ENTREPRENEURSHIP AND INNOVATION: SOME RESEARCH FINDINGS

John A. Murray*

This paper reports on some of the findings of the research work in progress at The Enterprise Centre, Faculty of Commerce, UCD. A series of small scale research projects have been completed on aspects of entrepreneurship and innovation in Ireland which may help to illuminate the related organisational, strategic and social processes at work in the community. It is hoped that the emerging results will stimulate further research and allow us to move on from exploratory inquiry to more conclusive research with immediate decision making implications at both industrial policy level and at individual enterprise level.

The Entrepreneurial Process

New venture formation is often conceptualised as a life-cycle or organisational growth process. Collins and Moore's (1970) pioneering study of the formation of new manufacturing businesses in Michigan suggested a process beginning with the family circumstances and life experiences of the entrepreneur and progressing through venture projection, launch, "through the knothole", and consolidation stages. Variations on this stages of development theme are many and they have an obvious conceptual convenience. In addition, they have the attraction of linking with the stages of corporate development models such as those reviewed by Starbuck (1965, 1971) and Child and Keiser, (1978). The empirical validity of such a concept would therefore seem to merit examination.

O'Donnell and Murray's (1982) study of eight new ventures suggest that at a very general level the stages model has descriptive validity but that the time scale of the process varies widely from one new venture to another and that we do not find a simple linear progress from stage to stage but rather continuous feedback processes and both "leapfrogging" of stages and recycling through stages.

This study investigated in depth, using a case research design, the formation and development of eight Irish owned new ventures with some significant technological content. The companies were chosen to reflect different stages of development: some had not commenced trading and

* The author is Lecturer in The Enterprise Centre and Department of Marketing at University College, Dublin.

IBAR — Journal of Irish Business and Administrative Research, Volume 5, Number 1, April 1983, pp 20-30.

some were experiencing the upheavals of expansion while others were in the process of going out of business within several years of start-up. The companies studied were in different industry sectors ranging from energy to softwear development. To the extent that a stages-of-development pattern could be observed it was best described by the process illustrated in Figure 1.

