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Breaking the Paradox of Innovation: Lessons from history, the story of a small manufacturing company

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Abstract

In 2005 Deloitte Research released a paper examining the phenomenon they refer to as the 'Innovation Paradox', the inability or reluctance of manufacturing firms to pursue the strategies that build the operational capabilities necessary for innovation that will provide both profitability and growth. The report claims that this is due to the rapidly increasing complexity of global markets and the lack of synchronising innovation efforts across their value chain, thus positing the problem as a 21st century issue. While the research did not target the small and medium enterprises specifically, the implications for the business sector are apparent given their substantial contribution to global economies and their high failure rates in the first three to five years of operation. While the researchers do not question the data contained in the Deloitte's research, this paper does question the assumption that the phenomenon is irreversible and the apparent underlying self fulfilling prophecy with respect to Small to Medium Enterprises. To demonstrate this the authors draw on a case study of a small manufacturing company in rural New South Wales, Australia, operating between 1889 and 1983 to show that the breaking of the innovation paradox was successfully achieved by this firm in the late 19th and early 20th century. Applying the case study to the Deloitte model, the authors overlay the history of Joseph Laycock and Son on the various success factors, and problems, identified in the Deloitte's study to demonstrate temporal similarities or differences.

Key Words: Small business innovation, reinvention. Innovation paradox

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Introduction

The innovation paradox is described by Deloitte (2005) as the inability or reluctance of manufacturing firms to pursue the strategies that build the operational capabilities necessary for innovation to provide both profitability and growth. Their research showed that innovation was the top factor with respect to growth but the bottom factor with respect to supply chain management. They claim that this is due to the rapidly increasing complexity of global markets and value chains, thus positing the problem as a 21st century phenomenon.

Relating this specifically to small business, renowned for their innovations, this paper questions the assumption that this is a self fulfilling prophecy. The paper draws on a case study of a small manufacturing company in rural New South Wales, Australia, operating between 1889 and 1983 to show that the breaking of the innovation paradox was successfully achieved by small business firms in the late 19th and early 20th century. Taking the Deloitte model, the authors overlay the history of Joseph Laycock and Son (Gibson, 1988) on the various success factors identified in the Deloitte's study to demonstrate that by continually reinventing itself, this firm successfully avoided the paradox of innovation.

The Deloitte Model

The Deloitte model is premised on four critical outcomes of their research. First, that manufacturers have to master the complexity of innovation in order to grow; second, that such innovation is driven by changing customer demands and competitive offerings; third, the need to develop a value chain that builds effectively on the market complexities; and finally, the effective management of the entire product lifecycle. From these outcomes Deloitte identified three decisive steps that can be used to generate profitable growth through innovation.

The first of these steps is the task of creating innovation, the act of generating and evaluating ideas. This involves generating ideas or sourcing concepts from outside the organisation, developing business strategies on which to base investment decisions, recognising and understanding the gap between the performance of existing products that satisfy customer demands and proposed new products, and determining the most appropriate organisational model to put the innovation into practice. The second step is to exploit the innovations created in step one. This involves maximising the innovations growth and profit throughout the products entire lifecycle. In particular, ensuring profitability of the product through flexibility of design, thus allowing speedy and inexpensive modifications, together with cost-effective service and other downstream activities. In other words, the business must recognise the entire value chain.

Building innovation capabilities for success is the third step. This involves identification and utilisation of four key factors;

- Better visibility, both upstream and downstream in the value chain,
- Flexibility in product designs and platforms that allow for quick modifications of product offerings to meet market demands,
- More extensive collaboration with customers to define product requirements and with suppliers to design components and new materials, and,
- The use of advanced technologies for product lifecycle management, product data management, customer relations management, and advanced planning and scheduling.

A Review of the Relevant Literature

Introduction

Innovation has been defined as an application of ideas and knowledge to meet a current or future market needs, or more specifically as the ability of a firm to develop a product to satisfy the future needs of customers (Fitzgerald and Moon, 1996). The difference, while subtle, moves the focus from market needs to customer needs and at the same time from business in general to small business specifically. This is significant as small business innovations in the nineteenth and twentieth centuries have out paced big business by two to one (Siropolis, 1997). This is mainly due to the ability of small business to concentrate on new products rather than improving existing products as is generally the case with big business (Hatten, 2006). While the high failure rate of small businesses is generally acknowledged, there have been instances where small business have survived, and indeed flourished, through the process of 'creative destruction' or 'disruptive reinvention', that is the replacement of existing products, processes, ideas, and businesses with new and better ones (Hatten, 2006).

