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EVOLUTION OF INNOVATION STRATEGIES DURING THE MARKET LIFECYCLE

Tamas Koplyay
Université du Québec en Outaouais
Maria Fekete Farkas, Edit Feher-Toma
Szent Istvan University, Hungary
Li Li
Canadian Advanced Technology Alliance

Annotation

Innovation is at the heart of firm's success. As the firm evolves along the market lifecycle, the nature and contribution of innovation change dramatically. At the beginning the emphasis is on product innovation, in mid cycle on new marketing and financial solutions, the concern being commercialization and growth. At maturity the focus shifts to production innovation and to financial innovation, the recycling the excess cash flows into other productive ventures. Using the concept of the market and organization lifecycle, this paper builds an explanatory and predictive model of the evolution of core innovation as the market develops, matures and declines. It concerns the dynamics of innovation, the innovation profile along the lifecycle and the innovation project profile. The lifecycle has the innate capacity to provide a logical framework for the innovation process and a lot more that both explains and predicts. So in this sense, the lifecycle becomes a template that can be relied upon to trace the evolution of the innovation strategies of the firm, as it progresses along the market curve. Even so the lifecycle sufficiently explains the evolution of general firm strategies, HR practices, IT concepts, IP strategies, compensation practices, marketing approaches and financial responses to name a few of the important management challenges that can be better structured and understood. Our goal is to construct model that will allow practitioners to follow with some certainty their innovation initiatives and provide an underlying rationale for the different characteristics of innovation as the firm proceeds from start up stage to growth then on to maturity and eventually into decline. The focus for this article though is innovation, which is a subset of the other phenomena that can be explained using the lifecycle. Using the concept of the lifecycle we can trace the evolution of innovation strategy, its profile and the projects that deliver innovation. We can link these to the underlying dynamics of both the market and the situation of the firm within the market.
KEY WORDS: Innovation, lifecycle, strategy dynamics, high technology management, market dynamics

Introduction

Authors writing about innovation often refer, without necessarily acknowledging it, to the lifecycle as an organizing concept, and for very good reasons (Casselman Nadeau 2002). The lifecycle has the innate capacity to provide a logical framework for the innovation process (and a lot more) that both explains and predicts. So in this sense, the lifecycle becomes a template that can be relied upon to trace the evolution of the innovation strategies of the firm, as it progresses along the market curve.

To our knowledge there has been no attempt to construct a complete, yet concise, model that will allow practitioners to follow with some certainty their innovation initiatives and provide an underlying rationale for the different characteristics of innovation as the firm proceeds from start up stage to growth then on to maturity and eventually into decline.

This article is based on many years of data collection, teaching of high technology management and other articles that set the stage for this synthesis exercise.

We are confident about the validity and grounded status of the model we are putting forth and invite others to join us to flesh out the details that both confirm and advance the depth of understanding of this powerful technique that, like the laws of physics is symmetric in time, and predicts both the future and the past

Among other applications we have found that the lifecycle sufficiently explains the evolution of general firm strategies, HR practices, IT concepts, IP strategies, compensation practices, marketing approaches and financial responses to name a few of the important management challenges that can be better structured and understood this way.

Using this model we can also extend Porter's five forces model along the curve, explain how the firm's core competencies metamorphose into core capabilities and how and why Christensen's ideas on blindness to disruptive technologies occur during the late stages of the lifecycle.
The focus for this article though is innovation, which is a subset of the other phenomena that can be explained using the lifecycle.

The dynamics of innovation

Innovation and risk taking have been synonymous forever. Firms need to foster, successful innovation attempts in order to guarantee survival, enhance competitive capacity or create competitive breathing room by retreating into niche markets that are innovation driven (Apple vs. Samsung). The extent of the niche retreat and ability to defend the niche market may actually lead the firm to a blue ocean nirvana, as was the case with Apple computers, which now has long outgrown its computer start and can be seen today as provider of personal communication or identity defining devices (many of Apple's products are seen as fashion accessories as much as portable communication devices). The niche market expands like a new universe and becomes more dominant than the market originally abandoned; from PC's to laptops and tablets and finally to universal hand held communication devices and beyond, as embedded in clothing.

Another example of a blue ocean move that did not happen was American Airlines in the early eighties; AA developed its own reservation system, the Saber that they shared with the agents. Of course the reservation system showed AA travel options first. The system became so successful and monopolistic in character that AA was forced to choose between being an airline or a computer system/software designer and operator. The debate internally was long and exhausting, but AA remained an airline and divested itself of the reservation system. In hindsight they may have missed a big jump into a brand new lucrative market that at the time was a true blue ocean

In the auto market Hyundai is experimenting with new green technologies for its engines that could easily catapult it into a distant enough niche market that looks very much like the beginning of a blue ocean. This move may also be interpreted as one up along the food chain from cars to engines, putting Hyundai directly in competition with another engine company, Honda.

The discovery of blue ocean opportunities is fully covered in Kim, Chan and Renee Mauborgne (Kim, Chan, Mauborgne 1999).

