

## **The Engineer in Business Lecture 2 The Growth of the Firm**

### **Notes**

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*I know what my firm does, but how can I make it grow?*

### **Introduction**

We observed in lecture 1 that most firms were small and new firms had a half-life of less than 6 years. Yet the number of firms was growing in the UK. This immediately suggests that new business populations are highly turbulent with lots of entry and exit.

A new industry or market segment typically exhibits the following industry dynamics<sup>1</sup>. The start-up rate is initially low (phase of pioneers) with the majority of pioneers often exiting before population stabilizes. The number of firms increases with maturity (phase of followers), then entry declines (phase of consolidation), as larger firms emerge often through combinations (mergers) of smaller firms. Exit rates are highest in new small business populations, and decline as populations mature, but outstrip birth rates to give rise to drop in the number of firms in the industry.

### **What explains firm growth and profitability?**

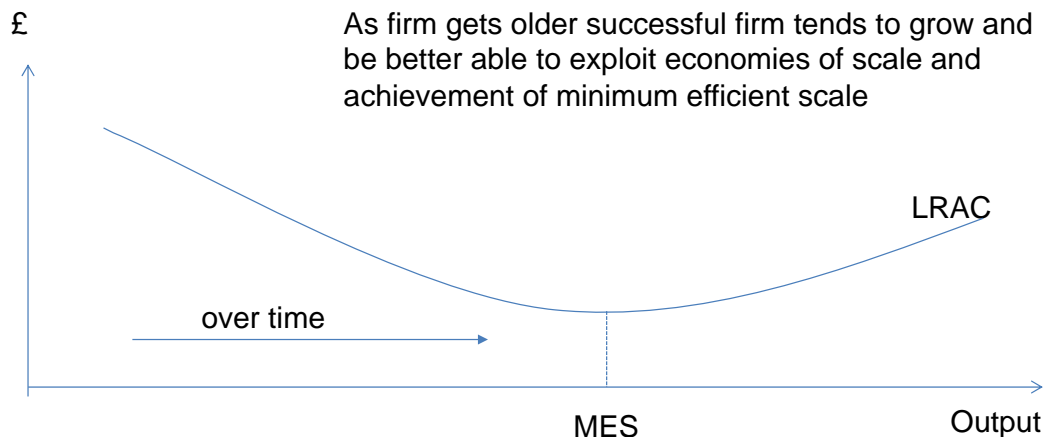
Neoclassical theory imagines that firm size and hence firm growth as a quest for the profit maximizing size of the firm. Thus, we can think of firms being driven by shape of their long run average cost curves – what most firms are striving for is to produce at the minimum of their long run average cost. At this point the firm will be as efficient as it can be and will be best placed to survive in a competitive market. If the minimum occurs at a low level of output then firms will not seek to grow beyond this. This might be true of many small businesses, who can be thought of as only being able to grow if they take on more expensive premises or staff and often are optimally exploiting the labour of family or friends and the available space in their home. It is long run (rather than short run) costs that matter because this is the cost that can be achieved in the long run (say after an initial period of learning how best to produce their product or service).

The output level at which long run average costs are first minimized is referred to as the minimum efficient scale (MES). The quest for lower average cost and the achievement of minimum efficient scale can drive growth. Similarly, changes in the shape of cost curve can

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<sup>1</sup> See for example: Aldrich, H. (1995) 'Entrepreneurial Strategies in New Organizational Populations' in Bull, I., Thomas, H., and Willard, G. (eds) *Entrepreneurship: Perspectives on Theory Building*. Pergamon, reprinted in Swedberg, R. (ed) (2000) *Entrepreneurship: The Social Science View*. Oxford University Press, Oxford.

drive longer run trends in scale in an industry (towards smaller or larger minimum efficient scale). Firms enter an industry small and then grow and reduce long run average costs. This is shown in the figure below. As demand expands and dominant designs emerge for products than larger scale production is both possible and cost effective. This is as far as neoclassical theory gets in explaining growth of the firm.



LRAC – long run average cost  
MES – minimum efficient scale

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This above diagram is not just about production on a single assembly line or in a single plant, it can refer to the level of the firm. Owning/organizing several plants can bring about lower LRAC at the firm level and hence be consistent with a high minimum efficient scale. This might be true of car firm with several production plants across the world, or a supermarket chain with many different outlets across the country.