Disruptive Reinvention

Fasenfest and Jacobs (2003) document the case of the automotive industry in Southeast Michigan, where a rapidly declining manufacturing sector, overly dependent on one sector of industrial production, transformed itself into a revitalised and restructured high-technology business centre. This transformation of a small business sector represented a shift away from manufacturing centres to technical centres that design and build prototypes, make dies, fixtures and machine tools, and assemble automobiles. In a similar way the small businesses of Richmond, Virginia, have reinvented themselves from support businesses for the traditional banking, tobacco, and manufacturing industries to dynamic players in the information technology, semiconductor, and biotech industries (Mosher, 2000).

The two examples cited above are examples of the changing small business landscape during the 20th Century, and demonstrate the need for sustainable competitive advantage through reinvention based on disruptive innovation. According to Voelpel, Leibold and Tekie (2004) the focus is on the development of new bases of building strategic competitive advantage to outperform competitors and leapfrog into new areas of competitive advantage. However, the strategy of reinvention for small businesses pre-dates the 20th century. Morgenthaler (1989) reported the case of the Warren Feathbone Co between 1883 and 1989 and its strategic reinvention. The company, established in 1883, manufactured an elastic boning material from finely split turkey quills which was used to stiffen and shape corsets, collars and bustles in the ladies clothing industry. However, the company fell victim to changing fashions and the development of plastics and in 1938 reinvented itself, in collaboration with the B. F. Goodrich Co., into a manufacturer of plastic baby pants. Its second reinvention occurred in the late 1960s, early 1970s when the era of disposable diapers arrived, reducing the use of cloth diapers, upon which the company relied. This reinvention saw the emergence of a manufacturer of baby-clothes, a small thriving business that still exists.

The impetus for reinvention, therefore, appears to be driven by factors within the firm or from the industry of which the firm is part of (Burns, 2001). Such factors include; new knowledge – both scientific and non-scientific, the unexpected – be it unexpected success or failure or the unexpected event, and changes in perception – caused by economic changes, together with societal, cultural and fashion changes. All of these are evident in the cases reviewed above.

Structure

From the above review of reinvention it appears clear that innovative behaviour is influenced by a variety of forces, including the business activity, the industry, and the type and structure of the company. Baard (2002) argues that in small businesses the focus of the organising activity is the achievement of an effective and efficient blend of the essential ingredients for organisational

success, specifically, people, physical resources, and structure. In this respect small businesses have a characteristically flat, flexible structure (Hudson, Smart and Bourne, 2001) reflected by a one hierarchical level (Hankinson, Bartlett and Ducheneaut, 1997).

The other aspect of structure that appears in both the automobile industry study (Fasenfest and Jacobs, 2003) and the Warren Featherbone study (Morgenthaler, 1989) is the strong relationship between changes in structure and the timing of reinvention. The reinventions of the automobile industry between the 1970s and the 1990s corresponded with important shifts in the development of human capital strategies including the flattening of the organisation, the transformation from unionised to non-unionised firms, and the replacement of existing management with a more highly educated management team. Likewise with the Warren Featherbone case the major innovation reinventions within the company corresponded with generational changes in management. The move into plastic diapers in 1923 occurred with the retirement of the 86 year old founder. This was followed, in 1956, by the firm's move from Michigan to Georgia and into general clothing manufacturing, with the founder's grandson taking control of the business. This was followed in 1976 with the decision by the new Vice-President, the founder's great-grandson to discontinue the manufacture of general clothing and the move into the manufacture of medium-priced specialist baby clothes.

This review, while brief, suggests that small business can adopt competitive strategies that build upon its operational capabilities. This is displayed through the ability to reinvent itself, and by so doing avoid the paradox of innovation.

Overlaying the Laycock Story

Background

The Laycock story was documented by Gibson (1988) in his thesis Joseph Laycock and Son – Blacksmiths, Engineers and Manufactures 1889-1983, and it is from this work that much of the information was drawn. Joseph Laycock and Son commenced operations in Bathurst, a rural community in Western New South Wales, Australia, in 1889 as a blacksmith's shop, progressively diversifying into engineering, founding, welding and, in 1918, the manufacture of bagged goods elevators and conveyors for the agricultural industry. With the success of the Laycock Elevator, the company turned to the manufacture of fruit pickers and other small farm equipment, including the patenting and manufacture of a combined cutting and threshing machine in 1922.

Following the abolition of bag stacks in favour of bulk grain storage in the 1960s the viability of chain type elevators declined, with the Laycock Company ceasing elevator production in 1969. However, the other components, such as the light engineering section expanded, and with the garage, continued until the death of Joe Laycock in 1986 and the closure of the company.