IBM has migrated substantially from the PC and even mainframe markets to be seen today as a corporate consulting firm. This migration was possible through the judicious use of marketing and services innovation. Of course others have followed, Compaq/DEC as an example and will follow, since this niche is not well endowed with a defense perimeter but as an early enough movers, IBM enjoyed a huge advantage, along with Accenture, the first giant competitor in this space. IBM's recent acquisition of Cognos is to be assessed in this perspective of building its application software as a consulting firm and a potential one stop destination for corporate clients. Interestingly IBM's original dominance in PC's market has long faded and its first mover advantage never translated into a serious competitive strengtht. It may well be that IBM's corporate heart never left the mainframe thinking and cultural attributes during the development of the PC.

Recently HP has made moves, along with Oracle and even Microsoft to follow into this market of huge margins and stable clientele. HP and Oracle are relatively late movers and their attempts to bulk up through corporate acquisitions may well be an attempt to enter fully equipped for competing with a "one stop" product line up in this space. HP and Oracle acquisitions provide both market share presence and new innovation capability to the parent companies.

What drives the dynamics of innovation?

Fig. 1. and 2. depict the dimensions of innovation and how the shape of the "egg" emerges from the dominant dimensions at the various phases of the cycle.

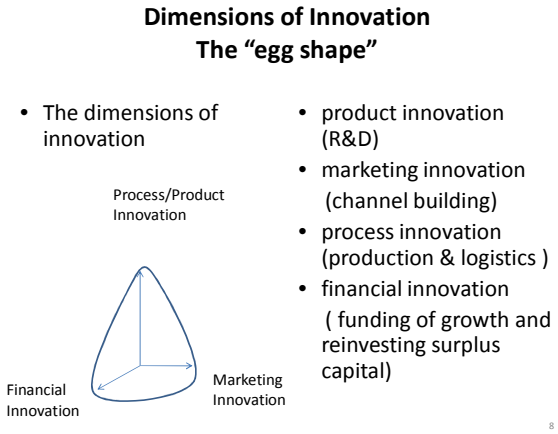


Fig. 1. Four Dimensions of Innovation: The "egg shape" represents the 3 dimensional projection

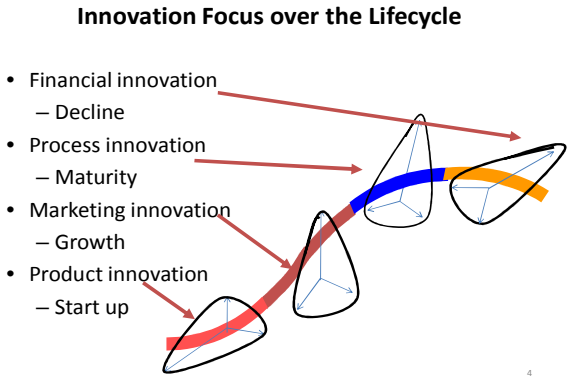


Fig. 2 Innovation of Focus over the Lifecycle

Innovation like any other activity in the firm is subject to the rationale of the appropriate strategy for the particular stage of the lifecycle. In the early stages the rush is to build the top line, in other words revenues faster than the competition. This is done because revenue growth best correlates with stock price and investor interest. And this is why red ink is of little concern to the venture capital investor as long as the revenue growth is substantial in the

sense of faster than any close competitor's and commensurate with growth of the market.

Once the exponential growth phase is exhausted, investors also demand operational discipline and the focus shifts to margins, which require cost controls. So significantly the strategic task shifts from primarily an external perspective, revenues, to an external-internal combination, revenues minus costs, that is margins. This is why entrepreneurs yield to professional managers beyond the high growth stage as leaders of the firm. Entrepreneurs tend to be supercharged on vision and short on managerial discipline, which is absolutely critical for margins generation and maintenance.

When markets start leveling off and shakeout looms the emphasis once again shifts to profits. It takes financial reserves to survive shakeout and great technology does not cut it. All along the maturity phase the key indicator to investors remains profits, which can either be returned to investors as dividends or reinvested in the firm. The very first signal that the growth phase has been left behind is this payment of dividends. The firm admits that it can no longer justify major investments in itself and returns the surplus funds to the shareholders. Microsoft crossed this threshold about a year ago, whereas Apple still finds internal investment opportunities, mostly in next generation products. Correspondingly Apple stocks are on the move and Microsoft shares are stagnant. Worth remarking at this point that firms generate returns for shareholders in two basic ways, either through share appreciation [market value added] or through profits which may become dividends [economic value added]. So the focus shifts from top line to bottom line as the market evolves. Early firms tend to add value through stock price growth and mature firms through accumulation of dividends. In this respect early firm investments are more spectacular and lot more risky whereas late firm returns are steady, usually dependable and low risk. In between growth firms bring a combination of returns, increase in stock price and progressive increase in profits. And that is why firm leadership changes for the visionary entrepreneur who is market fixated to the professional manager who keeps eye both on the market and the firm to the late stage mature market administrator who almost exclusively focuses on the internal operations of the firm (Koplyay et al 2006).