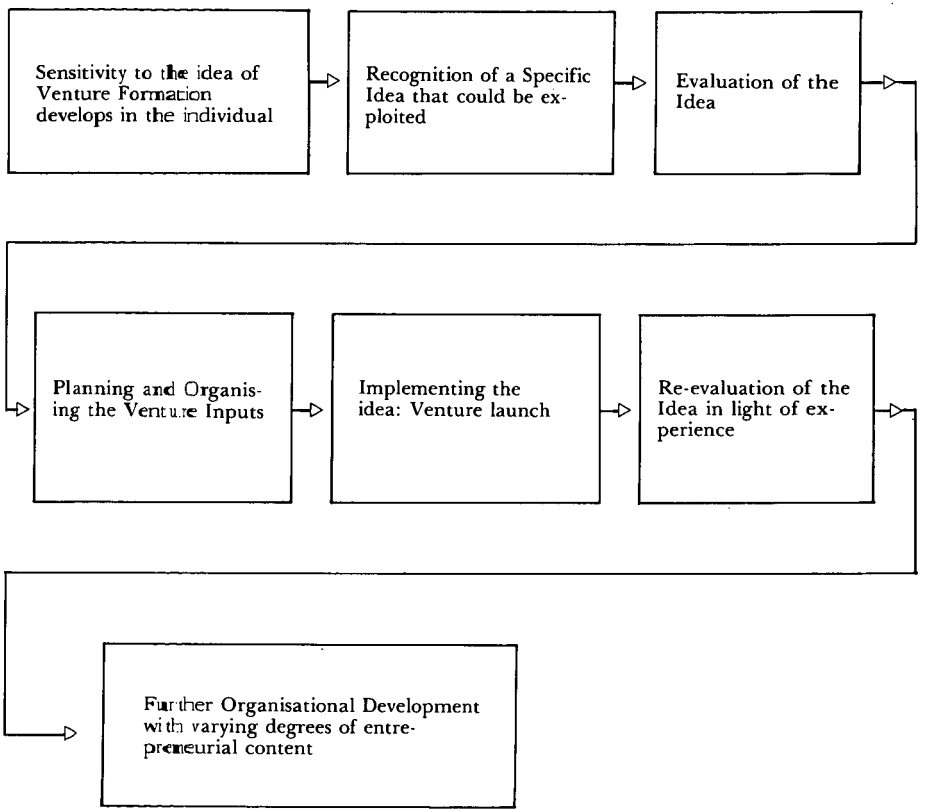

Figure 1. *Stages in the New Venture Formation Process*

(*Source:* O'Donnell & Murray, 1982).

The entrepreneurs who went through this process were characteristically triggered into entrepreneurial behaviour by frustrations related to their previous employment and by perception of an opportunity they thought they could exploit. They were typically from secure, happy, family backgrounds and were well educated relative to the norm for Ireland. A particularly distinctive feature of the group, reflected in much of our continuing research, was the extent to which they had lived and worked abroad accumulating experience of business and accumulating market and technical knowledge. Most of them claimed the companies they had worked for were vibrant, active companies, and they all knew someone

who had started a new venture before their own was started. They therefore knew that the idea of venture formation was a credible and realistic one.

The "incubation" period from the initial thoughts about forming a new venture to launching one varied from six years to six months and most of them investigated several ideas for self-employment. The venture ideas themselves were almost exclusively based on work experience — a finding common to almost all studies of new venture formation, and especially associated with successful new enterprise. An important policy implication of this factor is that a community must have a stock of companies in which potential entrepreneurs may accumulate experience of an industry, its technology and its markets before they can successfully "spin-off" to form new ventures in the same or related product areas. A problem faced in Ireland is that the existing stock of companies in which such experience may be gained is limited and, furthermore, contains many firms in mature and declining industries. Spin-off ventures from this latter group, unless they are very innovative, can do no more than speed up sectoral decline or make the maturity stage more painful for all competitors — especially if significant barriers to exit exist. The most immediate mechanism for bypassing such a structural barrier to enterprise development is clearly the one illustrated by the group studied: they gained experience abroad. There may, after all, be a very positive side to emigration — provided that the emigrant uses it to learn and is committed to returning and exploiting that learning.

When ideas for a new venture are evaluated, the research suggests two alternative patterns of behaviour. Some entrepreneurs handle evaluation on the basis of an opportunistic "try-it-and-see" approach, making limited and relatively low-risk commitments and adjusting behaviour as they learn from reality. A second group uses a complex, analytical approach during a pre-launch period and after the launch. The second strategy is associated with projects that require larger initial investment, relatively fixed commitment to markets and technology, and in which the strategic "degrees of freedom" are far more limited than in the ventures adopting the first approach. This feature of the formation processes observed suggests two kinds of entry strategy: the low risk, low commitment, highly flexible and small size entry, versus the high risk, high commitment, large size with limited strategic flexibility entry route. In the first case, the organisation learns through a process of low-risk experimentation; in the second, it must invest heavily in pre-launch research to minimise market and technical uncertainty before making a relatively inflexible strategic commitment of resources on the launch of the venture.

During the planning and organising phase the state infrastructure is a

major feature of the process — especially the development of relationships with IDA or SFADCO. Our data suggests that the relationship can be quite a finely balanced one, and while it is universally helpful and supportive, it can run the risk of creating a dependency relationship. Parent-child rôles can all too easily emerge, if the entrepreneur is not mature enough in his innovative behaviour, or if the support agency is too directive in its guidance. Dependency, if it develops, is a destructive phenomenon, because the new venture above all needs to exhibit great independence in analysis and decision-making if it is to develop in a healthy manner.

As noted by many other researchers such as Cooper [Cooper, 1973] and Susbauer [Susbauer, 1972] the decision about location of the new venture usually leads to a location close to the entrepreneur's home. This brings the advantages of access to, and trust by, local bankers, suppliers, customers, accountants and so on, and to the extent that the new venture is a spin-off from an established local enterprise, bankers and other support agents are familiar with the industry. The most unsuccessful firm in our group located eighty miles from the entrepreneur's home and had major problems establishing credibility with the banking sector.