So far, we have emphasized production costs as a driver of firms seeking to grow. However demand is also important. The standardization and increased desirability of the product facilitates growth. Some products are inherently scalable, like the wide-bodied aircraft, or cars, or Apple computers, while restaurant meals are pretty difficult to scale up (though some try). Many firms can diversify their products at relatively low cost in an attempt to increase the size of their market (e.g. a university offering many degrees with the similar staff and administrative input). This sort of diversification exploits economies of scope: which arise from producing differentiated products using shared assets/inputs.

The neoclassical firm is trying to maximize profitability by growing. Thus we might expect that firms entering the market become more profitable over time as output grows and costs

fall. However the ability to grow relies on finance being available to pay for investment in growth. Thus there is a relationship between growth & profitability such that: growth depends on profitability and growth affects profitability. However it is important to remember that *growth is not always a profitable or desired strategy*. Many firms will reduce profitability by growing too quickly and many very profitable firms exist in niche markets and only grow in line with the market growth.

### **Rolls-Royce: An example of a firm that has grown production**

Rolls-Royce cars are now made by BMW, we think of the listed firm which makes aero-engines (this is a different firm from the car manufacturer).

What's the most important market for Rolls-Royce Plc makes aero engines. The company is the third largest manufacturer of jet engines in the world. How was this success achieved? By recognizing the crucial role of scale and scope economies. Aircraft engines have huge costs in R&D, requiring large production runs to recover this initial investment. The company's change in strategy reflected two key insights. First, extension of initial investment so that its engines could service a wide range of aircraft, thereby increasing the chances of building up long-term relationships with particular aircraft manufacturers and the airlines that they supply. Second, fixed-price agreements for the subsequent repair and maintenance of their engines (insurance against defective quality) = signal of commitment to excellence and safety. As we will mention below this is a type vertical expansion into a related market.

Result: increased orders, growth in the long run → volume of business allows to recoup large R&D costs.

### **Constraints on Firm Growth**

The growth of the firm is determined by the levels of and changes in:

- Management skills
- Management objectives
- Available finance
- Technology
- Opportunities for learning
- Market size
- Macroeconomic environment
- Chance.

Importantly management factors constrain firm growth. Penrose wrote eloquently about this. The Penrose Effect (1959, p.47) suggests there are both economies and diseconomies of growth. She writes:

“If a firm [...] expands its organization more rapidly than the individuals in the expanding organization can obtain the **experience** with each other and with the firm that is necessary for the effective operation of the group, the efficiency of the firm will suffer [...] Since the

services from “inherited” managerial resources control the amount of new managerial resources that can be **absorbed**, they create a fundamental and inescapable limit to the amount of expansion a firm can undertake at any time.”

What Penrose was identifying was that every firm has some capacity to grow every year, this is because due to learning the managers can do everything they did in the previous year slightly faster (in less time and with less material input) in the current year, leaving free resources to expand output (i.e. economies of scale). However if they expand faster than this ‘free’ capacity allows then they need to take resources away from current output and this increases management input / £ of expansion. At some point the marginal growth achieved (e.g. in pursuing new products/markets) from diverting existing managers time will turn negative (e.g. because the ability to serve existing markets will be sufficiently reduced), leading to diseconomies of expansion. This implies limits to firm growth. Permanent growth is possible due to natural learning and the optimal growth rate can be increased but requires organisational change and management development. A possible problem is that there is a conflict between profit-maximising growth versus managers’ wealth-maximising growth (Marris 1963), such that it is not necessarily profitable to expand at the maximum possible growth rate. Marris explicitly looked at this in the context of expansion through diversification (see later), which was a way to speed up the growth of the firm and beyond a certain growth rate could only be done at the expense of declining profitability.