Once the market decline is reached, the challenge is to recycle funds into more productive investments and use the cash cow grazing in the fading market pastures to feed the question marks and stars of the portfolio, or outside the portfolio.

Fig. 3. shows how the focus of innovation evolves along the cycle.

Innovation Characteristics along Lifecyle

	Startup	Growth	Maturity	Decline
Strategy Focus	Product design; Market development	Sales; Production capacity; Production technology	Market share; Production efficiency; Customer loyalty	Margins; cost controls; Financial strength; Portfolio balance
Product Innovation	Product design; Product/ market match	Product differentiation; Product line-up	Product variants; Production costs	Cost savings
Marketing Innovation	Product awareness; Market development	Sales; Brand development; Price reduction	Defend market share; Market share; Customer loyalty	Market exit; market rejuvenation
Process or Production Innovation	Narrow range production or outsourcing	Production capacity; Production technology; Standards development	Production efficiency; Productivity technology reengineering	Capacity/ volume balance
Finance Innovation	Lines of Credit	Capital acquisition; Cash flow	Capital asset management	Margins; cost controls; Financial strength; Portfolio balance; Reinvest profits

Fig. 3. Innovation Characteristics along Lifecycle

The markers of the phases: revenue, margins, profits and cash flow growth are the closest indicators of stock performance and investors make their calculations using these indices as the key input. Martin (Martin 2010) has argued that managers of a firm would be better off concentrating on costumer interests instead of shareholder ones. The claim is that superior results can be attained with this change of focus. Our contention is that customer focus is fine during early stages of the market because it promotes revenue growth but in late stages the customer focus should be replaced with paying attention to the competitors, as now the customer base is stable and well documented and profits are more impacted by competitor moves. And this is why competitive intelligence increases in importance.

Along with the evolution of the financial dynamics we see a corresponding change in management and leadership style at the firm; entrepreneurs of the start up and incubation phase yield to managers in the growth phase, who in turn are replaced by administrators at maturity and the financial custodians in decline. Interestingly the characteristics of these managers correspond to the management style needs of the particular market phase.

Entrepreneurs look exclusively to market opportunities, managers focus on both markets and the firm, administrators still scans in a cursory fashion the now stable mainstream conditions but concentrate on the internal efficiency of the firm to become either the low cost producer or the innovative niche player. In the decline phase, with competition actually starting to leave the market, the financial engineers take over and exclusively focus on the firm, squeezing the operations to extract all the cash flow for outside deployment.

Fig. 4. summarizes the profiles of the leaders managing the innovation process during the four phases of the lifecycle.

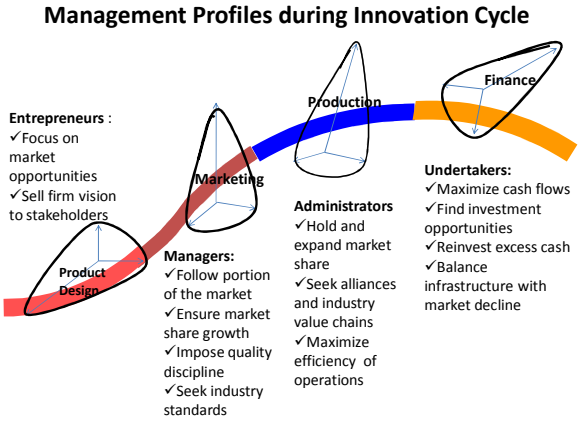
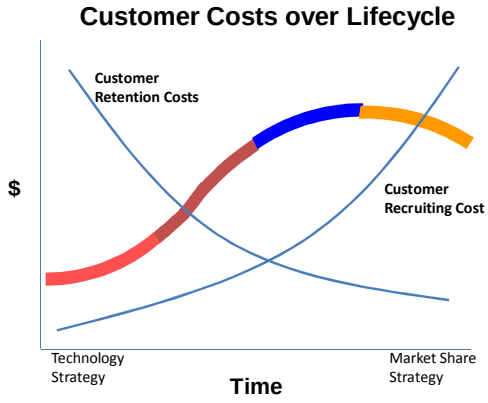


Fig. 4. Management Profiles during Innovation Cycle



Label bold curve as »market lifecycle »
Fig. 5. Customer Costs over Lifecycle

The innovation profile along the lifecycle

It is our contention that innovation has many dimensions, with specific dimensions dominating the firm's innovation focus at different stages of the cycle. But all of the key ingredients of innovation are there and play some role, although a subservient one to the dominant feature. It can happen though that sometime a firm risks all in with a new strategy or a newcomer enters the market with some disruptive idea that defies the dominant innovation mode and redefines the competitive dynamic, but these situations are the exception not the norm.

