

1998 Award Winner

David J. Storey's Contributions to Entrepreneurship and Small Business Research¹

Hans Landström*

"Dr Storey has also been very active and successful in reaching both academic and non-academic audiences. This is evident from the fact that he is, by far, the most oft-cited small business researcher in Europe. As a well deserved consequence, his research contributions have had a major impact on the quality, credibility and policy relevance of the entire field of small business research."

The aim of this essay is to present the research of David J. Storey, the 1998 FSF-NUTEK Award Winner. Only research within the area of the Award will be presented. The presentation starts off with an introduction to the Winner's career and continues with an overview of the most important research contributions.

Career in Brief

At the age of 21 David Storey took his degree in economics at Hull University in 1968. For four years after his graduation, he worked at the Department of Trade and Industry and then for a local authority in Buckinghamshire. In 1974 he obtained a position as a research fellow at the Department of Economics at Newcastle University, and at the same time he studied for a PhD on a part time basis – a thesis on environmental economics – which was completed in 1978.

After his contract with Newcastle expired, he got a job at the Centre for Environmental Studies, an independent research institute in London, but David's work was in Middlesbrough on Tees-

side (about 50 miles from Newcastle) where he studied economic development in the area. In 1981 David Storey went back to Newcastle University, this time to the Centre of Urban and Regional Development Studies, where he stayed for almost six years. In 1987 David Storey received an offer from the Centre for Small and Medium-sized Enterprises at Warwick Business School. The Centre was run by Ian Watson – Watson died a couple of years later and David Storey assumed responsibility for managing the centre – a position that he still maintained in the early 2000s.

David Storey is perhaps the most prominent exponent of small business research in Great Britain. This research is strongly policy oriented. Storey's research consists of robust, high-quality empirical work, which includes detailed literature reviews, a carefully conceived methodology, in-depth reflection and interesting conclusions. In particular, his critical reviews of earlier research deserve attention along with his ability to synthesize knowledge and to make complex phenomena understandable. In this way, Storey has provided a more balanced picture of the importance of small businesses for societal development as well as making small business research more credible.

Although he is a harsh critic of prevailing small business policy, he has exerted an enormous influence on national policymakers in European countries, both directly and through bodies such as the EU and the OECD.

David Storey first became interested in job creation, especially in less prosperous regions such as northern England. His production primarily consists of books. The next section presents three books that demonstrate his interest in job creation and the policy implications that may be deduced from these studies. David Storey was also the co-ordinator of a major research program in the UK in the late 1980s and early 1990s, the ESRC Small Business Initiative. The program generated a host of interesting results concerning the development possibilities of small businesses. Storey summarised these re-

¹ This presentation covers David J. Storey's main contributions to entrepreneurship and small business research until around the year 2004.

* Hans Landström is Professor at the Department of Business Administration, School of Economics and Management, Lund University. He has been on the Prize Committee since the inception of the Prize. He is the author of the book *Pioneers in Entrepreneurship and Small Business Research*, New York: Springer, 2005.

sults in his book *Understanding the Small Business Sector*, of which a summary is presented. In addition to these studies, David Storey has also taken an interest in several research areas. His research on new firm formation, job creation and regional development as well as his research on new technology-based firms and formal training in small firms will be presented in the last three sections.

Research Contributions

Job Creation and Regional Development

In this subsection three early books from Storey's research on job creation and regional development will be presented: *Entrepreneurship and the New Firm* from 1982, *Job Generation and Labour Market Change* together with Steven Johnson in 1987, and *The Performance of Small Firms* written together with Kevin Keasey, Robert Watson and Pooran Wynarczyk, also published in 1987.

Entrepreneurship and the New Firm (1982)

The book *Entrepreneurship and the New Firm* was published in 1982. This was a period in Britain when small firms had undergone a remarkable metamorphosis. From the late 1960s the number of small firms had increased, and this trend occurred at a time when the British government was convinced that large corporations were of paramount importance and that economies of scale were the basis for economic development. The Bolton-Report of 1971 predicted an increase and stabilization of the small business sector based on higher income levels in society, leading to a demand for more "one-off" goods, which small firms were most suited to supply. This prediction came true, and during the 1970s small firms increased their share of total output and employment in Britain.

In *Entrepreneurship and the New Firm*, Storey critically reviewed the evidence justifying of a growing small business sector and concluded that the role of small firms in development is more complex than previously assumed. He further argued that large firms still create the majority of new jobs (as well as being responsible for the majority of job losses) and although small manufacturing firms produce an increasing proportion of the total manufacturing output, this is due to a decline in demand for the products of large firms rather than increased demand for the products of small firms. In addition, the majority of new firms disappear within a few years of establishment, and most small firms exhibit a low level of growth. However, this does not detract from the fact that a handful of firms show rapid growth and will be major producers and employers in the future. It may well be that the distinction between small and large firms is less meaningful than that between old and new firms – the poor economic development in Britain since World War II is perhaps more attributable to the relatively low birth rate of new firms than to the existing stock of small firms. There is considerable evidence of the contribution of new firms to the local, regional and national economy. However, robust knowledge is hampered by the lack of a recognized definition of small firms and by the absence of databases on non-manufacturing small firms.

