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# HR ISSUES EVOLUTION ALONG THE MARKET LIFECYCLE AND THE VALUE CHAIN: CASE OF THE HI-TECH INDUSTRY

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ABSTRACT. Managing human resources and aligning this input with market demand is a primary ingredient of corporate success. In fast paced industries, such as high technology, the issue is even more critical since the duration of a specific HR configuration is short and the transition periods from one to another are sudden and often unexpected, yet predictable. Furthermore, the configuration profiles are substantially different as the company itself transitions from incubation to market traction and growth through the lifecycle phases of leveling off, maturity and eventual market decline. It is well known and widely accepted that corporate structure also follows such dynamics, and that companies which best align structure with market conditions produce sustainable and superior financial results in the long run. In this article, we shall provide arguments that proper matching of HR management with evolving market conditions should also contribute substantially to the survival and long run success of the firm. The logic of the article follows the development of the market dynamics and the related HR issues, and provides a logical framework for creating an alignment between the two. To the extent that the market lifecycle provides an all-encompassing prototype for the entire market evolution, the model put forth is both explanatory and predictive. Value chains also emerge in market maturity and add complexity to HR functions by creating company traits that differ enormously between upstream and downstream components. The article further provides a framework for exploring this HR dimension. Once a map of the market situation (growth and value chain) is created, it becomes possible to predict where a firm is heading, how HR issues are about to change, and which HR response strategy should be deployed for the most probable outcome of success.

**JEL Codes:**

Keywords: human resources design and management; information technology; market lifecycle; value chain; smart economies; hi-tech industry corporate centers of gravity

## 1. Context

The proper management of available human resources is one of the determining factors for an organization's long term success. It is estimated that approximately 70% of a hi-tech firm's activities are delivered on a project basis: strategy choice, strategy implementation, product development, market positioning, mergers and acquisitions, downsizing, restructuring and supply chain or distribution channel development. These collectively represent examples of critical functions that are project based initiatives, and can be managed as discrete projects with all the concomitant phases and methodologies. However, in each of these endeavors, appropriate marshalling of human resources plays a key role. Furthermore, when the firm is in the steady state mode of stable and continuous interactions with the market (Koplyay et al, 2010) these very same resources are at the forefront of the daily management and operations of the firm. According to Pfeffer (1994), the current recognition among strategic management researchers is that sustained competitive advantage arises more from a firm's internal resource endowments and resource deployments, particularly its human capital that are imperfectly imitable than from a firm's product market position (Malik, 2009). HR is very much a resources husbanding component of the firm but it also plays a critical role in the firm's positioning strategies. [1]

Whether the firm aims to maintain existing market orientation equilibrium, or proceed to project-based management of change to a new equilibrium, four principal factors are crucial to implementing the change:

1. Staffing and leadership style as framed by the firm's culture;
2. Choice of structure;
3. Incentive and reward systems that drive individual or group accomplishments and are aligned with corporate goals; and

[1] Exhibits 1 to 9 are adapted and modified from Dickel, K. E., Mason, R., Rowe, A.J., *Strategic Management and Business Policy: A Methodical Approach*, Addison-Wesley Publishing Company, 1982; and Galbraith J., Kazanjian R., *Strategy Implementation*, West Publishing,1986