At the beginning of incubation and start up, the firm's priority is breakthrough innovation to appeal to the innovators and early adaptors of the market, who are as equally technically competent as the firm in the use of the product and relish the chance to deal with challenging technologies. They even take the time to provide feedback to the firm and become a big beta incubator that will signal to the next group, the early majority, the appeal of the product. The only way to retain this customer's group's loyalty is through a continual cycle of new and cutting edge products. The relationship between customer recruiting and retention cost is shown below:

Fig. 5. demonstrates the evolution of the two dominant customer costs during the market cycle. Note the contrasting relationship between the two.

The shape of these curves has logic of its own. The interesting aspect here is that you cannot retain the customer base at the early stages unless you have the very best performing product, even if this product is fragile and lacks reliability. Your marketing signaling device is in fact the cutting or bleeding edge features of the product that recruit the customer, who is the innovator or early adaptor seeking the new product rush. [teenagers and iphones] The relationship reverses in the late stages where recruiting costs become prohibitive, as every competitor wants to hold market share and will defend this with determined effort. However the good news is that retention costs moderate and through such devices as switching costs the customer can be enticed to remain with the firm.

It is worth noting that the early stages are where competitors are "to be beaten" to build market share whereas in the late stages, because market shares are now aggressively defended, the mantra becomes "if you can't beat them buy them". Most of M&A activity in the late stages is to enhance market share (print media]) and in the early stages to capture good technology. Whether to acquire,merge or seek a strategic alliance is the proper option is discussed in an article by Roberts (Roberts, Wenyun 2001).

For a long time during its early growth, Cisco went through dozens of acquisitions, to bring in- house great technologies developed by small and not so small firms. In fact in their candid moments Cisco admitted they were a lot more of a marketing company than a technology one. In contrast Microsoft tried to develop its critical technologies at home, and made several attempts to diversify its markets, without much success it appears. Cisco acquisitions were by and large a great success. And some of the reasons can be found in (Koplyay et al 2007).

The innovation profile changes dramatically along the curve.

During the first stages the firm is a reckless risk taker with blue sky and breakthrough thinking dominating the culture, when high growth rates level off the risk profile transits to risk management (seeking a balance between

new technologies and protecting infrastructure already developed). The dynamics of slowing down the risk taking happens first when marketing comes on the scene (In the early stages marketing's role is minimal as the market seeks you out. You are targeting the innovators and early adaptors, who are alreay looking for you.

But when, and if, the chasm is crossed and the early majority looms, marketing begins to play a key role. As part of crossing the chasm, a bowling alley strategy was developed to focus on the most promising segments of the exploding market. Entrust, in the field of encryption technology, targeted the banks with an impeccable rationale, if we are good enough for the banks we should be good enough for anybody.

However a close competitor to Entrust, VeriSign, grew faster than Entrust during the early tornado phase and hence had better stock price performance due to its top line numbers. So VeriSign was in a position not only to apply competitive pressure but to threaten an acquisition of Entrust. Strategically market share gains (market strength) on the competition can assure both late stage success, a sin setting stanards and a takeover scenario. (The lesson here is that great innovation without great growth numbers is not much help.)

After selecting specific market segments a firm will build customized channels to its customer base. And then marketing comes in to manage and nurture these channels, furthermore because channels represent an investment, finance also starts to take notice.

So the word is relayed to product designers to scope down the blue sky approach and start focusing on products that fit and fill the channels.

In addition, the early majority now is asking for vastly increased product reliability, quality and ease of use which becomes a further constraint on product design freedoms (Moore 2005).

Marketing intelligence feeds this demand configuration back to the product designers and a discipline of not going beyond channel capacities is imposed. Silicon Graphics in the early nineties took its eye off the quality ball and paid a handsome penalty for it. The head of manufacturing called a crisis meeting to force the company back to order as there was significant defection and discontent among its early majority customers, because of persistent quality problems.

A specific technique, concurrent engineering, is often used at this point to instill discipline. Marketing product designers, accountants and production people sit around the same table and discuss their needs. Marketing asks for simpler and less expensive product features, production demands fewer moving parts to make manufacturing easier and better achieve product quality performance and finance imposes product development and production budgets.

Slowly the risk promoting tendency is washed out of the culture and is replaced by a calculated management of risk that evaluates payoffs in light of the market constraints and the existing customer base. The entire support scenario for innovation is discussed in kolyay et al (Koplyay, Chillingworth, Mitchell 2013).

By the time mainstream is reached the firm has substantial investments in infrastructure as part of its legacy. Culture, routines, values, procedures and resources allocations all interact to protect these investments in assets; both tangible, like production capacity and intangible, customer goodwill.

The risk taking is further constrained. Only incremental innovation that supports or improves firm efficiency is promoted or accepted. The hallmark technique of innovation at this phase is TQM, ideas provided by the many is distilled by the few and is meshed seamlessly and incrementally to the existing infrastructure without disrupting operations.

Maclaren Industries (papermaking) in Canada in the mid nineties had production machinery worth close to $500 million that ran 24 hours, every day of the week, with almost zero downtime. The firm had duplicate test machinery off site worth $30 million, which was used to assess all suggested improvements and innovations. The key consideration for this very mature company was never to endanger operations. Risk containment was the principal objective.