Part II of the book is devoted to a comprehensive multi-disciplinary examination of existing theories on new firm formation. It includes a historical review of entrepreneurship in economic thinking as well as non-economic aspects (such as the role of class divisions and education, family background and entrepreneurial personality,

etc.).

Part III presents an empirical study of 301 new firms in the county of Cleveland in north-east England. The firms included all sectors of private industry with the exception of retailing. The aim was to describe the process of new firm formation as well as the individuals behind the establishment of new firms. The results can be summarized as follows:

- The analysis of personal characteristics of the entrepreneurs showed differing results when linked to the performance of the firm. Storey concluded that personal characteristics seem to have little influence upon the firm's performance.
- The entrepreneurs showed a reluctance to make use of assisting agencies – an entrepreneur is likely to cherish his/her personal independence and ability to solve his/her own problems.
- Banks and finance houses were important external sources of finance for new firms. However, clearing banks do not seem to be particularly adept at avoiding investments in loss-making companies nor are they overrepresented amongst the companies making the highest rate of profit.
- New firms make little contribution to job creation in the short term, and it is a small percentage of small firms that provides most of the jobs.

What policy implications can be drawn from the study? At a regional level, Storey developed an index of latent entrepreneurship based on factors such as the percentage of small firms in the region, the population in managerial groupings, the population with high level degrees, availability of capital in the region, percentage of the population in low entry barrier industries, and regional income distribution. It was shown that regions in Britain differed greatly in their entrepreneurial index ratings, with the south-east of England having the highest rating and the northern regions the lowest score. Storey argued that prosperous regions are more responsive to favorable conditions for new firm formation than less prosperous regions. Thus, policies designed to assist new and small firms are likely to be most successful in the most prosperous regions, and conversely, regions currently experiencing high unemployment are likely to derive very little benefit from such policies (this argument is further elaborated on in Storey and Johnson 1987).

At the government level, many policies were introduced during the 1970s to stimulate the small business sector in Britain. Storey argues that there has been a tendency to uncritically accept these policies in the hope that they may provide some benefits – small firms will create new jobs and new wealth. Storey argues that this "euphoric" view of the potential contribution of the small business sector is neither supported by fact nor have the various policies always succeeded in their aim of stimulating this sector. Storey questions the tendency among policy makers at that time to positively discriminate in favor of the small business sector.

Job Generation and Labor Market Change (1987)

The 1970s could be characterized as a period of "social turmoil" that included several structural changes in society: (i) oil crises that triggered or coincided with a number of major developments in the world economy, (ii) a change in attitude among young people, large firms were regarded as boring and bureaucratic, while smaller companies were increasingly regarded as dynamic and as providing a more creative environment, and (iii) the late 1970s and early 1980s also saw major political changes with the coming to power of Ro-

nald Reagan and Margaret Thatcher – both elected on the manifesto of reducing the power of the state and providing greater opportunities for the individual to be responsible for themselves.

In the book *Job Generation and Labour Market Change* (1987), David Storey and Steven Johnson attempted to describe the changes that had occurred in the labor market since the early 1970s, but also to find explanations to these changes. The main contribution of the book is, however, the methodological discussions; Storey and Johnson's critical review of the data and analyses made in previous studies on small firms and job creation provide a more credible and balanced interpretation of the conclusions of previous studies. The main conclusions of the book can be summarized as follows:

- Storey and Johnson provided a comprehensive critique of Birch's study *The Job Generation Process* (1979) and concluded that Birch overestimated the contribution made by small firms to job creation. Replications of Birch's study were made in many countries, and the results indicated that (i) the scale of net job creation by small firms is not as significant as that indicated by Birch, and (ii) it is a relatively small number of new and expanding small firms that create a substantial proportion of the new jobs.

- There is no simple or single explanation for the relative growth of small firms in the economy. Storey and Johnson used three different geographic areas as examples: Birmingham (UK), Boston (USA), and Bologna (Italy). In each of these areas, small firms had become more important but for different reasons. In Bologna the growth of the small business sector stemmed from the system of locating small firms in industrial districts, where they specialized in high-quality products, co-ordinated by merchants with international linkages. In Boston the growth of the small business sector was due to the wealth created by high technology-based firms, stimulated by defense expenditure and the concentration of higher-education institutions, which led to a massive increase in consumer-based demand, which in turn tended to be satisfied by small firms. In Birmingham small firms were "forced" to become more important because of the decline or restructuring of larger firms. In advanced economies there will be elements of the above three models, and it must be borne in mind that policy implications are very different for each of them.