4. Decision making mechanisms and supporting IT infrastructure (Galbraith, Kazanjian, 1986)

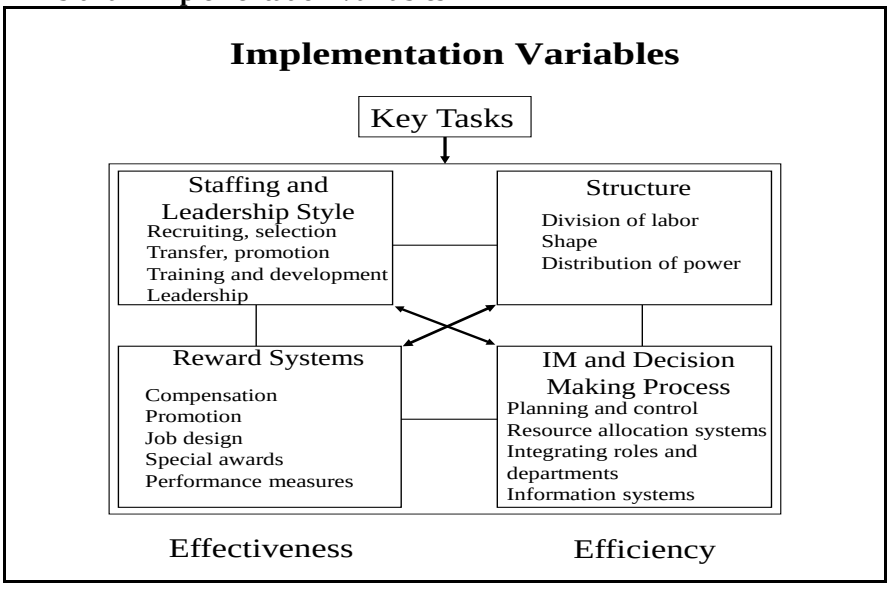
All of these factors, with the exception of the choice of structure, arise from human resource management considerations, however the choice of structure also has a direct impact on the performance of the human resources.

As an example, matrix type structures require a particular type of individual in order to thrive, which is quite different from the character of individual required for a functional type structure. The matrix structure is premised on the presence of staff which can live with ambiguity, multiple reporting relationships, weak power reinforcement and frequent, internal re-assignments. Life in the matrix can best be described as variable and discontinuous, and represents a continual struggle for survival with only the most flexible employees predestined for success.

In the functional structure much is predicable, stable and continuous, attracting and conditioning employees who are risk averse. In a military analogy, those who prefer the functional form would join the navy, those who seek out the matrix would become pirates. Apple's Macintosh design team is a literal example where the group worked in a separate building with a pirate flag flying over it (Pfeffer, 1998).

The basic relationship among the four variables is shown in Exhibit 1a.

**Exhibit 1a – Implementation Variables**[1]



Staffing and leadership and the reward systems have a primary effect on the firm's long term interactions with the market [effectiveness] whereby the structural form, along with decision making routines, reinforce the short term position [efficiency]. In particular, it is worth noting the strong ties among the variables: staffing has a direct impact on decision making and conversely, the level of knowledge, experience and education of the staff determines the characteristics of the supporting decision making system to be implemented. In turn, the established decision making routines of a firm become a factor in hiring and training future staff, and reinforce the internal "cultures" and leadership styles of the organization. Structure defines the direction of information flows, the impediments to decision making, and the relative openness of the firm to the environment.

## 2. Boundaries and the identity of the firm

Every organization has to have some boundary to maintain its identity vis–a-vis the environment, otherwise the completely free exchange of information and export-import of resources can lead to an equalization of entropy levels inside and outside the firm's perimeters, which leads to the eventual absorption of the firm into the background environment.

A living entity, the firm, within its environments requires the maintenance of separating boundaries to keep its level of organization and information above that of the environment in spite of the second law. However, critical trolling of the environment remains a key challenge in order to extract from the environment strategic information that can be used to set goals, directions of evolution, and performance measures during the attainment of these desired objectives.

Furthermore, the firm has different information requirements for each function within its structural boundaries; marketing seeks out information that captures the firm's relationship with a critical stakeholder - the customer - so it is externally oriented, whereas the HR is internally focused but needs information from competitors on compensation, hiring practices, attrition rates and level of satisfaction of the employees, so every function focuses on different information type, quantity and frequency of acquisition of this valuable commodity.

To accommodate these differing needs, the firm develops several layers of overlapping boundaries that are open to and filter the appropriate information required by the specific function. It is as if a filter or membrane characterizes each boundary that is permeable to certain types of information flows and not others, which may become distractive and confusing to the function assigned the boundary.