Innovation here concentrates on production matters and correlated marketing issues. Product design plays a secondary role and only to the extent that design can help the production process or create, on the margin, product variants that marketing can move within existing channels.

Once the firm reaches market decline the dominant culture becomes one of risk avoidance. The market is close to collapse, competitors are leaving and the firm is exploiting the decreased competitive situation and maybe even gaining market share captured from the exiting firms although in a shrinking market and paradoxically in market decline you can gain market share as your revenues collapse.

Life can be good though (if risky when the rate of decline or potential market collapse is misjudged and assets are left stranded and become write offs) and the principal task is to decrease production capacity commensurate with the market decline.

The focus is to extract the maximal financial returns while the market is still alive. There is no need for renewal innovation, instead just enough creative tinkering is fostered to keep assets healthy and sustainable in the short run.

The premium is on deployment of cash flows and hence the key innovation dimension is finance. Production efficiency is still there and marketing concepts echo through the corporate suites but no longer dominate executive thinking. Product design is a distant memory.

Fig. 6. demonstrates how risk is perceived and managed during the cycle and the framework within which innovation adapts.

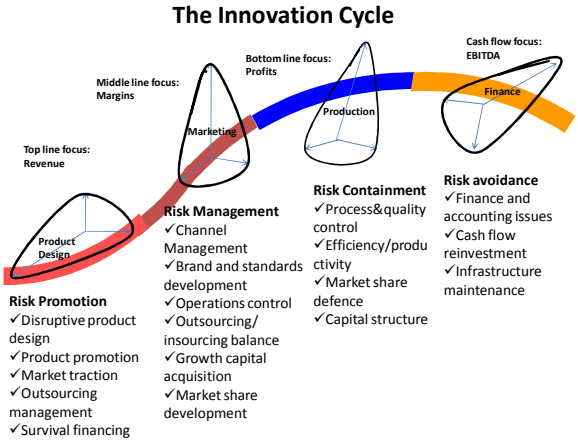


Fig. 6. The Innovation Cycle

So through market pressures the firm, as it proceeds along the lifecycle, evolves from innovation strategies that promote risk taking to the final stages where risk taking is almost banished.

Along with this dynamic, innovation changes emphasis from product focus and big thinking to tightly focused financial concepts such as where to reinvest and how to exploit the remaining competencies of the firm.

Although the succession of innovation is primarily product, marketing, production and finance, nevertheless the other dimensions in a reduced capacity are still there, except perhaps they are not obvious until the transition takes place.

The first stage "egg" is shaped mostly by the product demands which are of the breakthrough type. Yet when the chasm is crossed and bowling alley strategies form, marketing and finance dimensions assert themselves and as soon as the tornado is entered, production plays a key role to protect the quality and reliability interests of the early majority/pragmatist customers.

As the bowling alley develops marketing takes the lead with finance playing a supervisory role in imposing returns on investment criteria. Product design starts a long descent into a secondary or even tertiary role. And this is one of the reasons that top product designers start leaving the firm. They no longer see the challenge of creating cutting edge products and seek out younger firms that still do.

The "egg" now has a principal marketing axis.

When the firm graduates to mainstream and enters maturity, which can last a long time, production takes the lead. The customer base now is mostly the late majority and this group is highly price sensitive, quality conscious and product functionality focused.

Using the market share built during the growth phase, production now bears down of the task at hand.

Economies of scale guarantee the ability to execute a low cost strategy. Close supervision of the production process leads to better quality and incremental product design can hide the technology in a black box that becomes the surface of interaction for the customer and the guarantor of high functionality. Examples are GPS devices installed in cars, the technology is completely masked and the driver sees only the response to or three basic queries

Product design fades to a support role and marketing changes emphasis, instead of always seeking out new markets its primary role is to reassure the existing customer base. The production capacity constraints can dictate sales scenarios that are limited in scope. The volume of sales cannot exceed the capacity to process the orders. Marketing is at this stage more of a junior partner to production and product design is either subservient to production needs or is substantially absent.

In the final stage of decline, the accountants rule the roost. The goal is to extract the maximum return in the form of cash flows for use outside the company. Within the company the only investments that take place are for maintenance of the decreasing production capacity and marginal marketing to serve the legacy customer base. This base is usually well known and does not need major marketing efforts to service.(And accounting imagination takes hold, profits now become EBITDA so that cash flow is maximized to appeal to the economic value investor).

A typical example is Lucent, which services the legacy end of the IT market and generates a very decent return on its efforts.

The "egg" now lies on its side with finance as the main component. Production is still there but diminishing in importance and marketing is a service provider to the other two functions.

The shape of the "egg" evolves along the curve with different players taking turn to assume the lead role.

The dominant players of the late stages are not even present at take off, and conversely, the critical inputs of the early stages are non factors at the end. The evolution of the customer base during the lifecycle influences critically the strategic responses.