According to Storey and Johnson, the lesson to be learned is that it appears not to be the number of small firms – the quantity of small firms – that determines the performance of the economy – it is the quality of these firms that is crucial, and relatively few firms in an economy are the prime determinants of success.

The Performance of Small Firms (1987)

Interest in small businesses increased during the 1980s, and Margaret Thatcher introduced a range of measures to stimulate the small business sector in Britain. Some of these initiatives, such as the Enterprise Allowance Scheme, were designed to raise the rate of new business formation, while other measures primarily targeted existing small businesses. These initiatives aimed at creating employment and were based on certain fundamental propositions, such as: (i) that the small business sector would thrive if government regulation was reduced, therefore small firms should be exempted from some taxes and regulations; (ii) that small firms are disadvantaged compared to large firms, for example regarding finance and knowledge and that public policy should compensate for these disadvantages; (iii) that there was an ideological justification for the small business sec-

tor; and (iv) that an attempt should be made to bring small business or self-employment to the attention of those who perhaps never considered this option. The book *The Performance of Small Firms* (1987), co-authored with Kevin Keasey, Robert Watson and Pooran Wynarczyk, is primarily intended for policy makers and aims to provide a better insight into the process of job creation in smaller businesses, and the conclusions could be summarized as follows:

Small Businesses Job Creation. The book is based on 636 independent single-plant manufacturing companies in Northern England with less than 200 employees. From the results it is obvious that small firms are far from being a scaled down version of a big publicly listed company, indicating that the large body of empirical studies based upon performance of listed companies will be of little relevance to policy makers.

A major thrust of British Government policy toward existing small business was to reduce their operational costs and in this way increase their profitability in the hope of creating more jobs. Policy was especially directed at the level of "trading profit" in small firms. However, Storey could find only modest evidence of an association between high trading profits and increased job creation. Instead, those firms that had higher "retained profits" appeared to create more jobs. Thus, public policy should pay more attention to small business profit retention than trade profit. In addition, young firms were not only more profitable but grew faster than older firms.

It was also clear that only a handful of firms contributed to employment growth, or as Storey et al. formulated it (p. 152): "In the broadest terms one-third of the jobs are found in less than 4 per cent of those businesses which start to trade." In the light of this fact it would appear to be an attractive strategy to concentrate public resources on the fast growing firms. However, arguments against such a policy are that the public sector has a poor record of "picking winners" – an increase in the total number of new businesses would presumably lead to an increase in the number of winners, and it may be unjust to direct public resources to a small group of firms while excluding the majority. However, Storey's conclusion was that it seems unlikely that "across the board" assistance to all small firms will be effective in terms of new job creation, and he presented a justification for a more selective small business policy – toward those small businesses that have the potential and determination to grow.

Failure prediction. One important characteristic of small firms is their high failure rates; there is an almost tenfold probability of failure compared to large firms. The high failure rate of small businesses makes it important to try to gain an understanding of small business failures in order to develop prediction models that will make it technically possible to identify indicators of impending failure.

Storey and his colleagues conducted a series of statistical analyses. Three indices of potential failure were examined: profitability, liquidity and gearing. The assumption was that firms more likely to fail would exhibit lower profitability and lower liquidity, but be more highly geared. In the univariate analysis, all these assumptions seemed to be supported. However, the ratios showed a high variance, indicating that they did not constitute a consistently effective prediction measure. To overcome these problems, multiple discriminant analysis was employed, and in this case the "best" prediction models included "cash flow" and "asset structure ratios" rather than liquidity and profitability measures. However, in the logit analysis, the importance of profitability and liquidity was re-emphasized,

whereas gearing did not appear to be a powerful factor. Throughout the analyses, two other factors seemed to be important, but difficult to isolate, namely the age of the business and the existence of possible differences in failure rates between sectors. In the study, some qualitative factors were included, and the analysis showed that small firm failure was positively correlated with fewer directors, “qualified” last year’s account by auditors, longer account submission lags, and having loans secured by the banks.

Understanding the Small Business Sector (1994)

Understanding the Small Business Sector published in 1994 has its origin in the decision by the Economic and Social Research Council (ESRC) to fund a research program on small businesses. In 1987 David Storey was appointed Program Co-ordinator for the research program. The program was structured in three main research centers, each of which would focus upon a major theme: the center at Kingston Polytechnic (today Kingston University) led by James Curran looked at the role of small firms in the service sector, the center at the University of Cambridge under the leadership of Alan Hughes investigated the economic contribution of small firms, while the center at the Institute of Manpower Studies at Sussex University with John Atkinson as director focussed on small firms and the labor market. In addition, 13 separate research projects on a variety of topics were commissioned. The research was performed between 1989 and 1992. A number of articles were published based on the research program, and three books on key topics were edited: urban and rural issues (Curran and Storey 1992), employment (Atkinson and Storey 1993), and finance (Hughes and Storey 1994).