Imperfections in the planning of the launch were characteristically in the market assessment and marketing planning areas, in manpower planning, and in the creation of control systems to monitor early launch problems. While all the ventures entered very competitive markets, very little formal research was undertaken. This reflected initial beliefs by the entrepreneurs that their industry experience equipped them with adequate market knowledge. Their later reflections on the company formation process highlighted the naïveté of their original assumptions.

The initial launch phase, as observed in the companies studied, was characterised by a period of approximately eighteen months of immense stress and quite considerable chaos. The intensity of this experience varied with the two types of entry strategy noted earlier. Those ventures launched on a "try-it-and-see" basis experienced considerable chaos but the stress was lessened by the flexibility to manoeuvre quickly and by low breakeven requirements. Those who entered with less strategic flexibility combined with large investment commitments seldom achieved breakeven before nine months and experienced great stress as they learned the reality of their markets and technology with only limited room for strategic change. To the extent that their pre-launch analysis was inadequate or incomplete both stress and chaos were at threateningly high levels. Entrepreneurs typically felt isolated during this period and it is interesting to note that the board of directors was never used as a mechanism to access outside expertise, advice and support.

Re-evaluation of the new venture typically took place between eighteen months and two years after initial launch and the decision-making style of the entrepreneur appears to change at this time from one of intense personal identification with strategies and a very black or white view of outcomes, to a more detached, objective, pragmatic approach to identifying alternative courses of action and choosing between them. This period would appear to be a very appropriate time for intervention by support agencies interested in assisting the development of new ventures because the entrepreneur is receptive and, having survived this far, has left behind the peak period of stress and chaos during which it is very difficult to avail of advisory and support services even when he wishes to do so.

Fundamental decisions about the future evolution of the firm are also made both explicitly and implicitly during this phase. One of the companies sat back and began to grow fat; five made decisions that virtually redefined their business; two entered new markets with new products; two changed their production process and one grew by acquisition. Entrepreneurship is not a life-long characteristic of an organization. Some cease to be entrepreneurial quickly and may even be threatened by this change quite early in their life if they compete in a dynamic industry. Others to varying degrees retain a long-term entrepreneurial bias in searching out new opportunities, adopting new technology, entering new markets and developing innovative products. Entrepreneurial strategy must be a conscious concern for the management of an enterprise throughout its life.

The generalised process model of venture formation is therefore seen as a convenient descriptive tool and has clear advantages in a management training and development context because of its ability to sub-divide an enormously complex process into manageable units of analysis that highlight tasks to be undertaken and the required steps in analysis and decision-making. Both the O'Donnell and Murray research [O'Donnell & Murray, 1982] and two studies of individual new ventures [Morrow, 1982; Reynolds, 1982] highlight the total inadequacy of such models as predictive tools, however. This is not surprising, given the experience of most other researchers of organisational and strategic behaviour with life-cycle theories and models.

Entrepreneurs

The research discussed above yielded some insights on the characteristics of individual entrepreneurs. However, the existing Irish work on entrepreneurs [Fogarty, 1973; Rothery, 1977; Ahmed, 1977; Hawkes, 1981; O'Connor, 1983] is best complemented by some research undertaken by McManus [McManus, 1982] on the founders of new ventures formed with the assistance of the Industrial Development Authority's Enterprise Development Programme. The Enterprise Development Programme pro-

vides grant aid and other assistance for first-time manufacturing ventures promoted by individuals with professional management experience. Persons likely to qualify include engineers, accountants, scientists and business school graduates with a solid managerial track record. This type of entrepreneur might be expected to behave in the manner of the technical entrepreneur discussed by Murray [Murray, 1982] and whose emergence is of considerable importance to industrial development in Ireland.