Fig. 7. shows the interaction between the customer bases and the major markers of the hi-tech cycle as the market develops.

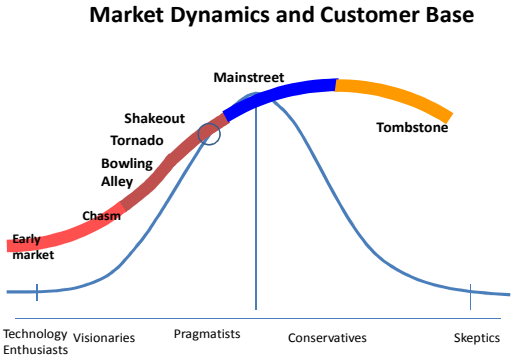


Fig. 7. Market Dynamics and Customer Base

Innovation Project Profiles

What about the characteristics of the activities that delivers innovation?

Almost all innovation, within the firm, takes place on a standalone project basis (the other mechanism is serendipity). But the nature of these projects, their contribution and payoff times vary depending where in the lifecycle the project is undertaken.

Fig. 8. captures the profiles of the underlying projects that deliver the innovation activities during the market evolution.

Innovation Project Profiles

Supports strategy	Supports strategy /Implementation	Supports Implementation of strategy
Low success rate (1-10%)	Higher Success Rate (>50%)	Medium success rate (10-30%)
Product focus	Delivery focus: Suppliers/channels	Alliances focus: industry value chain
Portfolio based (R&D motivated)	Functional based (marketing, logistics etc)	Intra or inter-company based Partners, suppliers, competitors
Short Duration (3-6 Months)	Longer duration (6-18 months)	Longer duration (2-3 years)
High Immediate payoff	Payoff spread out in time	Payoff only after implementation
Idea/Product Centred	Product/production centred	Asset centred
Company based	Focus outside company	Focus both on company and market
Internally funded	Internally /venture capital funded	Internally/jointly funded

Fig. 8. Innovation Project Profiles

Based on unpublished research we can provide a summary of the innovation project profiles as the firm moves along the cycle. This summary is provided above.

Early on innovation is at the heart of strategy. It is risky, of short duration and is often abandoned in execution phase due to unforeseen market developments, but the payoffs are immediate when innovation projects are successful. More often than not they fail as projects or fail to produce anticipated results.

During the growth phase of the market innovation projects focus on both supporting strategy and its implementation. The projects are initiated by the various functional groups in the firm, are less ambitious and hence have higher success rates. Project payoffs are delayed until implementation of the results.

At the late stages innovation projects tend to buttress strategy implementation, as the strategy itself is now stable (either cost leadership, or niche market innovation). Success rates are much higher but involve more stakeholders as the results may affect the company and its partners in the industry value chain. Payoffs are even more delayed due to implementation requirements of the many parties generating the project. (Innovation aimed at improving company logistics is only going to pay off when suppliers and customers both implement the improvements at the same time.)

It may be worthwhile to look at now the stages and types of in venture type capital involvement we find with respect to financing innovation which is at the heart of the young firm. In VC financing the above mentioned stages can be also observed according to the actual situation of the company.

Seed/start up financing:

Seed capital is connected to companies being formed but not yet in fully operational. The development of a basic business idea is supported at this stage through the implementation of a research plan that will bring forth the service or product destined for the market. The technological and economic analyses are financed by this investment. Since the company does not yet exist legally, the investors get options, which ensure them the right to have the proprietary shares in the company in the future.

The start up financing is connected to the product development or service, the testing and the production, often through outsourcing of the product offering by the company that now has assumed legal status and in case of service it is connected also to the establishment of the service. Furthermore financing supports efficient market penetration and especially the ability to follow market growth subsequent to crossing of the chasm. According to Dan Primack Venture Capital investment hit a 14-year high and Venture capitalists are paying more for startups. Much more. And they also have a lot of new funds from which to invest (Primack 2014). This availability of new funds could be attributed to pension funds looking somehow desperately for home runs. These investors tend to respond earlier than their larger VC counterparts, and get heavily involved at the earliest stages of company development. Steve Anderson, for example, used this model with Instagram, getting heavily involved during the first year or so of the company's development. That paid off when Facebook bought the company for $715 million (Forbes 2013).

Both the seed and start up financing have the common feature that they have extremely high risk content.

Early stage financing:

The newly formed companies, which have been working for a short time, and could not get any bank loan because of their high risk profiles, need help from the venture capital. In this stage of the financing the investor has the most active role in the business management to reduce the involvement risk. It is not uncommon for the investor to step in and take control of the firm when the firm does not follow the anticipated growth path.

Such was the case with Philsar in Canada where the key investor stepped in, cleaned house and built the renamed company, Skystone into an attractive takeover target for Cisco.

Expansion/Development financing:

During the expansion stage companies could run into liquidity issues, often due to an imbalance between accounts receivable and payable, an important first sing of dysfunctional entrepreneurial management. And market growth itself may be happening too fast for the firm to keep pace from internal resources. Growth consumes funds quickly but this is acceptable as long as market share and stock value keep pace.

