of introducing your business to an international market. The multimedia capabilities now becoming common on the Internet make it ideal for impressive press releases, company reports, newsletters, advertising and other forms of promotion. Smaller companies can react more quickly than their larger competitors in revising their Internet presence - a competitive advantage.

2.4 Information Resources

The amount of information available through the Internet is staggering, and growing. Given the increasing knowledge and information, access to this wealth of information is vital for businesses wanting to establish competitive advantage. SMEs can access vital information on targeted international markets, including: demographics; market trends; competitors; and legislative practices.

3. SMEs in Northern Ireland

The return of relative normality to Northern Ireland since the paramilitary cease-fires in 1994 resulted in a record year for the economy during 1995, which outperformed most regions in the United Kingdom, with unemployment falling to the lowest point for fourteen years. Manufacturing exports, tourism and inward investment all improved substantially, as a direct result of the more peaceful political climate in the province.

Despite this, many areas of business life remain quite depressed, and unemployment overall is around 12%. Agribusiness, the single largest industry in northern Ireland grew only sluggishly; the construction industry continues to decline; certain sectors of the retail industry remain in a difficult situation; public sector employment is decreasing; and long term unemployment continue to be a serious problem [4].

Employment in Northern Ireland is concentrated in either the public sector, or within SMEs. Given the provincial nature of the country, there are very few large corporate employers, or headquarters of major organisations. In the private sector, most people are employed by organisations employing less than 250 people. The economy, then, is based very heavily on both SMEs and the public sector. SMEs have a key role to play in the economic regeneration process that is currently underway in Northern Ireland, and, given the difficult social circumstance from which we are emerging, these organisations need all the assistance that they can get, and very much need the benefits that new technologies can bring.

This is all the more so, when the ambitious targets of the private-sector led Northern Ireland Growth Challenge are considered. This respected initiative has developed a blueprint which proposes a series of measures to achieve a target of 5% per annum growth in the local economy by 1998 and 60,000 net new jobs by the year 2000.

The communities of west and north Belfast have been particularly badly affected by the twenty-five year long 'Troubles'. Here the figures for unemployment, long-term unemployment and all the other social indicators make very depressing reading, and the lack of both money and educational attainment produces very little entrepreneurial activity. It is, in short, an area badly in need of the creation of new, start-up SMEs and the revitalisation of existing businesses. In such a situation, new technology will be a key to economic regeneration. It is new technology allied to new, more efficient business processes that create new markets and invigorate existing markets that will create a vibrant business community which will help to transform these communities.

The Northern Irish development agency, the IDB, which seeks to promote inward investment to Northern Ireland, has been successful in attracting some major corporate employers in recent years. One notable example which is currently building a major new factory in West Belfast is Fujitsu, the Japanese information technology and telecommunications corporation. Such developments are very important and obviously very welcome, but this will not replace the economic regeneration potential of a thriving SME culture. It is towards the development of such a situation, that *Synergy* is directed. *Synergy* exists to help promote the use of new, emerging technologies by SMEs in this depressed area of Belfast, and to encourage new business start-ups in the high-tech area.

4. The *Synergy* Project

4.1 Background

Synergy is an innovative project undertaken by the University of Ulster and International Computer Limited, a large European systems integration company, with substantial financial assistance from the European Union. After the original cease-fire in Northern Ireland in 1994, the European Union decided to make available £380m to: "reinforce progress towards a peaceful and stable society and to promote reconciliation by increasing economic development and employment, promoting urban and rural regeneration, developing cross-border co-operation and extending social inclusion" [5]. This special 'Peace & Reconciliation' fund covers a number of areas, in an attempt to target those areas in Northern Ireland that have been most severely affected by the political problems and violence of the past 25 years. The money is designed to help promote cross-community initiatives, to help employment, to target vulnerable groups, especially young people, and to foster economic regeneration in problem areas.

Synergy is a direct result of the funding opportunity that arose from this EU initiative, and is a high-tech project which addresses many of the key priorities of the 'Peace & Reconciliation' fund. These include the problems of young people in disadvantaged situations, the need for local community access to emerging technologies, and the need to encourage economic activity based on these technologies in these communities. *Synergy* directs its activities at all these problems and is based in the west part of Belfast, which has been particularly badly affected by 'The Troubles'.

The people of West Belfast, and its young people in particular, have suffered greatly as a result of the Troubles, and the need for positive action, which is attested to by all the social indicators (low educational attainment, high rates of employment, poor levels of health and so on), is very evident. In such a situation, SMEs do business in an extremely disadvantageous environment. Unemployment is high, traditional business opportunities are scarce and the potential work force is under-educated and under-skilled. The self-esteem, aspirations and educational attainment of the young people of this part of the city are all disastrously low, and traditional methods have not solved the problems. In addition, the advent of the Information Age, where access to knowledge through electronic means becomes the route to economic regeneration, is expected to increase the distance between disadvantaged communities and mainstream society, thus exacerbating all the problems currently faced by West Belfast businesses and the wider community.