Started in 1978, the Enterprise Development Programme had approved 73 projects by the end of 1980. Fifty-four of these ventures were included in the study, as the remaining nineteen had either ceased business, or had not commenced trading at the time of the research study. A structured mail questionnaire was used to collect data and a response rate of 82% was achieved.

The profile of the typical entrepreneur that emerges (see Table 1) from the data is that of a male, on average 40.5 years old, married, with an average of 3.4 children. Forty per cent had self-employed or farming fathers, and 37% were first-born children in families with an average of 5.1 children. Academically, their level of achievement is high — 78% having a primary degree, 23% a master's and 13% a Ph.D. Their academic qualifications are predominantly in engineering and science. An intersting commonality with the research discussed already, is that 74% of the group had overseas work experience. Considerable experience had been gained by the group who held, on average, 3.8 jobs prior to becoming entrepreneurs, mainly in line management positions in manufacturing industry.

Table 1: *Profile of Enterprise Development Programme Entrepreneurs*

- Male
- On Average: — 40.5 years of age
  - — married with 3.4 children
  - — held 3.8 jobs prior to becoming an entrepreneur, usually in line management in manufacturing industry
  - — "incubated" by Irish or U.S. subsidiary company in medium technology and in a mature industry
  - — "pulled" into entrepreneurship by opportunities, not "pushed" by frustration/redundancy etc.
- 40% had self-employed/farming fathers
- 37% were first-born children in families with average size of 5.1 children
- 78% have Primary Degree (mostly Engineering & Science)
  23% have Masters Degree
  13% have Doctoral Degree
- 74% had overseas work experience
- 77% of ventures are team ventures not single entrepreneurs
- Over 50% of ventures are not related to the last employer organisation by products or markets

The entrepreneurs came to independent entrepreneurship predominantly from Irish companies, and subsidiaries of U.S. companies, and 42%

had held a position of Managing Director, or General Manager, while 51% had held positions of either Sales, Marketing or Production Manager. Most of the employing organisations were in medium technology businesses in industries predominantly at mature stages in their life cycle and in highly competitive markets. The reported motivations for leaving employment to create a new venture was most commonly the perception of an opportunity and a desire for independence. These "pull" factors far outweigh "push" factors such as frustration, or being made redundant.

The organisations established by the entrepreneurs studied were predominantly (77%) team ventures rather than single-promoter ventures, and over 50% were based on different markets and different technology from those of the firm with which the entrepreneurs had previously worked. This finding contrasts with most North American research on technical entrepreneurship, which typically shows a very strong linkage between new venture and "incubator" firm – that is, the employing firm with which the entrepreneur worked before starting on his own. The degree of innovation involved in the new ventures was low when measured in terms of product or process innovation, and products were predominantly of a "medium" technological content. The innovaveness of the new ventures was measured on a scale ranging from a venture based on a copy of an existing product to one based on a totally new product and process. When measured on this scale of innovativeness, exporting ventures were more innovative than non-exporting firms.

These findings have many commonalities with the U.S. work on technical entrepreneurship [Cooper, 1973; Roberts, 1968] and differ most notably in the apparent absence of any significant incubator organisation phenomenon in Ireland. This may well reflect the early stage of structural evolution at which Irish industry finds itself. The emergence of significant incubator organisations spinning-off new technology-based ventures is a process that will not be observed until the industrial base contains a core of knowledge-intensive native ventures of sufficient size and competing in sufficiently dynamic markets to trigger the spin-off process in any appreciable volume.

Innovation

A study of innovativeness in the engineering sector was completed in September 1982 by Lennox (1982) based on a sample of the 380 firms located in County Dublin and listed in the I.I.R.S. 1981 Engineering Directory. A random sample of 35 firms was selected, and 30 personal interviews using a structured questionnaire were completed.

Fifty-three per cent of these companies were found to have introduced at least one new product in the previous five years, and 88% of these had introduced products totally new to the firm. Thirty per cent of the in-

novators had introduced more than one new product in the previous five years.