But there are definite overlaps: marketing and HR may be equally interested in the staff turnover at competitors' and customers' premises. Excessive turnover at competitors may signal weakening of competitive pressures and an opportunity to raid the competitors' client base. Similarly, high turnover at customers can be the first sign of unreliable future sales to the particular customer. On the other hand, HR, seeing high layoffs at close competitors, may anticipate the easing of compensation pressures and the opportunity to staff for the future, as was the case when Nortel layoffs became a hiring bonanza for Cisco. Analogously, staff turnover at major clients may put immediate pressures on HR to redeploy staff or even, as is the case with Japanese kairetsus, loan critical staff to either troubled suppliers or customers to maintain the viability of the value chain.

So information can be shared but used for very different purposes as determined by the filtering mechanism associated with the function. Some activities forcibly modify the boundaries of the firm; reorganization, downsizing and M&A are, in particular, major influencers of boundary adjustments that often expose the firm to an external threat of loss of identity. This was the case with Nortel's acquisition of Bay Networks where the acquired company was never integrated into the parent but remained a quasi, almost competing independent entity. This instance is a marked contrast to the quick absorption of acquired Nortel units by Avaya.

Reorganization can alter the shape of the boundaries and their relative importance depending on which functions assume greater or lesser roles. Under restructuring or reorganization, the firm may also lose the previously independent status of the various functions, with some weakened and others strengthened. This imbalance of relative power can lead to further erosion of information management that is dependent on information sampling and acquisition across the boundary.

For example, when a firm outsources an important function due to cost considerations, such as manufacturing, it can lose control eventually over the quality dimensions of its products, as production is no longer there to exercise a moderating influence on the roles of marketing and product design. Excessive outsourcing and extreme reorganization can lead to dangerous information hollowing of the company that can no longer tune in to the frequencies of the market. This may well be the case with Sony today, that has progressively outsourced so many of its functions that it is today just a marketing company with about 80% of the value added to its products provided by suppliers.

In the case of downsizing, the boundaries shrink with the company size and structure, with overall size [its corporate weight] determining the perimeter of the boundary, and structure its shape.

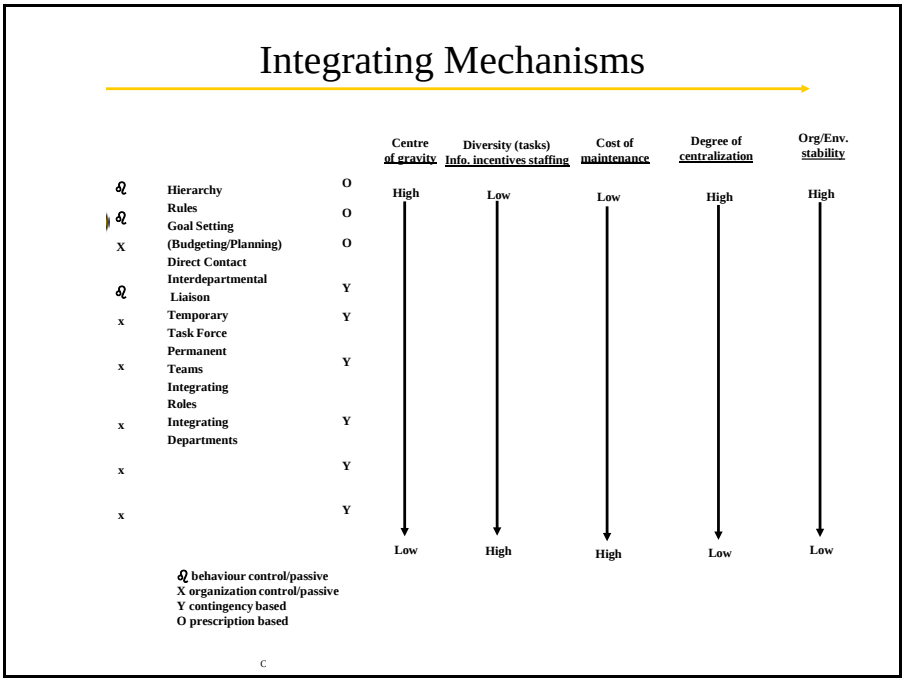
One of the cohesive glues of identity and commonality of purpose is culture, which in turn is singularly shaped by sharing, or not, of information. One of the advantages of strong culture is that it defeats internal silos and provides a common sense of purpose or inertia that propels the firm in a certain direction. A good measure of the strength of culture is how long a firm can continue in a designated strategic direction without guidance. The head of a major IT consulting firm once remarked: “Imagine that the executive team disappears in a disaster; how long can the firm continue in its strategic groove?”