It is vital, therefore, to begin to harness the power of new technology (multimedia computing, knowledge & software engineering, the information superhighway, etc.) for the benefit of these communities. Indeed, so powerful are these technologies, that it may be possible, by taking strong and positive action to provide access, training and creating a technology culture, to give such businesses and communities a real chance to 'catch up' and play a positive role in society as a whole. To do so is in the interest of everyone: the communities themselves, government and also the private sector at large, which depends on stable, wealth-creating communities for its future. An opportunity exists to make use of the technology in two ways - for the purposes of social inclusion and for economic regeneration.

4.2 Objectives of *Synergy*

Synergy has two overall objectives. Firstly, to exploit the opportunities and address the needs arising from the peace process in order to boost economic growth and advance social and economic regeneration in West and North Belfast. This is done by taking innovative business activities which we believe will lead to the further development of existing businesses, the creation of new businesses and the creation of sustainable employment. Secondly, to promote the social inclusion of those who are at the margins of social & economic life, by addressing the specific difficulties faced by young people and other vulnerable groups (including ex-prisoners) in West and North Belfast.

The specific needs and opportunities that *Synergy* is attempting to address are outlined in the following paragraphs.

4.2.1 Community Access

Access to the emerging Information Age is, and will become increasingly, important for every community. It is vital that those communities which are already disadvantaged are not left behind in terms of access to the information superhighway and the knowledge and information services it provides. There is a need, then, to provide young people, businesses of every size and community organisations with the training and skills, and the access they require.

4.2.2 Knowledge & Technology Transfer

The transfer of newly emerging technologies associated with the Information Age - networking, the Internet, intranets, multimedia computing and knowledge engineering

- to businesses in West Belfast is of vital importance to their wealth and job creation potential, and hence to economic regeneration in the area. A successful model for such IT-related technology transfer has already been successfully pioneered at the University of Ulster since 1992 through NIKEL[1], and there is a strong requirement for a such a function working specifically in West Belfast, concentrating on the technologies just mentioned.

4.2.3 Business Incubation & Development

Furthermore, the currently emerging technologies of multimedia computing and the information superhighway offer significant opportunities for start-up businesses, given the global nature of Internet. The development of a skills and business base centred on these technologies can play an important role in economic regeneration in West Belfast. What is required to encourage participation in the new opportunities offered by the technology, is a business incubation unit, with access to the skills, research and resources of *Synergy*.

4.2.4 Young Peoples' Needs

A number of important community-based IT initiatives already existed in West Belfast, of which notable has been the success of a venture called Bytes for Belfast. Bytes consists of a number of drop-in centres sited in economically marginalised areas of Belfast which give disadvantaged young people the opportunity to engage creatively with new technology, and has been successful in both building self-confidence in young people and in spawning small start-up IT enterprises. There is a

[1] NIKEL (Northern Ireland Knowledge Engineering Laboratory) is a joint venture between the University of Ulster and ICL. It is a knowledge & technology transfer organisation which focuses on helping SMEs exploit advanced information technologies. For the past six years it has been working

need, however, to enhance the capabilities of such initiatives for reaching young people, by providing supporting services in the form of software development facilities and access to state-of-the-art IT facilities, supported by an organisation with the latest skills and resources, which can be used to provide new training and assistance. In addition, there is a need to provide a progression route for young people whose imagination has been fired by the use of IT in the Bytes centres and elsewhere, and who need further stimulation, challenge and an opportunity to progress in professional work in the IT arena. Given current educational attainment levels, this is not possible currently.

4.2.5 Community Outreach

For a variety of reasons the traditional education system has not worked for some young people in this area, and levels of educational attainment are very low. Studies from the United States and elsewhere indicate that innovative uses of new technology for teaching purposes can have a beneficial effect on under-achieving children, and the opportunity exists to begin using multimedia software along with a variety of distance-learning functions, including video-conferencing to help provide remedial education. The University of Ulster's Community Outreach Programme, along with its Virtual Community College seeks to create an infrastructure whereby technology can be used in this way. A major opportunity, then, exists to develop appropriate educational software for these initiatives , all of which will be of major benefit to the young people of West Belfast.

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with industrial organisations throughout the whole of Northern Ireland to help them take advantage of newly emerging information technologies.

The problem areas, then, that *Synergy* is addressing, are the economic problems resulting from a low level of business activity, and the social problems of marginalisation and alienation, particularly of young people. These are both areas that can, in some measure, be tackled using newly emerging technologies, and, indeed, the technology itself enables both these problems to be addressed simultaneously.