Until this time the previous capital investments are returned so the investments for solving the liquidity problems have relatively small risk. Usually when further financial support is needed, it may be coming not only from private equity or venture capital funds but also from the

bank as a bank loan or mezzanine investment. By this stage the firm has assets the banks can make a loan against; IP, market presence, reputation, key customers and order backlogs. The risk is reduced to a normal level for the institutional investor.

Financing the Initial Public Offering of the company (IPO):

One possible way of leaving the company for venture capital is taking the company public but it is only common in the countries which have a developed capital market. Furthermore the going public phase has onerous information restrictions on the firm to prevent insider trading and stock manipulation, for this reason many young firms in fast moving markets do not prefer this route. Venture capital has to finance the transition period and the setting up of the conditions, which are needed for the realization of the IPO. The venture capitalist has a most important role during this stage, from organizing the syndicate through the preparation and the issuing of the prospectus until the company becomes listed in the stock exchange. As an example the IPO of Facebook in May 2012 can be mentioned.

Financing of the management buyout (MBO) and management buy in (MBI).

Turnaround financing:

Some companies, which are in trouble, financial or managerial, may be worthwhile for venture capital to support. In this case when the problem is occurring in management [for example the knowledge or experience of the management team is not insufficient] then venture capital could reach an effective solution by financing a restructuring of the company or the replacement of the management team (BSE 2003), (Feher-Toma Fekete-Farkas 2014). Turnaround has some specific timelines in mature markets; a company is deemed to have turned around if it posts 6 consecutive quarters of profitability. For the young firm this is not applicable as profit in early markets is nonexistent as the metrics of success are based on market share, revenue growth and customer base loyalty and stability. Usually turnaround is a one-time event, if there is a second turnaround situation the firm usually goes under. Like people firms get confused from turning around too much.

Among other things such collective response tends to foster core capabilities; “what unique things we can do together”, as opposed to early stage core competencies; “what I can do alone.” Initially the projects overlap due to uncertainty in the market and the strong competitive pressures, which often forces the firm to place several bets at once and abandon some projects in mid stream.

As a result projects pile up as waves when driven to shore by the strong winds. High growth lessens these pressures by giving more competitive space to the firms, and hence the projects become less crowded and better planned. Eventually towards mainstream the project overlaps cease and become sequential. Again there is more deliberate planning and selection of projects according to the firms’ strategy and innovation agenda (Hirotaka, Ikujiro 1986).

In maturity, the stroll down mainstream leads to projects that may be distanced from each other, with gains from one project assessed before the next one is undertaken. Projects here usually maintain their ‘shape’ during execution and a lot less contingency adjustments are made. Innovation results last much longer but have only incremental impacts on strategy. Their focus is mostly efficiency improvements to existing operations.

As market head winds diminish (to appreciate the concept of market headwinds, see articles by Paquin and Koplyay 2007), the project portfolio assumes a deliberate structure that is maintained during the execution cycle. Due to higher market certainty, better planning and incremental focus of the projects, a much higher success rate is achieved.

But the payoffs are marginal for each innovation project, although cumulative effects of many initiatives can be impressive. A penny saved on each ton of material produced, when volumes are in the millions, is a significant cost reduction.

Fig. 9. shows the correlation between the evolving innovation profiles and their delivery mechanisms, projects.

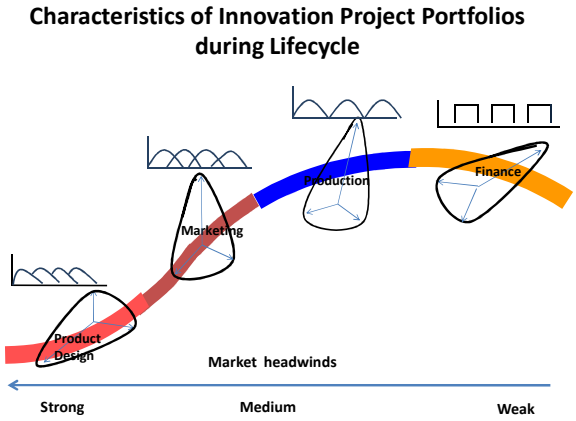


Fig. 9. Characteristics of Innovation Project Portfolios during Lifecycle

The innovation projects could be also considered to have an “egg” shape.

In the early going the main axis is strategy development then its support, in mid cycle it’s both strategy and its execution that shape the “egg” and late stages the key factor is implementation of strategy.

Conclusions

Using the concept of the lifecycle we can trace the evolution of innovation strategy, its profile and the projects that deliver innovation. We can link these to the underlying dynamics of both the market and the situation of the firm within the market.

Innovation first supports, during takeoff, the sometime desperate gambles of the firm to gain market traction and then, as progressively the market headwinds subside, it

underwrites the search for efficiency in the execution of the cost leadership strategy, unless the firm is in a niche market where innovation can still focus on product rejuvenation, in which case it becomes both the primary defense mechanism of the niche and a device to open up doors to blue ocean options. Very distant niche markets from the mass markets can be considered as the first stage of transition to blue ocean markets.