He was basically paraphrasing this idea of firm inertia, which is determined by strong culture, structural rigidity and procedural inflexibility - the hallmark of mature firms. When M&A becomes a strategic component in growth for late stage, mature firms, there is a distinct danger that both boundaries and culture get drastically changed to the detriment of the firm (Koplyay et al, 2006). Boundaries may get stretched and lose their ability to filter information, and culture diluted, if the two firms involved in the M&A process are culturally distant, which is always the case when they occupy different positions in the market lifecycle [Exhibit 6].

So in addition to contributing to the maintenance of internal culture, structural shape and size and distinct identity boundaries also set the course for the evolution of these characteristics by metering, selecting and determining the use or abuse of information from the environment. The maintenance of cultural and information cohesion is therefore an extremely important task for HR and many mechanisms exist, several quite cost-, information-, and effort- intensive, to avoid the drop from the cultural cliff, which is almost always accompanied by a divergence of information needs.

Exhibit 1b summarizes the various modes of internal interventions to maintain the integrity of the firm [elaborated from factors identified by Galbraith/Kazanjian].

**Exhibit 1b – Integrating Mechanisms**




## 3. Relation between the "smart economy" and HR

Innovation in general and social-organizational innovation especially became one of the „buzzwords" for policy makers in designing „smart economy" or „innovation union" as part of the Europe 2020 strategy (European Commission, 2010). However, innovation is not a panacea, we need to do more to better understand the complexity of this phenomenon. Since the emblematic work of Schumpeter (1934) and Lundvall (1992) there is a general consensus among scholars dealing with innovation on the decisive importance of ICT as a new technological paradigm shaping new path of the economic modernization. However, its positive impacts at firm (e.g. sustainable competitiveness) or national level (e.g. productivity) are often hindered or constrained by the negligence of "…synergic complementarities among technological, organizational and institutional paradigms" (Schienstock, 2004:5).

At the firm level, it is well worth to call attention to the need for organizational innovation in using human resources. For example, the diffusion of the High Performance Working System (HPWS) based on the strong involvement of employees both in problem solving and operational decision making in the labour process (e.g. team work, multi skilling + multi-tasking, Quality Control Circle, etc.) may improve substantially the firms' performance (Valeyre, at. al. 2009.) In this relation, it is worth referring to the following lesson: "A review of some sixty American articles on Workplace Innovation shows that the magnitude of the effects on efficiency outcomes is substantial, with performance premiums ranging between 15 per cent and 30 per cent for those investing in Workplace Innovation" (Appelbaum et. al., 2011, in: Dortmund Paper, 2012:9). So innovation becomes an important core variable in building the competitive staff capabilities.