New product ideas came predominantly from customers (33% ideas) and from the chief executive (27%). The impact of "market pull" factors is clearly illustrated, and the findings are in line with earlier work by McGarvey and Healy (1982), and by Jackson (1977). For process innovations, production and technical personnel dominated the idea generation process.

The evidence of the research suggests a low regard for the value of conducting basic market research and market testing, despite the respondents' perception of market uncertainty as the key uncertainty in the innovation process! Strategically, however, the pattern of behaviour was very appropriate, as the innovations implemented typically moved the firms into markets characterised by less price competition and fewer competitors than their previous markets. In general, the product-innovating companies were younger, larger (employment), growing faster (in employment) and more export-oriented when compared with non-innovators.

Success is a difficult concept to measure specifically. In this study, firms were asked to compare the outcome of their innovative efforts with their expectations prior to the implementation of their new product or process. For new products, expectations were exceeded in four out of every five cases whereas new process expectations were universally exceeded. Taking either area, the level of perceived success is remarkably high. Factors associated with the more successful new products were:

- a clear technical solution known from the start
- an estimate made of market size
- products with unique features
- launched into markets where there were relatively few new product introductions
- launched into markets not dominated by price competition

These findings have interesting common features with the extensive research by Cooper on industrial new product success and failure [Cooper, 1979].

Overall, these findings present an encouraging picture of considerable innovative activity in the engineering sector, although the level of innovativeness involved is hardly radical. However, radical innovation is the exception rather than the norm in any industrial sector in any economy and the fact that innovation was a feature of firms across the many sub-sectors in the engineering industry (mechanical, electro-mechanical, electrical, electronic, metal fabrication and job-shopping) is encouraging.

Industry Structure and Entrepreneurial Opportunity

Three studies were completed using industry analysis tools to identify industry structure and competitive dynamics, first at an international level, and then at an Irish level of analysis, in order to investigate the potential for new Irish ventures to compete in electronics, biotechnology and forestry products [Landy, 1982; Clarke, 1982; O'Connor, 1982]. The emphasis in these studies, (part of one of which is reported elsewhere in this issue of IBAR – Landy, 1983) was to evaluate the benefit of using an industry analysis approach to identifying strategic opportunities for new ventures to enter selected industries and to generate feasible strategic positions and entry strategies for such ventures. The results have been encouraging, although Clarke's study of the biotechnology industry illustrates very clearly how difficult it is to prescribe strategy for an individual new entrant into an embryonic or early-growth phase industry. Clarke's attempt to utilise industry life-cycle analysis illustrates this immense complexity very well, as she documents the emergence of a shake-out phase in the global biotechnology industry even before the industry enters the rapid growth phase that normally precedes shake-out in industry evolution.

The single greatest commonality among the findings of these three studies is the emphasis placed on the importance of niche strategies for Irish ventures, if they are to find strategically defensible positions in internationally traded goods industries. These niches are not easily, or readily, identified. They are much more likely to be identifiable only on the basis of deep practical experience of a market and its related technology. This point further reinforces the findings we have already discussed concerning the experience base, and especially the international experience base, of so many of our new generation of entrepreneurs. To successfully compete in international markets and in growth industries, there may be no alternative to basing our national efforts on entrepreneurs who have lived, worked, and learned in foreign markets. When this generation of returned emigrants has formed and successfully developed strategically oriented, knowledge-based, ventures that can "teach" a succeeding generation of entrepreneurs the required knowledge and skill in an Irish-based enterprise, we may begin to observe a more complete, self-perpetuating and innovative native industrial base. In the meanwhile, considerable thought might be given to schemes designed to assist managers and would-be entrepreneurs in gaining international experience of selected markets and technologies.

Conclusion

It is hoped that the range of findings reported here will serve to stimulate further thought and research on the subjects discussed. We need to know much more about the entrepreneurial and innovative processes if indus-

trial policy is to be wisely formulated and individual new ventures formed on appropriate strategic, technological and organisational design principles. The research, the policy-making and the managerial tasks faced are uniformly challenging and exciting, and it is hoped that efforts on all these fronts can proceed in harmony and with mutual support.