### **Entry, innovation and industry growth**

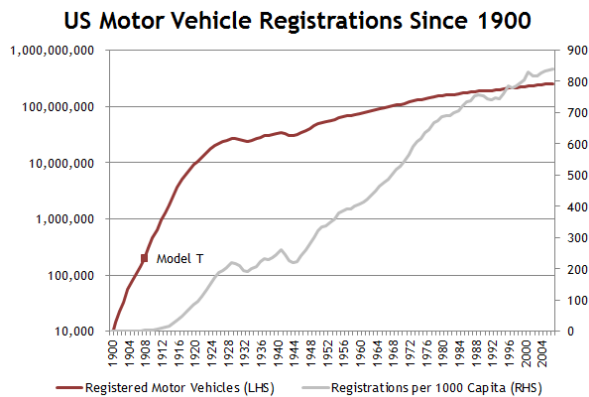
Role of new firms in the economy: they challenge the monopolistic positions of larger firms through the introduction of new technologies and new ways of doing business into the market (J. Schumpeter, 1934). New and small firms find more efficient ways to satisfy existing needs or identify new needs to be satisfied implying more efficient firms survive and grow, less efficient firms shrink and exit (the principle of *creative destruction* identified by Schumpeter).

Why should smaller firms be more innovative? Innovation is their best (or only) chance to gain a competitive edge; SMEs (small and medium sized companies) may have original capabilities and skills that established firms have not developed; SMEs are more adaptable than larger firms in rapidly changing environments; and smaller capital outlays and leaner (established) production capacity at risk of obsolescence.

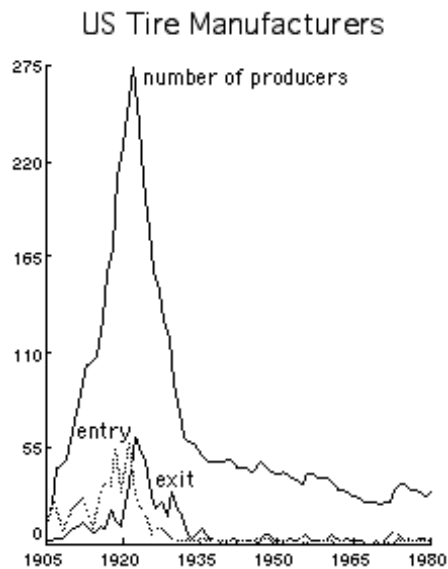
A classic example of this is the US tyre industry (‘tire’ in US), which grew up to service the growing car industry. Car registrations are on a log scale and grew massively in the 1920s, driving the demand for tyres<sup>2</sup>. Initially large numbers of firms entered tyre production and there was a lot of entry and exit, but then there was a classic shake out as the industry matured (and car sales growth slowed) leading to a sharp decline in the number of firms and emergence of the dominance of a few large firms, as shown in the right hand chart below.

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<sup>2</sup> This was driven by mass market car production. For example, Henry Ford’s Model T was in production from 1908-1927 and sold 15m units.



Source:  
<http://avondaleam.com/us-auto-registrations-since-1900-and-the-pc/>



Source: Klepper and Simons,  
*Journal of Political Economy*, 2000, p.731.



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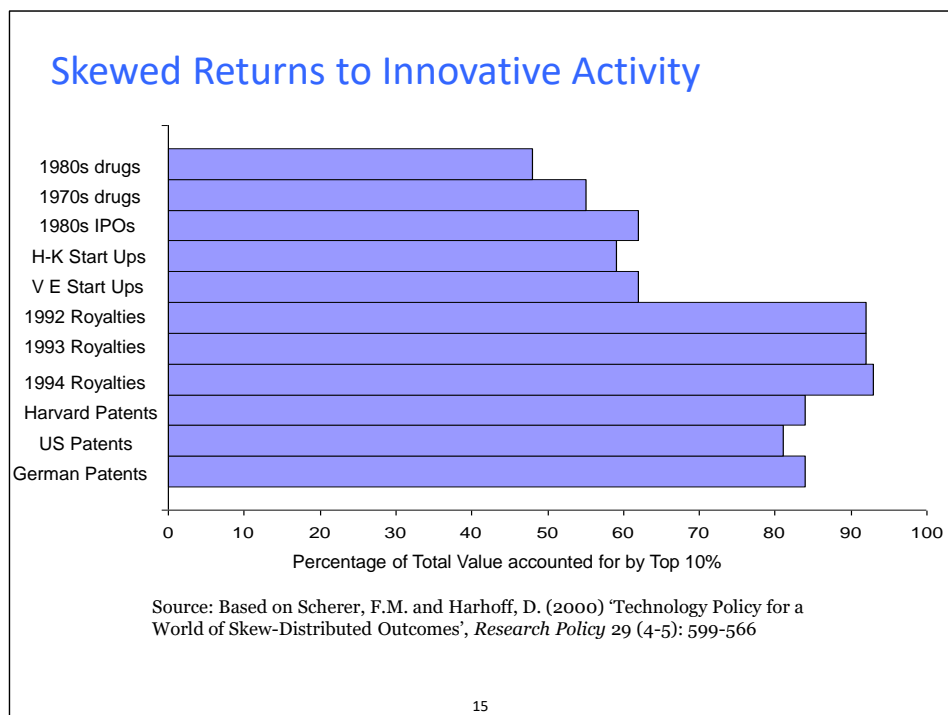
## Small firms and jobs growth