## 4. The big picture in hi-tech

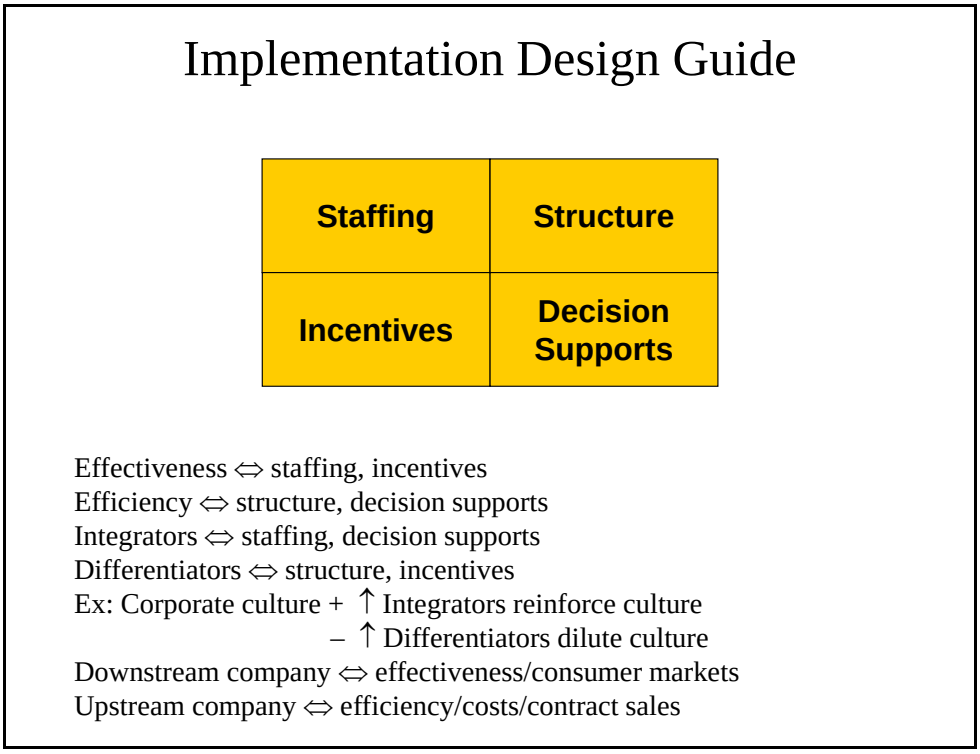
In the hi-tech industry, the small firms at the beginning of the cycle tend to be unstructured and quick to react to market opportunities, yet often wrong about their critical choices. As long as the 'portfolio' or aggregate of decisions can produce an occasional 'home run', the firm can and will likely survive.

On the other hand, the mature company must make the right decision as each choice represents a huge investment of effort and corporate funds, hence decision making apparatus is designed to provide all the possible information to buttress this choice.

From the hasty, frequent and often imperfect early market decisions, we evolve into the deliberate, slow and infrequent format of the mature market, and this resoluteness produces the right decision more often than not, but with a time delay penalty.

Exhibit 2 provides a brief summary of the issues impacted by the four variables:

**Exhibit 2 – Implementation Design Guide**




Integrators in the firm reinforce cultural adhesion and differentiators dilute culture. Hiring staff from the same academic institution, for example, guarantees a modicum of common language, perceptions and philosophy of approach that acts as positive reinforcers, whereas more structuring can lead to silos that weaken the corporate culture. Similarly, markedly different incentives for employees within the firm can dissipate culture and even create intra-company, non-productive competition, and break down project and matrix-based decision making processes.

A firm that recognizes only marketing in moving a product can cause resentment in the product designers and production staff who made the product attractiveness possible. This is well known, however unfortunately the closer the function [marketing] is to the customer, the higher the accolades and compensation in practice.

## 5. The Industry Value Chain Impact

The effect on the industry value chain, which normally emerges in market maturity is worth highlighting: the more a company finds itself removed from the final customer [upstream] the more the focus will be on efficiency issues such as volume of production with given tolerances for defects (e.g. chip manufacturers). It also concentrates on issues of seamless meshing of its products with the next member of the chain that it supplies. Alternatively, the closer the firm is in the chain to the final customer [downstream], the more it will deal with effectiveness- type problems such as customer service, customer-friendly products, and customer acquisition and engagement strategies. Providers of application software for Apple and RIM communication products are prime examples of downstream companies, but not as downstream as Apple or RIM: they focus more on bug-free applications and zero-error releases, whereas RIM and Apple focus on effectiveness for the user.

