

# Learning curve and experience curve



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This essay will attempt to distinguish between the learning and experience curves and propose how each of these distinct curves may give rise to competitive advantages.

It is imperative to observe why many individuals may come to the conclusion that these two curves are one and the same. James P. Gilbert (Experience and Learning Curves, 2010) provides the basic notion of experience and learning curves, stating that:

“ Experience and learning curve models are developed from the basic premise that individuals and organisations acquire knowledge by doing work. By gaining experience through repetition, organisations and individuals develop relatively permanent changes in behaviour or learning. As additional transactions occur in a service, or more products are produced by a manufacturer, the per-unit cost often decreases at a decreasing rate. This phenomenon follows an exponential curve.”

The frequent interchangeable use of the terms learning curve and experience curve can be easily disproved upon examination of their respective definitions, which differ. John L. Colley (1991, p. 1) postulates that “ the learning curve expresses graphically the observable exponential increase in the cumulative volume of production as costs are reduced due to a reduction in labour input hours as workers learn their jobs (i. e. cumulative learning experience)”. Contrastingly, the experience curve applies to process orientated as well as labour intensive production methods, as according to Hall and Howell (1985, p. 197-212) “ the experience curve is an analytical tool designed to quantify the rate at which experience of accumulated

output, to date, affects total lifetime costs”. Gilbert (Experience and Learning Curves, 2010) best summarises the differences between learning and experience curves: “ the experience curve is broader than the learning curve with respect to the costs covered, the range of output during which the reductions in costs take place, and the causes of reduction”.

The cost leadership aspect of Porter’s (1980) two dimensional strategic choice leading to competitive advantage model is substantiated by the learning curve. Sami Daniel (Strategic Assets, 2003, p. 7) elaborates specifically on the cost leadership aspect of Porter’s (1980) model, stating that “ Cost leadership: producing the same product at lower cost creating barriers to entry through economies of scale and experience”. When a firm has the cost advantage associable to the reduction in its costs of production as a result of a reduction in the number of hours of labour it employs (due to workers increasing their familiarity of production methods), it moves along the learning curve and experiences increased cumulative frequency of output. As a result, such a firm has the competitive advantages of economies of scale and barriers to entry into the industry.

John L. Colley (1991, p. 2) exemplifies this further with Grumman Aerospace Corporation during 1970, stating that:

“ Grumman Aerospace Corporation was successful at realising the learning curve effect. Grumman began with a massive cost-cutting campaign in 1970 when severe overrun problems developed with their newest aircraft, the F-14 Tomcat. Grumman had everyone in the manufacturing organisation question costs and developed a special ‘ productivity’ group with people who had

nothing to do but challenge costs. As a result, Grumman was able to achieve a reduction in the cost per plane and number of manufacturing hours per plane, making the F-14 Tomcat the staple fighter aircraft in the US Air force during the 1970's, thus giving rise to barriers to entry and economies of scale (due to cost advantage)".

The Boston Consulting Group (BCG) observed a distinct and consistent relationship between the costs of production and the cumulative volume of output during the 1960's, production costs declined as the cumulative volume of output increased. Sami Daniel (Strategic Assets, 2003, p. 5-6) elaborates upon this example in relation to competitive advantages:

“ The Boston Consulting Group saw two processes at work that led to a cost based competitive advantage, process innovation: repetitive task mastery and continuous minor improvements in production methods by management, and product refinement: standardisation of components, redesign of product to incorporate less expensive materials, or better focus on consumer needs. Economies of scale were also experienced: capital costs do not increase at the same rate as capacity, hence unit costs fall. These effects led to barriers to entry and the aggressive acquisition of market share.”

In conclusion, the experience and learning curves are divisible based upon their respective definitions. Firms who are on such curves can acquire competitive advantages such as cost advantages, economies of scale and barriers to entry.

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5. Does the Boston Consulting Group's product life-cycle view of company diversification satisfactorily answer scepticism about the portfolio explanations of this phenomenon? Explain your answer.

This essay will systematically individually ascertain what the portfolio explanation and the Boston Consulting Group's (BCG) product life cycle view of company diversification is and in doing so, will examine whether the latter view satisfactorily answers scepticism about the former postulation (i. e. when accounting for synergy).