Creating innovation

According to the Deloitte paper "manufacturers that are superior at product innovation make it a formal, centralised, step-by-step business process, not a haphazardly conducted and dispersed activity" (2005, 9). Gibson (1988) argues that it was clear that the company was established in a way that ensured that it was capable of more than traditional blacksmithing functions. This, he claims, was based on knowledge of change taking place in England and brought to Australia by Thomas Laycock. The advent of readily available retail hardware through mass production, together with increasing levels of technological innovation in farm and town machinery, and the reduction in the traditional sources of blacksmithing work were clear indicators of a need for innovation. In other words the innovative process was planned.

Thomas Laycock's knowledge of the technical demands of the new technology, e.g. steam plants, modern agricultural machinery, mining machinery that was being implemented on the farms and

within industries throughout the district provided the basis for the first innovative stage of the firm's growth. Gibson (1988) clearly indicates that the work of the machine shop, and the innovative developments, were a predominant function of the firm. In addition to innovations directly flowing from the blacksmithing function, the following were identified as part of the firm's growth and development: the foundry, oxy-acetylene welding, the motor garage, the electrical and radio branch, and electric arc welding.

Again drawing on the Deloitte's (2005) study it states that new product ideas must be evaluated on their own merits. A key determination of this is whether a new product concept reflects 'sustaining' or 'disruptive' innovation. The study defines these innovation phases as; sustaining innovations are incremental improvements to existing products, while disruptive innovations are substantial improvements that can displace or completely cannibalise prior products. It is clear that the Laycock innovations encompassed both sustaining and disruptive innovation.

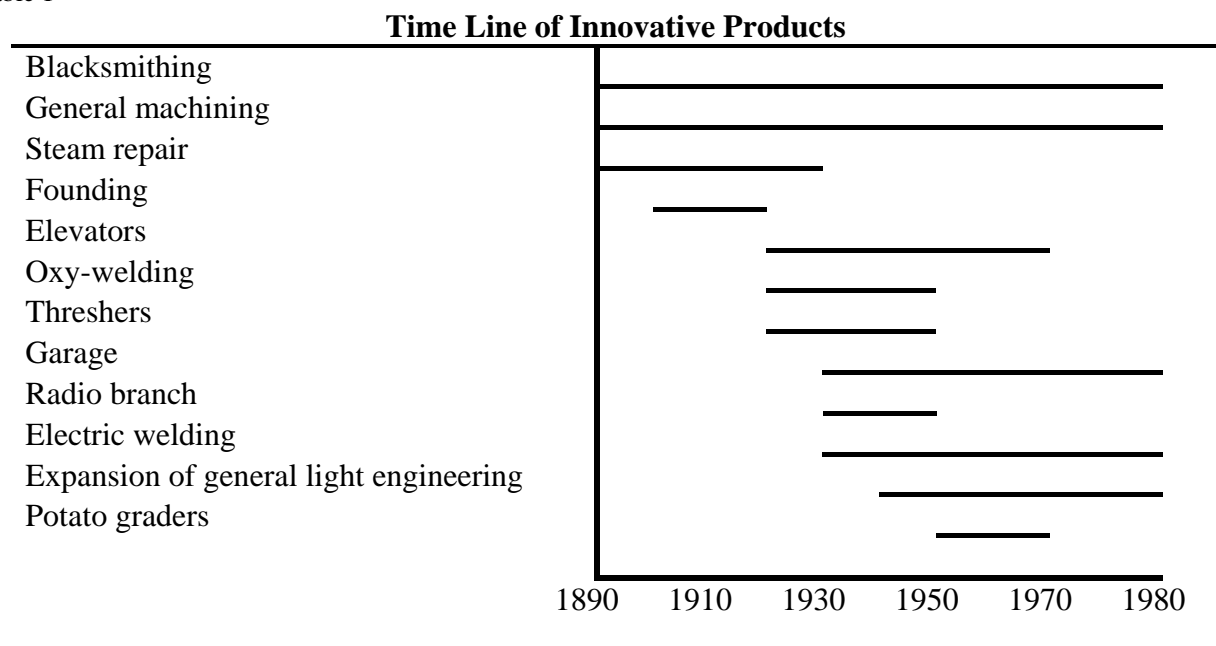
The sustaining or incremental innovations can be identified as; the movement into oxy-acetylene welding and the transition to electric arc welding, while the establishment of garage and the electrical and radio branch are disruptive as their establishment would draw on existing resources. However, the introduction of the most successful innovation, the Laycock Elevator and Conveyor, was both sustaining and disruptive. From the disruptive perspective the Laycock Elevator had the capacity to draw on the entire resources of the firm. All components were initially manufactured in Laycock's factory, and given the small workforce, had the potential to disrupt the profitability and cash flow from other sections of the firm. The sustaining or incremental phase comes from the firm's diversification into the manufacture of threshers, patented in 1922, and of fruit graders for the agricultural industry. In addition Laycock provided a wide variety of elevators, from its initial standard elevator, including straight gantry, special balance, and midget low loader.