Several empirical studies from the late 1980s and 1990s found that small and medium sized enterprises (SMEs) make a contribution to net job creation which is *more than proportional* to the size of these firms. Re-appraisal of these findings on the basis of more data and more robust estimation techniques showed that: SMEs generate new jobs, but as many jobs may be lost among SMEs as they are created ('revolving doors' effect); smaller firms grow faster, but it is mostly *new firms* that create new jobs; among small firms, the smallest generally do not have the resources to grow and among new entrants that grow, many firms are spin-offs from larger firms. Thus increases in the number of SMEs and associated employment do not correspond to proportional increases in the share of economy-wide turnover accounted for by SMEs. This is because higher shares of value added are captured in large firms who have the capacity for high valued expansion or outsourcing of potentially competitive inputs.

## Growth skewness and heterogeneity among firms

Recent research on the dynamics of firm growth emphasizes the enormous **heterogeneity** found among populations of firms. There are very clear indications that the distributions of both growth rates and innovation are **extremely skewed**, with a small minority of firms responsible for most of the overall (positive) contribution of all SMEs to the economy. **High-growth firms** (both in terms of employment and sales) disproportionately more likely to be

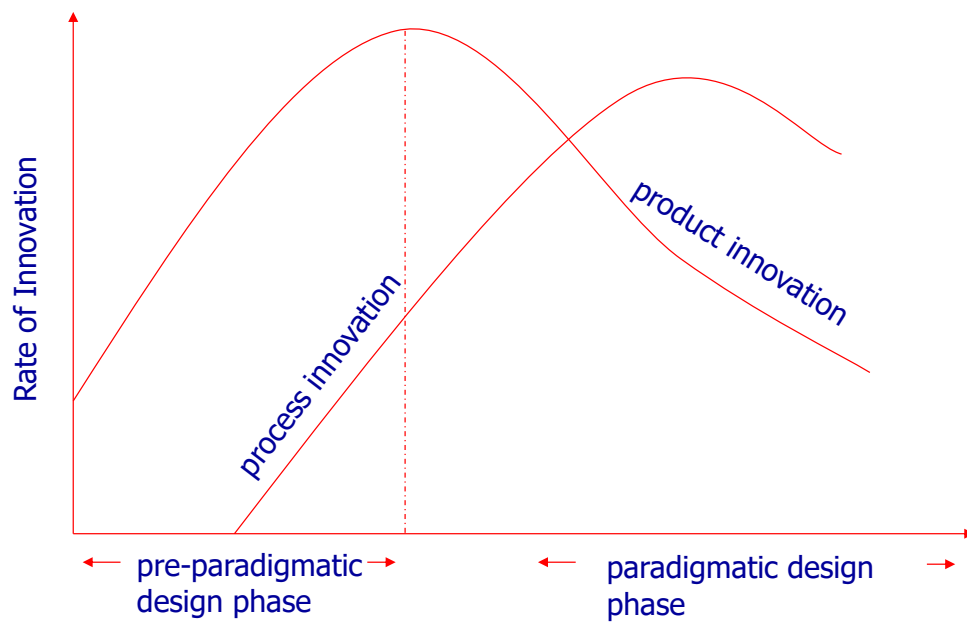
**innovators.** Innovators seem to grow twice as fast as non-innovators. However, most **innovation is concentrated** in approximately 20 percent of firms, and while innovation is highly persistent through time at the firm level, firm growth is far less predictable and often akin to a random process. The skewness is illustrated in the table below which shows that the top 10% of firms in most sectors are responsible for the large majority of innovation.