4.3 Activities of *Synergy*

Synergy can be conceptualised as a building with three floors (see Figure 1). The first floor is directed towards social inclusion objectives; the second floor is concerned with technology transfer to SMEs and the top floor is a small business in its own right, developing multimedia software for export markets.

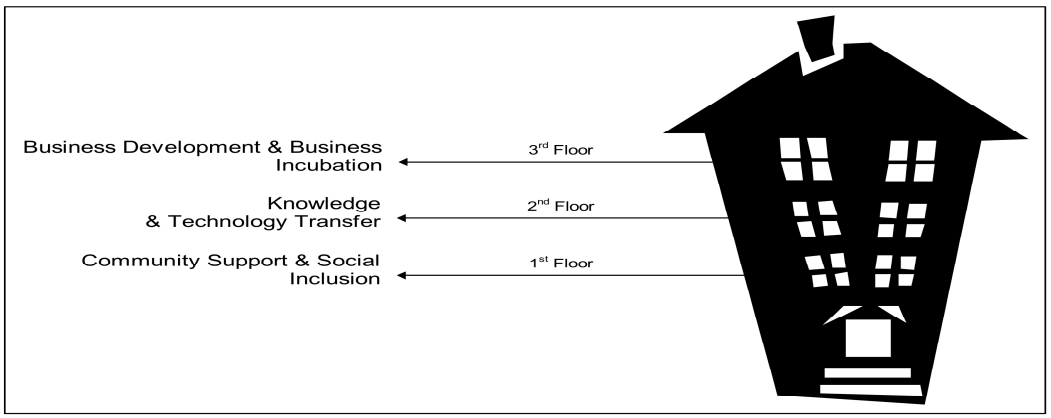

Figure 1. The *Synergy* Concept

The idea is that while each floor houses a discrete activity, nevertheless each contributes to the activity of the others and creates a unique synergy which enhances the effect of each activity domain.

4.3.1 First Floor: Social Inclusion

The social inclusion activities are two-fold. Firstly, to support a variety of already existing community-based IT projects, which seek to introduce new technology to disadvantaged groups such as under-educated young people, ex-prisoners, women and the unemployed. These organisations, scattered throughout Belfast, are experiencing various degrees of success, but all cite the lack of suitable multimedia software as an inhibiting factor in their ability to cater for their clients. *Synergy* works in partnership with these community organisations, helping them to define their software requirements and developing applications to meet those requirements. Much of this software is directed towards engaging the attention of disadvantaged young people and providing multimedia educational software which addresses literacy and numeracy issues in this group, as well as a variety of interpersonal and social skills, including drug-awareness and employability skills.

Secondly, *Synergy* is addressing the issue of social inclusion through the establishment of a Cyberskills Centre in West Belfast, which gives SMEs, young people and the community access to the information superhighway, to assist community development and regeneration. This is based on a successful grass roots model pioneered in Britain over the past three years in inner city areas, where local communities and business have been empowered through giving them access to, and awareness of, the information superhighway. These *Learning Networks*, know as 'Cyberskills' are "regarded internationally as a potential blueprint for the empowerment of individuals and communities through the use of information superhighways…[they] aim to raise awareness of the availability and value of information, providing practical experience of superhighways technology" [6].

Recently Richard Civille, Director of the Washington Office of the Centre for Civic Networking said that the Cyberskills model was "unique and already doing what is otherwise only being talked about in the United States", and referred to it as "an important new model for sustainable community and local economic development for industrialised nations of the world". The West Belfast Cyberskills centre, then, offers workshops dealing with such technologies as the Internet, electronic commerce, knowledge & software engineering, networking, video-conferencing and multimedia computing to a variety of groups and can cater for up to 400 people a month. With state-of-the-art computers and on-line services, the Cyberskills workshops provide the training tools and technical know-how that enables direct access for the surrounding business and wider community to the millions of other users, information providers and electronic libraries all over the world. The Cyberskills centre offers a vital service for what is a very disadvantaged community, where typically access to and awareness of the emerging high technologies are lagging severely behind the social norm. Through the availability of the training and consultancy services in *Synergy*, small businesses are beginning to be exposed to the potential and the opportunity of information superhighways, in a way that is empowering them to be more competitive and to see new business opportunities.

4.3.2 Second Floor: Knowledge & Technology Transfer

This facet of *Synergy* is directed at a programme for knowledge & technology transfer to SMEs in West and North Belfast. This has built upon the successful track record of NIKEL working with industry and commerce in West Belfast over the past few years, and is designed to move some of the near-to-market research that is going on in the University out into the business community. The following areas have been targeted: knowledge engineering in a variety of domains, including management information

and decision support systems; and multimedia and information superhighway applications for training and marketing.