The book *Understanding the Small Business Sector* is by far David Storey’s most frequently cited work. In the book he synthesizes a large amount of research in the area, not least the projects that formed part of the ESRC Small Business Initiative research program. Based on these syntheses, David Storey draws conclusions from a policy perspective. A brief summary of the main conclusions within the different themes covered by the book are the following:

- Small business development in the UK (chapter 2). Storey concluded that small businesses are important for economic development and that their share of employment and output in manufacturing had risen in the UK since the end of the 1960s. The rise in self-employment in the UK at that time could be attributed to a combination of a higher rate of unemployment, a reduction in the real level of unemployment benefit, government schemes, a lower rate of self-employment than most other comparable countries, and technological changes, especially the increased role of information in the economy.

- Changes in the stock of firms – birth, death and growth (chapters 3–5). The studies showed that new firms had a major influence on the stock of businesses in an economy but that their formation rates varied significantly from one sector to another, from one time period to another, and from one country or region to another. These variations appear to be due to expected profitability and the presence of entry barriers. Thus, these are the key factors for understanding sectoral differences in new firm formation. Similarly, profitability, measured by the level of aggregate demand in the economy, is a key factor for explaining spatial and time series differences in new firm formation, but access to capital and the real interest rate on capital also appear to be important explanatory variables.

Death of firms is an important characteristic of the small business sector – young firms are more likely to fail than old ones, and very small firms are more likely to fail than their larger counterparts. The most powerful influence on the survival of young firms seems to be their ability to grow within a short period of time after start up. The characteristics of the entrepreneur as an individual (e.g. age, gender, education), on the other hand, do not appear to be related to business performance (except for “education”). This indicates that neither the individuals themselves nor other bodies have a clear understanding of which individuals will succeed in business. Only by being an entrepreneur and observing performance can success be identified.

Rapidly growing firms constitute a very small proportion of the small business population – most small firms do not want to grow – but these high-growth firms make a major contribution to job creation. There seem to be three main factors influencing small firm growth: (i) the background/resources of the entrepreneur(s) (e.g. motivation, education and management team), (ii) the nature of the firm itself (e.g. smaller and younger firms grow more quickly, and there are sectorial and locational differences), and (iii) strategic decisions taken by the management (e.g. willingness to share ownership and the ability to identify niches), although the components need to be appropriately combined in order to achieve growth, which indicates the difficulty involved. On the other hand, constraints that hinder growth generally relate to finance, labor market issues and markets.

- Employment and finance (chapters 6 and 7). Storey concluded that small firms in the US as well as the UK seem to create jobs at a faster rate than larger firms, even though this contribution is nowhere near as high as originally estimated by David Birch. Moreover, small firms were also more consistent creators of jobs – they seemed less influenced by macroeconomic conditions – irrespective of the trade cycle. However, the quality of jobs was lower in small firms compared to larger firms in terms of, for example, wages, fringe benefits, and training. On the other hand, there seems to be a considerable degree of workplace harmony in smaller firms.

The banks are the major external source of finance for many small firms, but the relationship between banks and small firms has also been the target of a lot of criticism. The conclusion arrived at by Storey was that the problems stem from (i) the nature of the contract; the loan contract involves the bank incurring full downside risk but a fixed upside gain, and (ii) the cost structure of the financial institutions – the relative costs of small amounts of money are high.

The ability of small firms to create employment and the difficulties involved in obtaining access to finance were also two issues usually addressed in government policy. Storey examines government policy toward small firms in chapter 8. Several conclusions are drawn. First, the magnitude of the small business sector in many countries is such that it is no longer possible to discuss economic policy without recognizing the role of small firms in the economy. Second, whilst there is a wide range of policy initiatives to assist small firms, policies have often been introduced on a piecemeal basis, in response to pressure from the small firm lobby or to changes in the macro-economy. Governments need to formulate a coherent policy toward the small business sector, including the range of public policies that currently exist, clearly specifying the objectives and targets of each policy in measurable terms, thus making it possible

to judge whether or not the policies are effective (this reasoning is further elaborated on in Storey 2000).

New Firm Formation, Job Creation and Regional Development

David Storey's interest in new firm formation, job creation and regional development has been sustained over a long period of time, issues that he discussed not only in books but also in a large number of articles. As we have seen, his interest in these types of issues dates back to David Birch's study published in 1979. However, Storey was in many respects critical of Birch's results, which criticism concerned not only methodology but also the relevance of the results to the UK context (e.g., Storey 1981, and Storey and Johnson 1986; 1987; 1990).