## Industry Dynamics and Dominant Designs

In the early stages of industry growth there is a fluid design specification and lots of experimentation / new entry. Over time we see the emergence of a dominant design. The competitive process switches from being about product innovation (to establish the dominant design) and over to price and cost factors, which are driven by scale and learning effects in production. There is increased emphasis on cost cutting process (leading to process innovation). See figure below for an illustration. This sort of effect is most powerful in mass markets *with first mover effects*. This allows easy imitation/ design modification/ access of rivals to key complementary assets. A follower, not a pioneer, frequently appropriates profits (skills/capabilities other than pioneering innovation skills dominate).

## Innovation and Product/Industry Life Cycle



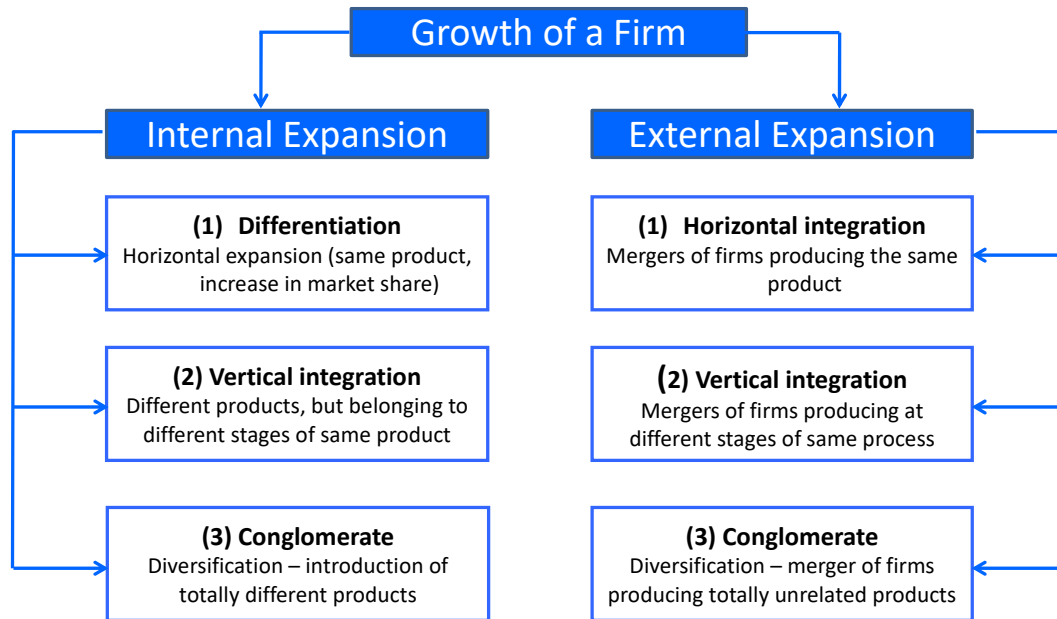
Source: Teece 1986

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### Growth strategies of firms

Many firms are 'lifestyle' firms (most small firms) where their owners are content not to grow the firm, because they want to continue to be owner managers trading off profit for control. However larger firms deliberately set out to grow by having a growth strategy. Alternative strategies are characterised below.

## Alternative Growth Strategies

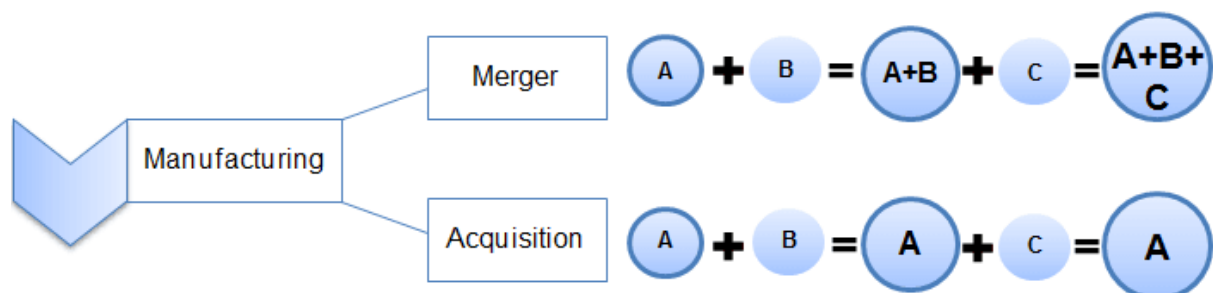


Note that growth strategies for a firm depend on the definition of “firm”.