The risk reduction approach to company diversification is as Sami Daniel (Diversification, 2003, p. 6) infers, " an extension of a theory developed in the field of finance: the portfolio theory of investment. It deals with the risks of holding different financial assets or stocks." The portfolio theory of investment was postulated by the economist Harry Markowitz (1952) in his paper " The Utility of Wealth", which changed the way people perceive diversification. The general axioms of Markowitz's (1952) paper are best summarised by Pickford (2001, p. 92-93), who states:

" Markowitz said that shareholders could reduce the variance of their investment returns by holding a diversified portfolio. Markowitz's Portfolio Theory shows that diversification by investors potentially eliminates the risk associated with the unique attributes that are specific to any given company."

The linkage between the portfolio theory and corporate diversification is elaborated upon by Daniel (Diversification, 2003, p. 6) who declares that:

“ This model (portfolio theory) has been used to explain conglomerate diversification – in this instance, firms are merely insuring against unique risks by diversifying into unrelated activities”.

The portfolio (hedging) theory has a degree of scepticism associated to it when it accounts for synergy (payoff). Daniel (Diversification, 2003, p. 6) states that “ if the market costs of exploiting synergy between a number of firms are high, added value will be created by linking activities in a single organisation, which is consistent with shareholder wealth maximisation. Neil Kay (1982) believes that synergy and correspondence will lead to interrelatedness. Kay coins the term ‘ catastrophe’, defined as “ the phenomenon external to the firm (i. e. government policies, technological progress and consumer habits) which directly precipitates the decline and obsolescence phase of the product life cycle” (1982, p. 72). Bouvier (1984) analyses the coinage ‘ catastrophe’ further:

“ For firms that operate within turbulent technological environments, subject to rapid acceleration of the rate of technological change, catastrophe always beckons. In this situation, synergy, once a blessing, now becomes a curse. The vaunted interconnections now can help bring down the firm, for if one product fails, others may follow, given synergistic bonds.”

Firms in such a scenario have a trade off dilemma between hedging and synergy. BCG’s life cycle view of corporate diversification can help such firms make this difficult decision.

A firm’s preferred scenario is illustrated in Daniel’s (Diversification, 2003, p. 6) proposition that “ the prime concern at corporate level is the achievement

of a balanced portfolio of businesses that assures an adequate cash flow with which to finance the growth of the firm". BCG's non-traditional approach to diversification is a fusion of its experience curve analysis (market share, economies of learning and cost based advantages) and the product life cycle (market growth rate), whereby a matrix approach is undertaken (the Boston Box). The BCG matrix offers an answer to the puzzle of the portfolio view of diversification. Ricky Griffin (2008, p. 218-219) evaluates the BCG matrix approach to the life cycle model of corporate diversification as follows:

" The BCG matrix suggests that fast growing markets in which a company has the highest market share are more attractive business opportunities than slow growing markets in which a firm has small market share. The matrix classifies the types of businesses in which a diversified firm can engage as dogs (businesses that do not hold much economic promise), cash cows (businesses that have large share of market that isn't expected to grow substantially), question marks (businesses that have a small share in a quickly growing market) and stars (businesses that have the largest share of a rapidly growing market). The BCG matrix suggests that " dogs" shouldn't be invested in, and that a firm should sell them as soon as possible as they have little economic promise. " Cash cows" generate high profits and a firm should use this to support " question marks" and " stars". If the performance of " question marks" doesn't live up to expectations, they should be reclassified as " dogs" and divested (i. e. BMW's purchase and subsequent sale of Rover). Thus cash generated by " cash cows" should be invested in " stars" to ensure their preeminent position."

In conclusion, BCG's product life-cycle view of company diversification can satisfactorily answer scepticism about the portfolio explanations (i. e. when accounting for synergy) of corporate diversification by providing a solution to the portfolio view puzzle.

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## **7 How far can the success of Japanese firms be accounted for by superior ability to create an effective 'organisational knowledge spiral' (Nonaka and Takeuchi, 1995)?**

This essay will determine the extent to which the success enjoyed by Japanese firms can be accounted for by their superior ability to create an effective 'organisational knowledge spiral'.