David Storey's own research in this area was initially based on the studies that he carried out in the north east of England in the 1980s. In several articles Storey has shown that regional labor market conditions are of great importance when explaining new firm formation rate between regions. For example:

- In earlier research there was an assumption about a relationship between the number of entrants and perceived future profits, but this relationship has seldom been tested. From the empirical studies on Northern England and the East Midlands reported in Storey and Jones (1987), little evidence could be found to support this assumption. Instead, the study showed that a major factor influencing the rate of new firm formation was the rate of job losses in the region, to which self-employment seemed the only alternative. The relationship between unemployment and firm formation can be explained in different ways (Storey 1991). According to the "pull" hypothesis, it could be argued that new firm formation takes place when an individual perceives an opportunity to enter a market, and this is more likely to happen when demand is high. The converse hypothesis, the "push" hypothesis, suggests that depressed market conditions and high unemployment are more likely to lead to the establishment of new firms – even if the expected income from self-employment is low, it is higher than the expected income from unemployment benefit. There may be a third hypothesis suggesting that the relationship between unemployment and business formation is non-linear – at a low level of unemployment increased job losses will lead to an increase in the rate of new firm formation, but once a "critical" level of unemployment is reached, further increases in unemployment result in a reduction in new firm formation, due for example to less business opportunities in highly depressed market situations.

- The relationship between firm size and performance is also poorly understood and has mainly been examined on populations of relatively large firms. It was assumed that firm growth is independent of firm size, the so-called Gibrat's Law, but Evans (1987) argued that when applied to the small firm sector, Gibrat's Law no longer holds, since growth and size appear to be negatively correlated. In order to explain the performance of the small business sector, it is necessary to introduce both the age of the firm and number of plants as, for example, growth decreases with age in younger firms, but increases with age in older firms. Similar results were obtained by Storey, Keasey, Watson and Wyncarczyk (1987). Storey (1989) further elaborated on these results, and he explored some of the reasons underlying the differences in performance between small and large

firms. He observed that many small business owners of fast growing firms had an ownership interest in at least one other business and that growth was positively associated with the proportion of trading profits which were retained within the business. From these observations Storey speculated that the objective of small business owners is to maximise the time-discounted stream of earnings from a portfolio of business interests. This could explain the fact that owners of more than one business are more likely to have both fast growing firms and companies likely to fail. The portfolio of companies is constantly adjusted through the formation of new firms and the closure of others. However, it also highlights the level of analysis required in the studies of small businesses – statistical data tend to be collected at firm or establishment level whereas the most appropriate unit of analysis seems to be the entrepreneur.

David Storey did not only take an interest in regional development in northern England. Together with Paul Reynolds and Paul Westhead, he received an assignment from the European Commission (DG XXIII) to co-ordinate a cross-national comparison of new firm formation rates in different countries, including France, Germany, Italy, Sweden, the UK and the US (Reynolds, Storey and Westhead 1994a, 1994b). The objective of the comparison was to explain why regions in some countries have higher new firm formation rates than others and to discuss what contributions public policy can make to raise the formation rates in a region. The underlying assumption was that new firm formation rates are affected by seven determinants that have a profound influence on new firm formation in a region: (i) demand growth, (ii) urbanization/agglomeration, (iii) unemployment, (iv) personal/household wealth, (v) proportion of small firms and sectoral specialization, (vi) political ethos, and (vii) government spending/policies. The results showed that the average new firm birth rates are roughly similar across countries and that regional variations in firm formation rates are also similar within all countries – the most fertile regions have annual new firm birth rates that are two to four times higher than the least fertile regions.

How can these differences be explained? Looking at the underlying determinants affecting the establishment of new firms, the explanations appear to be rather uniform across countries, indicating that three determinants have a definite and positive effect on firm birth rates, namely growth in demand (population growth and income growth), a population of businesses dominated by small firms, and a heavily urbanized context reflecting the advantage of agglomeration.

These results lead to the question: What can governments do to encourage firm births? According to Reynolds, Storey and Westhead (1994b), efforts to stimulate firm births can be divided into (i) general efforts to enhance all businesses to function more effectively, i.e. building an infrastructure, and (ii) more direct efforts related to the entrepreneurial process, i.e. reducing the transaction costs for small firms. However, from a regional perspective, these national policies to stimulate firm births seem to favor more prosperous and socially and economically well-endowed regions, that is, non-selective policies with no built in regional targeting may only serve to increase regional differences (see also Storey 1982).

In addition, Storey questions policies aimed at promoting firm births. Actions to stimulate new firm formation may be less effective in terms of job creation than devoting resources to facilitate the growth of those firms expected to follow a high growth trajectory –

the firms that, over time, are responsible for the majority of jobs, sales and exports. This argument is further elaborated on in Storey (1993), where he argues that the impact of public policies promoting start-ups is diffuse – a high proportion of new firms fail in their early years and job creation among surviving firms is heavily concentrated on a small percentage. Policy should therefore target businesses with growth potential.