Firms can pursue internal expansion strategies such as differentiation through producing new products in house. This might involve changing/adapting product characteristics in order to conquer market share.

### *Mergers and takeovers*

However, firms often go for rapid growth by external expansion via a merger or a takeover. For example, manufacturing firm A merges with firm B and so on, to create a combined firm (a ‘merger of equals’). Or firm A takes over smaller firms B and C in order to expand becoming a larger firm A. Many actual mergers have some of the characteristics of takeovers and vice-versa.



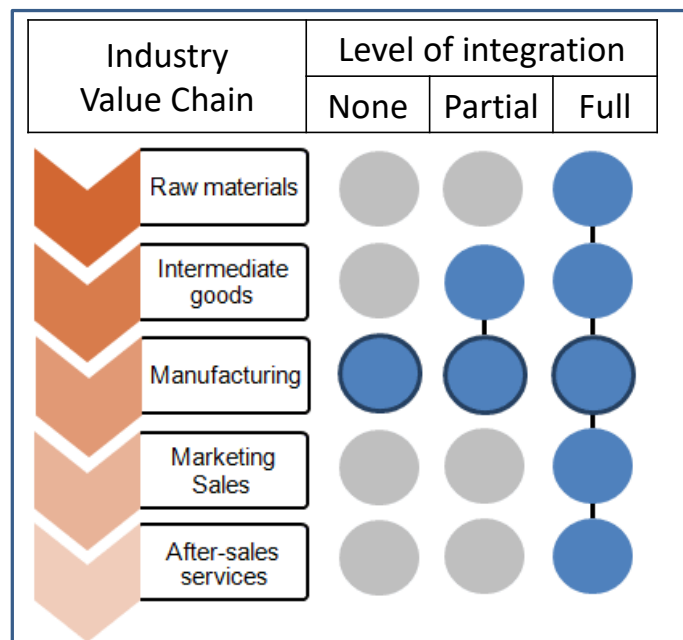


Mergers and takeovers are often examples of external horizontal integration, where firms operating at the same stages of the industry combine in order to: lower costs (via economies of scale and higher efficiency); increase differentiation (more product or service features); increase market power by concentrating the market; and getting access to new markets (different region or different market segments).

#### *Growth by vertical integration*

Vertical expansion is where a firm expands internally or via merger/takeover from one stage in the supply chain into another. Classic examples of vertically integrated firms are companies like BP or Shell, who have operations in oil exploration through to petrol retailing. A firm like Tata has interests in Steel, Cars and Retailing (though it operates the different firms like JLR separately). The figure below distinguishes between firms that are only in manufacturing and more integrated firms.