According to the Deloitte's (2005, 9) study;

"The likelihood of generating blockbuster new product concepts increases significantly when managers can tap the entire company for new ideas, as well as customers, suppliers and the external research community".

In the case of the Laycock Company the management and ownership structure ensured that the entire company was involved in the many innovative decisions. This is shown in Table 1, the time-line of innovative products.

Table 1



Management and organisational structure

Like many small business the management structure of the Laycock enterprise was confined to family members, while other employees were either members of the Laycock family or a small number of generally unskilled full-time, part-time or casual employees. Over the 97 years of the firm's existence the number of staff averaged between 3 and 5, including family, apprentices, part-time and casual employees. The management structure of the firm, together with the corresponding reinvention periods, is shown in Table 2.

Table 2

Management Structure and Periods of Reinvention of the Laycock Enterprise – 1889 - 1986

Trading Name	Date	Owners	Description of Enterprise
Thomas Laycock & Son	1889	Thomas	Practical Engineers & General Blacksmiths
Laycock Brothers	1903	William, Charles	Engineers, Boilermakers & General Blacksmiths
Joseph Laycock & Son	1917	William, Cyril	Engineers
1st Reinvention	1918	Laycock Elevator	
Joseph Laycock & Son	1936	Cyril	Engineers, Electrical & Radio
2nd Reinvention	1937	Electric Welding, Radio Branch & Garage	
Joseph Laycock & Son	1944	Cyril, Joe	Engineers, Electrical & Radio
Joseph Laycock & Son	1958	Joe, Ellen	General Mechanical Engineers & Manufactures
3rd Reinvention	1959	Expansion of general light engineering	
Joseph Laycock & Son	1968	Joe, Ellen	General Engineers & Manufactures
Joseph Laycock & Son	1971	Joe, Ellen	Electrical Goods, Engineers & Manufactures
Joseph Laycock & Son	1980	Joe	Electrical Goods, Engineers & Manufactures

Comparing the reinvention stage to the change of management structure it is evident that each change of management was followed by a period of reinvention. In 1917 Charles Laycock left the firm and moved to the near-by town of Lithgow and his place was taken by Cyril Laycock, the son of William. This coincided with the first reinvention in 1918, the introduction of the Laycock Elevator. The second reinvention occurred in 1937 with the introduction of electric arc welding section, together with a radio branch and the establishment of a garage. This had been preceded by William retiring from the business due to ill health in 1936. Following William's death in 1939 Cyril's son Joe entered the business and was joined by his wife Ellen in 1958 shortly after the death of Cyril. This was followed in 1959 by the third reinvention, the expansion of the general light engineering works. The above clearly shows how changes in the management structure changed the work emphasis through the reinvention process to ensure the survival of the company.

Conclusion

Relating the innovative product development back to the four critical outcomes identified in the Deloitte model it can be demonstrated with respect to the first and second outcomes that (1) the Laycock family had mastered the complexity of innovation in order to grow, as seen through their first diversification program following the first World War; and (2) that the innovation was driven by changing customer demands, demonstrated by the development of the Laycock elevator. The third critical outcome, the development of a value chain that built on market complexities, can be shown through the use of the traditional value chain framework of upstream functions of research, development and design, the manufacturing or production function and the downstream functions

of marketing, distribution and customer service. For example the Laycock Company conducted their own research, development and design, evidenced by the development of a wire strainer in the early 1900s and threshing machinery in the 1920s. All major components of the Laycock elevator, and other machinery, were manufactured in the foundry and workshop, with some castings purchased from local suppliers. With respect to downstream functions the Laycock Company marketed and distributed all of its products, with the exception of the Laycock elevator which was marketed through an agent, however, the company did carry out all customer service requirements.

The final requirement for breaking the innovation paradox is building a sustainable competitive advantage built on reinvention based on disruptive innovation. It is clear from the discussion of innovative products (Table 1) that the Laycock Company reinvented its self on three occasions, the first time in 1918 following the First World War, again in the 1930s following the Great Depression and for the final time in the 1950s. Whether these were deliberate strategies is best left to Gibson (1988, who believes

“The extension of the blacksmith’s shop in the 1890s to increase machining capacity and a foundry, the adoption of new technologies such as oxy and electric welding, and the diversification of the works into a small manufacturing enterprise were deliberate strategies used by the family owners to ensure their survival”.

What emerged from this study were two issues. First the problems identified in the Deloitte study are not time specific, the particular issues identified as a 21st century phenomenon were just as active in the 19th and early 20th century. Second, the issues themselves do not represent a self fulfilling prophecy. While the authors agree that innovation is the engine of growth we disagree that small businesses place a low priority on restructuring or reinventing their organisations to profitably bring new products and services to the market.

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