New Technology-based Firms

Ever since the Arthur D. Little Consulting Group's (Little 1977) path-breaking report comparing new technology-based firms in the US with those in the UK and Germany, the interest in new technology-based firms (NTBFs) has remained high among policy makers in many European countries including the UK. David Storey, together with co-authors such as Bruce Tether and Paul Westhead, has in a number of articles discussed the importance of new technology-based firms.

Evolution of Industries – An Analytical Framework

The most well-known model for explaining the evolution of industries is the life cycle model, which states that an industry is expected to pass through a standard evolutionary path over time. The life cycle model has been powerful in many ways, not least among policy-makers discussing the role of new technology-based firms in industrial renewal. However, the generalizability of the life cycle model has been questioned, and it has been argued that it is best suited to mass markets and does not hold for industries lacking rich opportunities for both product and process innovation. It can also be argued that the model provides an over-optimistic interpretation of the role of NTBFs in industrial regeneration – it predicts that some new firms in high-technology industries will grow into larger firms in the future, leading to the conclusion that the ability of an economy to produce a large number of new technology-based firms is crucial for industrial renewal and future industrial strength.

Together with Bruce Tether, David Storey presented an alternative framework which provides a means for “mapping” the development of industries. The framework (Tether and Storey 1998; see also Tether and Storey 1997) comprises four types of industry that are characterized by a two-dimensional change over time: the number of units (enterprises or establishments) active in the industry, and the level of employment. The framework relates to the “life cycle” model of industrial evolution.

Tether and Storey tested the framework on a variety of “high technology” sectors and also compared industrial changes between countries. Their conclusions were that the high technology service sectors (computer services, technical services, and R&D services) in Europe almost universally followed an expansion trend during the 1980s that entailed growth in both number of units and employment. In contrast, the high technology manufacturing sector (computers and office equipment, electronics, pharmaceuticals, and instruments) in many European countries was characterized by growth in the number of units but contraction in terms of employment. This indicates an increase in the number of small units and a decrease in the number of large units. Given that the high technology sector is expected to be important for future job creation, the findings are highly interesting. The existence of such industries may be less favorable for the role of small firms as a source of economic re-

juvenation.

The Performance of High-technology Firms

As indicated above, for a long time there has been an increasing concern among policy-makers about the creation of new technology-based firms – technological innovations seem to play a key role in the revitalization of the economy. However, we have limited knowledge of the factors associated with the survival of such firms. Westhead, Storey and Cowling (1995; see also Storey and Strange 1992) conducted a longitudinal study in order to examine the survival of high-technology based firms from 1986 to 1992 and to identify factors that influence the survival over time of high-tech firms based in UK Science Parks in 1986. In total, 284 face-to-face interviews were conducted, 183 of which were Science Park firms. In 1990 a follow-up study was conducted on the Science Parks firms from the original study. Of the 183 Science Park firms in 1986, only 31 firms could be regarded as failures (defined as businesses no longer identifiable as trading).

The study by Westhead et al. (1995) is to a large degree based on the research by Arnold Cooper, especially Cooper and Gimeno Gascon (1992) and Cooper (1993). The results indicated that few variables seem to explain survival or non-survival of technology-based firms. Although as many as 69 variables – all derived from earlier research – were included in the analysis, only 13 were found to be significantly associated with survival/non-survival. However, most interestingly, among variables associated with survival/non-survival, none of the technology-related variables were significant, which suggests that factors influencing survival/non-survival of technology-based firms are no different from factors influencing other firms.

In order to further elaborate on these results, and especially to explore the importance of informal and formal linkages made by technology-based firms to higher education institutions (HEIs), Westhead and Storey (1995) made an analysis based on the original database complemented by a new sample of 110 firms located in Science Parks in the UK. The results showed that, in 1986, many of the Science Parks were relatively new and that the linkage between industry and HEI were weaker than anticipated. However, firms located in a Science Park were significantly more likely to have a link with a local HEI than off-Park firms, and more interestingly, technology-based firms with a link to a local HEI, irrespective of location, were significantly more likely to survive. The conclusion is that the co-operation between technology-based firms and a local HEI seems to be important for the survival of the firm, and therefore, Science Park managers and HEI industrial liaison officers have an important role in encouraging and stimulating more formal linkages between technology-based firms and HEIs over time.

How can technology-based firms be supported? Based on an analysis of public policy measures to support new technology-based firms within the EU, Storey and Tether (1998) concluded that in most countries the support available to new technology based firms is identical to that given to other types of firms. They argued that new technology-based firms are “special”: (i) their returns from research and development are likely to be long term and uncertain and, therefore, it is more difficult to make an accurate assessment of their success, but (ii) technology-based firms may also have a short “window of opportunity”. Policy makers must recognize these spe-

cial qualities and requirements of new technology-based firms, and policies should focus exclusively upon these firms.