Contact with companies is initiated in a number of ways. Firstly many organisations will simply come out of curiosity to a Cyberskills workshop to learn something about new technology. Through this, interest and awareness is raised and the opportunity arises for more detailed discussion about how this sort of technology could be employed within the organisation. Very often, this leads to a properly defined project designed to introduce new technology into the company. Depending on how innovative the project is, it may attract funding from one of a number of government sponsorship schemes. For the larger SMEs in the area, *Synergy* has embarked on a marketing programme, whereby each one is contacted and detailed discussions held at a senior management level to see how the company might benefit from some of the new technologies.

Major technology transfer projects have been undertaken with a range of local businesses. One example is Boxmore Healthcare Packaging, a manufacturing SME employing around 200 people. Assistance has included a TCS[2] programme to implement new Computer Integrated Manufacturing (CIM) techniques and also with the use of multimedia and Internet techniques for sales and marketing presentation purposes; Another company, Finlay Packaging plc, has used the services of NIKEL to gain expertise in advanced techniques to solve shop-floor scheduling problems.

[2] Teaching Company Scheme (TCS) programmes are one of the UK government's most successful funding mechanisms. In TCS programmes, a recent graduate (or graduates) works with academic assistance on a company project. Typically, each programme lasts two years. The scheme is being targeted increasingly at SMEs.

4.3.3 Third Floor: Business Incubation & Development

Through this aspect of *Synergy*'s activities, the organisation is seeking to exploit commercially the development of high quality, world-class multimedia-based training and learning support materials in a number of important educational spheres, including colleges, schools and business. With a small team of highly experienced authors, multimedia software developers, television and graphic communication personnel, *Synergy* has a unique combination of resources to develop innovative, education support material.

Synergy's multimedia business activities are directed towards: supporting low and under achievers; developing multimedia educational products; and providing business incubation facilities. One important focus is the needs of low and under achievers both in education and training, and those who have opted out of the system with few, if any qualifications. A principal target is to provide technology-based support for the development of literacy and numeracy skills in this group. In addition, wider topics related to the interpersonal and social skills needed to enhance employability are also being addressed. There are considerable opportunities for the development of advanced multimedia material for the support for an international market in educational material. The skills and resources of *Synergy* along with the experience gained from working with low achievers in disadvantaged communities, and the facility of marketing through ICL (a large European Systems organisation and one of *Synergy's* sponsors) provides *Synergy* with the opportunity to make a significant contribution, on a commercial basis, to this market sector. The business incubation work carried out on this level of *Synergy* builds directly on the activities being pursued throughout the rest of the organisation, and seeks to make commercial

advantage of the social inclusion and technology transfer functions. In addition, through providing employment and conducting a successful, high-tech business operation in an economically depressed area, we are contributing directly to the economic regeneration of the area.

4.4 *Synergy* at Work

Synergy operates on the principal of the complementarity of all its three principal dimensions: social inclusion; knowledge & technology transfer; and business incubation & development.

The foci of *Synergy* are: the development of IT for disadvantaged young people; the apprenticeship scheme for young people; the community-directed Cyberskills centre; the knowledge & technology transfer functions; the commercial exploitation function; and the business incubation scheme. These are all related, in that they are focused on the exploitation of new emerging technologies, and synergistic benefits will develop between all these foci if they exist within the one organisation.

The apprenticeship scheme can be used to its maximum benefit if both the Cyberskills centre and the business development function are available for apprentices to train and work. The technology transfer function benefits from the Cyberskills centre which is attracting local business clientele and offering basic training which provides a springboard for skills transfer in more advanced areas. The business development function is dependent upon the social inclusion work with Bytes for Belfast and other centres, since it seeks to commercially exploit in export markets the software developed here. The business incubation service relies on ideas and technologies

emerging from both the social inclusion software development function and the technology transfer section. The knowledge & technology transfer area within *Synergy* provides needed intellectual resources to both the business incubation & development area and the social inclusion software development area. Only a structure which encompasses all these functions offers maximum benefit for the community at large and the business community.

5. Conclusions

The business imperative and the competitive opportunities that exist for SMEs to begin to exploit new, emerging technologies are clear, giving the development of the global, digital economy. SMEs must be encouraged to transform their processes and organisations and to participate fully in the new business world based on information and knowledge.

Synergy represents an important and innovative initiative in a depressed are of inner city Belfast to do just this. Through a partnership between a private sector IT company and the University of Ulster, producing a unique combination of activities and functions, it seeks to promote social inclusion and economic regeneration. Early indications are that the approach is successful, and that it will provide a model for other cities within Europe and the US to begin tackling difficult social and economic problems and promoting healthy SME growth, especially in deprived urban areas.

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