The success of Japanese firms is characterised by Nonaka and Takeuchi (1995, p. 3), who state:

“ The success of Japanese companies is not due to their manufacturing prowess; access to cheap capital; close and cooperative relationships with costumers, suppliers, and other agencies, or lifetime employment, seniority system, and other human resources management practices-although all of these factors, of course are important. Instead, we make the claim that Japanese companies have been successful because of their skills and expertise at 'organisational knowledge creation'. By organisational knowledge creation we mean the capability of a company as a whole to create new knowledge, disseminate it throughout the organisation, and embody it in products, services, and systems.”



The ability of Japanese firms to create an 'organisational knowledge spiral', involves the two dimensions of organisational knowledge creation as derived by Nonaka and Takeuchi (1995) – epistemological (tacit and explicit) and ontological (individual-team-firm) knowledge.

Daniel (Innovation and Competition, 2003, p. 7) summarises from Nonaka and Takeuchi (1995) that " Japanese firms view knowledge as being tacit i. e. inherently difficult to communicate and share, largely because it is context-specific and based upon intuition, personal experience and beliefs."

Nonaka and Takeuchi (1995, p. 4, 59, 62-63) argue the existence of four modes of knowledge creation or conversion that gives rise to the innovative and successful outcomes of Japanese firms' activity and operation:

" The first mode of knowledge conversion is from tacit knowledge to tacit knowledge, or the process of socialisation, whereby individuals within a firm acquire tacit knowledge from others within the firm by way of face-to-face exchanges such as mentoring, Honda's brainstorming sessions and apprenticeships. The second mode of knowledge conversion is from tacit knowledge to explicit knowledge, or the process of externalisation, which involves metaphors and analogies, such that previous tacit knowledge can be written down (i. e. becomes tangible), like when Canon used the disposal drum in its new mini-copier. The third mode of knowledge conversion is from explicit knowledge to explicit knowledge, or the process of combination, whereby individuals in a company would combine discrete explicit pieces of knowledge into new forms such as a report, like Kraft's micro-merchandising of consumer instore behaviour. The fourth and final mode of knowledge

conversion is from explicit knowledge to tacit knowledge, or the process of internalisation, whereby individual's 'internalise' what they have experienced, ready to pass on this knowledge to someone else."

Combining these four modes of knowledge conversion or creation, whereby one knowledge type is converted into another, leads to " the organisational knowledge spiral, which emerges when the interaction between tacit and explicit knowledge is elevated dynamically from a lower

ontological level to higher levels" (Nonaka & Takeuchi, 1995, p. 57) .

In his review of ' Nonaka and Takeuchi's theory of organisational knowledge creation'

D. McLean (2004) summates the final procedural aspects of Nonaka and Takeuchi's (1995) theory of knowledge creation and the Japanese firm:

" Their theory also explains how individual knowledge is " amplified" into and throughout the organisation through these four modes of knowledge conversion and under five conditions that enable and promote organisational knowledge spiral creation. These conditions include Intention (organisational aspiration), Autonomy (to examine unexploited scenarios), Fluctuation and Creative Chaos (managers deliberately upsetting the routine of the office to break down barriers to learning and efficiency), Redundancy (promoting socialisation), and Requisite Variety (information available to workers to help them deal with any impromptu situations). Finally, the theory consists of a five-phase organisational knowledge creation process. These five phases are:

1) sharing tacit knowledge, 2) creating concepts, 3) justifying concepts, 4) building an archetype, and 5) cross-levelling knowledge.”

The successes enjoyed by Japanese firms such as Toyota, Honda and Sony are quite substantially explainable via by the postulations of Nonaka and Takeuchi (1995) about the superior ability of Japanese firms to create an effective organisational knowledge spiral and in doing so, being able to quickly disseminate this newly created or converted forms of knowledge through organisation, into new systems, products, technologies and methodologies. There will however, always exist a small degree of the success associable to Japanese firms that isn't attributable to a superior ability to effectively create an organisational knowledge spiral; this is success or failure due to market risk and forces. It should be noted that the examples of knowledge creation given above prove that Nonaka and Takeuchi's theory isn't culturally specific; it is universal in its application.

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