Management Training in Small Firms

A third theme in David Storey's research that he discusses in his book *Understanding the Small Business Sector* in 1994 concerns the issue of formal management training in small firms. It is a well known fact that small firms are much less likely than larger firms to provide their employees and managers with formal training. In Storey and Westhead (1997) two explanations were given as to why the provision of training is lower in small firms compared to large ones:

- The “ignorance” explanation, i.e., the small firm owner is assumed to underestimate the benefits to the business of providing training for managers and the workforce, and therefore government needs to persuade business owners that more training would enhance firm performance.

- The “market” explanation, i.e., small firms provide less training, not because of a lack of awareness of the benefits, but rather due to the fact that small firm owners face higher training costs and reap less benefits compared to large firms.

Among policy-makers there seems to be a widespread acceptance of the ignorance explanation, implying a market failure, which provides justification for public subsidies. However, there are rational arguments as well as empirical indications against the ignorance explanation, which favor a market explanation – thus making the case for governmental subsidies much weaker.

In Storey and Westhead (1997) the authors provide some explanations as to why small firms are less likely than large firms to provide formal training for managers. From a demand perspective there are several reasons: (i) management training results in a long rather than a short term benefit, and the smaller the firm the less likely it is to survive long enough to take advantage of the benefits derived of management training, (ii) small firms are more likely to be at risk of losing managers with formal management training, (iii) there is no internal labor market for individuals with managerial aspirations employed by small firms, and (iv) smaller firms have higher training costs per employee because they cannot spread fixed costs over a larger number of personnel. But there are also arguments from a supply perspective, such as that it is more time consuming and costly to train providers to offer courses for small firms. In addition, the heterogeneity of small firms renders the unit cost of supplying training high in cases where the training provider wants to offer customized courses that fulfill the needs of each individual firm. In conclusion, there is evidence of less managerial training among small firms, but this does not necessarily indicate an ignorance-based market imperfection.

The importance of formal training in small firms is often based on the assumption that there is a broadly linear relationship between management training and firm performance. However, Storey and Westhead (1994) and Westhead and Storey (1996) fail to identify robust studies that have demonstrated a clear relationship between the provision of management training and enhanced small firm performance. Moreover, in a study of medium-sized firms in the UK, Storey (2002) found no direct link between training and firm performance but instead that both “attitudes to” and “practices of” education, and training and development variables were positively linked to firm performance. Thus, the conclusion seems to be that

there are rational arguments against, as well as weak empirical evidence in favor of, the ignorance explanation for the low level of formal management training in small firms. This calls into question the existing public programs for small firms, which tend to be based on the ignorance argument.

What small firm training policies can be found in different countries? In Storey (2004) a comparison was made between six OECD countries (Canada, Finland, Germany, Japan, the US and the UK) regarding their formal small firm training policies. The results show clear cross-country differences, reflecting national differences in approach to learning:

- The US makes the greatest use of independent private sector training providers. The implicit assumption is that entrepreneurship is “endemic” within the culture and that concern about business failure is almost non-existent, i.e., those who are sufficiently entrepreneurial will start a business, after which they will learn from their own mistakes. In many cases they may fail, but will start again.

- The opposite approach was found in Germany, where the chambers of commerce and industry associations play a key role in formal training for small firms.

- The provision of formal training for small firms by state organizations takes place primarily in Japan, which has a long history of public management training for small firms through government-backed organizations like the Small and Medium Enterprise Agency (SMEA) and the Japanese Small Business Corporation (JSBC). A similar situation exists in Finland with the Employment and Economic Development Centers, and to some extent in Canada, which has more than 400 Canada Small Business Service Centers.

Governments tend to favor formal training because it leads to a qualification that is recognized by all employers, and it is easier for government to monitor funding and to ensure that training is actually being provided. On the other hand, small firms do not favor formal training, but are more likely than larger firms to provide the greater part of their training in the form of an “informal” package. Thus, the challenge for government is to consider the US approach, assuming that experience is the most effective learning method for small firms, with perhaps some of it acquired through failure, which also implies another attitude toward business failures and bankruptcy.