## Vertical Integration (1)

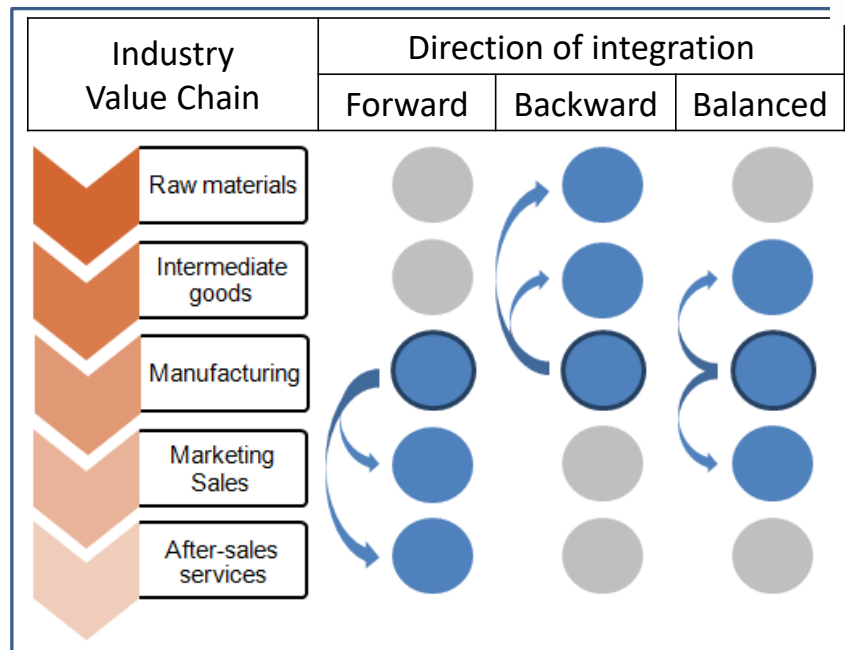


<http://www.strategicmanagementinsight.com/>



Vertical expansion can involve forwards or backwards integration. Rolls Royce integrated forwards from manufacturing into after-sales services. Apple similarly has expanded into retail over the last few years. Alcan (now owned by Rio Tinto) integrated backwards from tin can manufacturing into aluminium smelting and bauxite mining. GM's takeover of Fisher-Body in the 1920s was backwards integration.

## Vertical Integration (2)



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Why vertically integrate? It leads to greater efficiency via co-ordination economies (transaction cost view), managerial economies and financial economies. It can lead to reduced uncertainty e.g. implies lower 'hold-up' risk. It might also help create monopoly power via barriers to entry for non-integrated firms who cannot get access to other stages of the supply chain so easily. However it does have problems such as: higher coordination cost, lack of flexibility (e.g. in choosing other suppliers) and incentive problems arising from the lack of separate ownership and the hence the reduced profit incentives of the vertical divisions.

One way round these problems is to have tapered vertical integration (non 100% matching of supply and demand between the vertically related divisions). This partial vertical integration has advantages, it that it gives better cost information (if the firm also purchases inputs from outside companies as well as its own supplying division) and hence allows more leverage over both inside production and outside suppliers. It also reduces the capital required to undertake full integration. The disadvantage of smaller scale vertical integration is that it reduces the possibilities for exploiting of economies of scale.

### *Growth by diversification*

Firms can also grow through diversification. Gulf and Western was a conglomerate firm which grew rapidly by diversification from the 1950s (originally it was in car parts) which was in 14 industries at its peak in 1980 including films (Paramount Pictures), hotels, books, computing (Sega Enterprises) and manufacturing, it was defunct by 1989 due to many of its businesses having been separated and sold off.

Diversification can be via closely related products or through far away products. Diversification can be narrow spectrum where the firm uses existing technological base & existing market areas or new markets (e.g. Apple entering digital music from selling computer devices). Diversification can be broad spectrum can be where the firm uses a new technological base & existing or new markets (e.g. Virgin moving from selling music to selling air transport). Why diversify? It has the advantage that it offers stability/risk spreading across different products. It helps maintain profitability by entering new markets or maintain growth beyond mature market (e.g. the market for laptops is now declining and digital content is more important).

#### *Growth by merger/takeover*

Growth can come from takeovers/mergers. Vodafone is a great exemplar of this – it grew massively as a result of series of takeovers. Motives for mergers and takeovers include the fact that managers want growth even if this is not in the interest of shareholders. It is an easy way to grow firm, exploit economies of scale or gain monopoly power. It increases the value of the firm (reducing takeover risk itself) and reduces uncertainty about the future survival of the firm. It could lead to more opportunities for the firm's management. The drawbacks include the fact that a bad merger could destroy value, there could be legal repercussions (from monopoly power) and it could lead to reduced flexibility (because the firm becomes too large). Other motives for merger could be: the desire to avoid takeover; to save another firm from a hostile takeover (the firm is being a 'white' knight); to strip the assets of the firm and sell them at a profit; to build an empire for the owners/managers; to allow expansion into other countries' markets.

#### **Recap**

Many of the assumptions of the neoclassical economic model are rarely present in real markets. Therefore there is a need to take into account alternative theories of the firms (the theories of the firm are also theories of vertical and horizontal expansion). There is no single and unique growth target for economic agents, but often alternative targets or even multiple targets in terms of what they are trying to achieve.

There is no single recipe for growth, which is typically a complex multidimensional problem (at a micro as well as macro level of analysis). Observed growth strategies depend on historical and sectoral contexts of firms.