Projects, which are the most common vehicles to deliver innovation, also obey an evolutionary process that takes them from supporting strategy to enhancing implementation.

Project portfolios are shaped by the market headwinds (uncertainty and competitive pressures) and progress from highly unstable, overlapping and structurally fragile state to a more robust sequential existence that avoids the instability of the overlaps and low success rates of the early stages.

Future research should be able to confirm the specific links between innovation and the projects that deliver them by segmenting the market into its four distinctive phases. Furthermore the explanations for the shape of the innovation egg and the underlying project delivery mechanisms can be retested against past and present data bases.

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EVOLUTION OF INNOVATION STRATEGIES DURING THE MARKET LIFECYCLE

S u m m a r y

Innovation is at the heart of firm's success. As the firm evolves along the market lifecycle, the nature and contribution of innovation change dramatically. At the beginning the emphasis is on product innovation, in mid cycle on new marketing and financial solutions, the concern being commercialization and growth. At maturity the focus shifts to production innovation and to financial innovation, the recycling the excess cash flows into other productive ventures.

The lifecycle has the innate capacity to provide a logical framework for the innovation process (and a lot more) that both explains and predicts. So in this sense, the lifecycle becomes a template that can be relied upon to trace the evolution of the innovation strategies of the firm, as it progresses along the market curve.

To our knowledge there has been no attempt to construct a complete, yet concise, model that will allow practitioners to follow with some certainty their innovation initiatives and provide an underlying rationale for the different characteristics of innovation as the firm proceeds from start up stage to growth then on to maturity and eventually into decline.

This article is based on many years of data collection, teaching of high technology management and other articles that set the stage for this synthesis exercise.

Among other applications we have found that the lifecycle sufficiently explains the evolution of general firm strategies, HR practices, IT concepts, IP strategies, compensation practices, marketing approaches and financial responses to name a few of the important management challenges that can be better structured and understood this way.

Using this model we can also extend Porter's five forces model along the curve, explain how the firm's core competencies

metamorphose into core capabilities and how and why Christensen's ideas on blindness to disruptive technologies occur during the late stages of the lifecycle.
The focus for this article though is innovation, which is a subset of the other phenomena that can be explained using the lifecycle.

Using the concept of the lifecycle we can trace the evolution of innovation strategy, its profile and the projects that deliver innovation. We can link these to the underlying dynamics of both the market and the situation of the firm within the market.

Innovation first supports, during takeoff, the sometime desperate gambles of the firm to gain market traction and then, as progressively the market headwinds subside, it underwrites the search for efficiency in the execution of the cost leadership strategy, unless the firm is in a niche market where innovation can still focus on product rejuvenation, in which case it becomes both the primary defense mechanism of the niche and a device to open up doors to blue ocean options. Very distant niche markets from the mass markets can be considered as the first stage of transition to blue ocean markets.

Projects, which are the most common vehicles to deliver innovation, also obey an evolutionary process that takes them from supporting strategy to enhancing implementation.

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KEYWORDS: Innovation, lifecycle, strategy dynamics, high technology management, market dynamics

Tamas Koplyay received Master's degrees in Systems Engineering, Applied Mathematics and Information Theory from the State University of New York, his MBA from University of Ottawa and his Ph.D. in Systems Science from Michigan State University (1974). He was a visiting researcher at the Harvard Law School in Public Finance in 1985. Currently, he is professor of high-tech strategic management at the Université du Québec en Outaouais. He is also the director of research for the Canadian Advanced technology Alliance as part of his university commitments to the hi-tech community.

Maria Fekete-Farkas Faculty of Economics and Social Sciences, Szent Istvan University. She received Master's degrees in Economics from the the University of Economic Sciences of Budapest in 1975 and has got PhD degree in 1998. She is professor and head of department of Microeconomics at the Szent Istvan University. She is one of the founders and leader professors of Management and Business Administration Doctoral School at her university. She has participated in several projects founded by European Commission and Hungarian Governments. She also member of organizing committees of national and international conferences and editorial boards of scientific journals. E-mail:Farkasne.Fekete.Maria@gtk.szie.hu. Páter Károly utca 1.,Gödöllő, 2100-HU, Hungary

Edit Feher–Toma PhD student at Szent Istvan University. She holds a bachelor degree in EU Funds management from Dronten Professional Agricultural University in the Netherlands and a Master's in Agricultural Economics from the Szent Istvan University in Hungary. She is managing a unit dealing with EU related matters at the Hungarian Ministry of Rural Development while she is working on her PhD studies at Szent Istvan University. E-mail:edittoma@yahoo.com

Li Li holds a bachelor degree in software engineering from Wuhan Univerity in China and a Master's in project management from the Universite du Quebec en Outaouais. She is currently a project management consultant with the Canadian federal government and an associate director with the Canadian Advanced Techology Alliance.