REFERENCES

Ahmed, M., "An Analysis of Small Scale Entrepreneurs in the Irish Plastics Industry," *Economic & Social Review,* Vol. 8, 4, July, 1977.

Child, J. and Keiser, "The Development of Organisations over Time," in P. Nystrom & W. Starbuck, *The Handbook of Organisation Design,* Vol. 1 Amsterdam, Elsevier, 1978.

Clark, A., "Emergence of the World Biotechnology Industry: Strategic Implications for Ireland," unpublished M.B.S. dissertation, Faculty of Commerce, University College Dublin, 1982.

Collins, O.F. & Moore, D.G., *The Organisation Makers: A Behavioural Study of Independent Entrepreneurs,* N.Y., Appleton, 1970.

Cooper, A.C., "Technical Entrepreneurship: What do we know?", *R & D Management,* Vol. 3, (2), 1973.

Cooper, R.G., "The Dimensions of Industrial New Product Success & Failure", *Journal of Marketing,* Summer 1979.

Fogarty, M.P., *Irish Entrepreneurs Speak for Themselves,* ESRI Broadsheet No. 8 Dublin, ESRI, 1973.

Hawkes, M.S., "Graduate Entrepreneurship in Ireland," unpublished M.B.A. dissertation, Faculty of Commerce, U.C.D., 1981.

Jackson P., "New Product Development in Small Firms," unpublished M.B.S. dissertation, Faculty of Commerce, U.C.D., 1981.

Landy, P., "Competing in the Global Electronics Industry: The Challenge for Inidgenous Irish Firms," unpublished M.B.S. dissertation, Faculty of Commerce, U.C.D., 1982.

Landy, P., "Competing in the Electronics Industry: The Strategic Management Challenge," *Journal of Irish Business and Administrative Research,* Vol. 5, No. 1, April 1983. pp. 44-56.

Lennox, J., "New Product and Process Innovation in the Engineering Sector," unpublished M.B.A. dissertation, Faculty of Commerce, U.C.D., 1982.

McGarvey, P. and Healy, M., *Small Manufacturing Firms and Innovation — an Irish Research Study,* National Board for Science and Technology, Dublin, 1982.

McManus, T.T., "Technical Entrepreneurship in Ireland," unpublished M.B.A. dissertation, Faculty of Commerce, U.C.D., 1982.

Morrow, T., "Industry & Company Life-Cycle Theory: Applications and Analysis," unpublished M.B.S. dissertation, Faculty of Commerce, U.C.D., 1982.

Murray, J.A., "In Search of Entrepreneurship," *Journal of Irish Business and Administrative Research,* Vol. 3, No. 2, 1981.

O'Connor, B., "A Strategic Analysis of the Irish Timber Industry," unpublished M.B.S. dissertation, Faculty of Commerce, U.C.D., 1982.

O'Connor, J., "Issues in Enterprise Development: Business Owners Perceptions and Experiences," *Journal of Irish Business and Administrative Research,* Vol. 5, No. 1, April 1983. pp. 31-43.

O'Donnell, N. and Murray, J.A., Explorations in the Entrepreneurial Process, Dublin, The Enterprise Centre, U.C.D., 1982.

Reynolds, B., "Company Development Options," unpublished M.B.A. dissertation, Faculty of Commerce, U.C.D., 1982.

Roberts, E.B., "Entrepreneurship and Technology: A Basic Study of Innovators — How to keep and capitalism on their talents", *Research Management,* Vol. XI, No. 4, 1968.

Rothery, B., *Men of Enterprise* Dublin, IIRS, 1977.

Starbuck, W., "Organisational Growth & Development" in J.G. March (ed), *Handbook of Organisation* Chicago: Rand McNally, 1965.

Starbuck, W., *Organisational Growth & Development,* London, Pergamon, 1971.

Susbauer, J.C., "The Technical Entrepreneurship Process in Austin, Texas," in Cooper & Komives, *Technical Entrepreneurship: A Symposium,* Centre for Venture Management, Milwaukee, Wisc.; 1972.