References

- Atkinson, John and David J. Storey, eds. (1993), *Employment, the Small Firm and the Labour Market*. London: Routledge.
- Cooper, Arnold C. (1993), "Challenges in Predicting New Firm Performance." *Journal of Business Venturing* 8(3), 241–253.
- Curran, James and _____, eds. (1992), *Small Firms in Urban and Rural Locations*. London: Routledge.
- DTI (1991), *Evaluation of the Consultancy Initiatives – Third Stage: Report by Segal Quince Wicksteed Limited*. London: The Stationary Office.
- DTI (1998), *Small Business Action Update*. London: Department of Trade and Industry.
- Evans, David S. (1987), "The Relationship between Firm Growth, Size and Age: Estimates for 100 Manufacturing Industries." *Journal of Industrial Economics* 35(4), 567–582.
- Heckman, James (1976), "The Common Structure of Statistical Models of Truncation, Sample Selection and Limited Dependent Variables and a Simple Estimator for Such Models." *Annals of Economic and Social Measurement* 5(4), 475–492.
- Hughes, Alan and _____, eds. (1994), *Finance and the Small Firm*. London: Routledge.
- Little, Arthur D. (1977), *New Technology-Based Firms in the United Kingdom and the Federal Republic of Germany*. London: Wilton House.
- Reynolds, Paul D., _____ and Paul Westhead (1994a), "Cross-national Comparisons of the Variation in New Firm Formation Rates: An Editorial Overview." *Regional Studies* 28(4), 343–346.
- Reynolds, Paul D., _____ and Paul Westhead (1994b), "Cross-national Comparisons of the Variation in New Firm Formation Rates." *Regional Studies* 28(4), 443–456.
- Storey, David J. (1982), *Entrepreneurship and the New Firm*. London: Routledge.
- _____ (1989), "Firm Performance and Size: Explanations from the Small Firm Sector." *Small Business Economics* 1(3), 175–180.
- _____ (1991), "The Birth of New Firms – Does Unemployment Matter? A Review of the Evidence." *Small Business Economics* 3(3), 167–178.
- _____ (1993), "Should We Abandon Support to Start-up Businesses?" In Francis Chittenden, Martyn R. Robertson and David Watkins, eds., *Small Firms: Recession and Recovery*. London: Chapman, 15–26.
- _____ (1994), *Understanding the Small Business Sector*. London: Routledge.
- _____ (2000), "Six Steps to Heaven: Evaluating the Impact of Public Policies to Support Small Businesses in Developed Economies." In Donald L. Sexton and Hans Landström, eds., *The Blackwell Handbook of Entrepreneurship*. Oxford: Blackwell.
- _____ (2002), "Education, Training and Development Policies and Practices in Medium-sized Companies in the UK: Do They Really Influence Firm Performance?" *Omega* 30(4), 249–264.
- _____ (2004), "Exploring the Link, among Small Firms, between Management Training and Firm Performance: A Comparison between the UK and Other OECD Countries." *International Journal of Human Resource Management* 15(1), 112–130.
- _____ and Steven Johnson (1987), *Job Generation and Labour Market Change*. Basingstoke, Hants: Macmillan.
- _____ and Steven Johnson (1986), "Job Generation in Britain: A Review of Recent Studies." *International Small Business Journal* 4(4), 29–46.
- _____ and Steven Johnson (1987), "Regional Variations in Entrepreneurship in the U.K." *Scottish Journal of Political Economy* 34(2), 161–173.
- _____ and Steven Johnson (1990), "A Review of Small Business Employment Data Bases in the United Kingdom." *Small Business Economics* 2, 279–299.
- _____ and Andrew M. Jones (1987), "New Firm Formation – A Labour Market Approach to Industrial Entry." *Scottish Journal of Political Economy* 34(1), 260–274.
- _____, Kevin Keasey, Robert Watson and Pooran Wynarczyk (1987), *The Performance of Small Firms. Profits, Jobs and Failures*. London: Croom Helm.
- _____ and Arnold Strange (1992), "Where Are They Now? Some Changes in Firms Located on UK Science Parks in 1986." *New Technology, Work and Employment* 7, 15–28.
- _____ and Bruce S. Tether (1998), "New Technology-based Firms in the European Union: An Introduction." *Research Policy* 26(9), 933–946.
- _____ and Paul Westhead (1994) *Management Development in Small and Medium-sized Enterprises with Growth Potential*. London: CBI.
- _____ and Paul Westhead (1997), "Management Training in Small Firms – A Case of Market Failure?" *Human Resource Management Journal* 7(2), 61–71.
- Tether, Bruce S. and _____ (1997), "Smaller Firms and the Evolution of Technology-based Sectors in Europe." In Anthony Arundel, ed., *Innovation Measurement and Policies: Conference Proceedings*. Luxembourg: Office for Official Publications of the European Communities, 197–203.
- Tether, Bruce S. and _____ (1998), "Smaller Firms and Europe's High Technology Sectors: a Framework For Analysis and Some Statistical Evidence." *Research Policy* 26(9), 947–971.
- Westhead, Paul and _____ (1995), "Links between Higher Education Institutions and High-technology Firms?" *Omega* 23(4), 345–360.
- Westhead, Paul and _____ (1996), "Management Training and Small-firm Performance: Why Is the Link so Weak?" *International Small Business Journal* 14(4), 13–24.
- Westhead, Paul, _____ and Marc Cowling (1995), "An Exploratory Analysis of the Factors Associated with the Survival of Independent High-technology Firms in Great Britain." In Francis Chittenden, Martyn R. Robertson and Ian Marshall, eds., *Small Firms: Partnership for Growth*. London: Paul Chapman, 63–99.