Both upstream and downstream characteristics can be common to companies in the maturity phase. This often depends on the extent of the firm's vertical integration. However, all such companies have a dominant center of gravity that anchors their HR policies and competitive modes. Units in such a portfolio that find themselves distant from the dominant center of gravity may be ill-served by the common HR policy.

Exhibits 3 and 4a, b contrast the characteristics of upstream and downstream firms and illustrate the various centers of gravity within an integrated firm, depending on the degree and completeness of vertical integration.

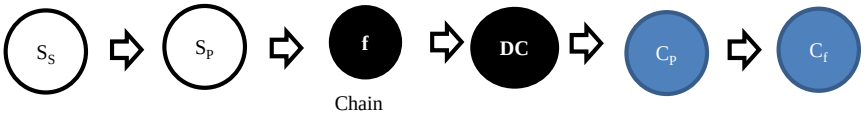
In addition to HR, the other three factors of decision making, structure and incentives are indelibly marked by the center of gravity of the firm, along with the evolution of the market towards maturity.

Interestingly, vertical integration always affects the center of gravity of a firm but horizontal integration does not: it represents the merger of competing firms in the market that happen to be at the same center of gravity. Hence, you would expect that vertical integration comes with immediate challenges, whereas horizontal integration implies only minor adjustments for HR.

**Exhibit 3 – Centers of Gravity – Upstream, Midstream and Downstream**

Value Chain Members – Operational Profiles

Value Chain Legend
f – Firm
$S_S$ – Secondary Supplier
$S_P$ – Primary Supplier
DC – Distribution Channel
$C_P$ – Primary Customer
$C_F$ - Final Customer




Chain Anchor

Upstream
-Commodities
-Standardization
-Low cost focus
-Process innovation
-Production assets
-Engineering culture
-Top-down management
-Low margins
-Repeat sales
-Market size
-Fixed cost amortization
-Volume of sales
-Balance production backlog to maximize efficient production

Midstream
-Capital budget
-Logistics
-Production innovation
-Concurrent design of products
-Mass customization
-Market share
-Economies of scale

Downstream
-Product innovation
-Advertising budget
-People intensive
-Marketing culture
-High margins
-Customization
-New sales
-Market strength
-Branding management to create price inelasticity [goodwill or soft assets].

**Exhibit 4a – Supply Stages or Vertical Integration**

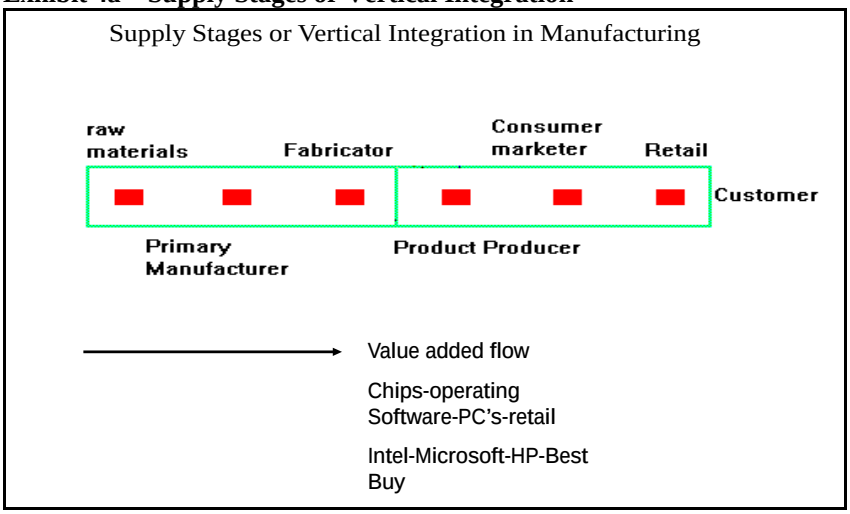
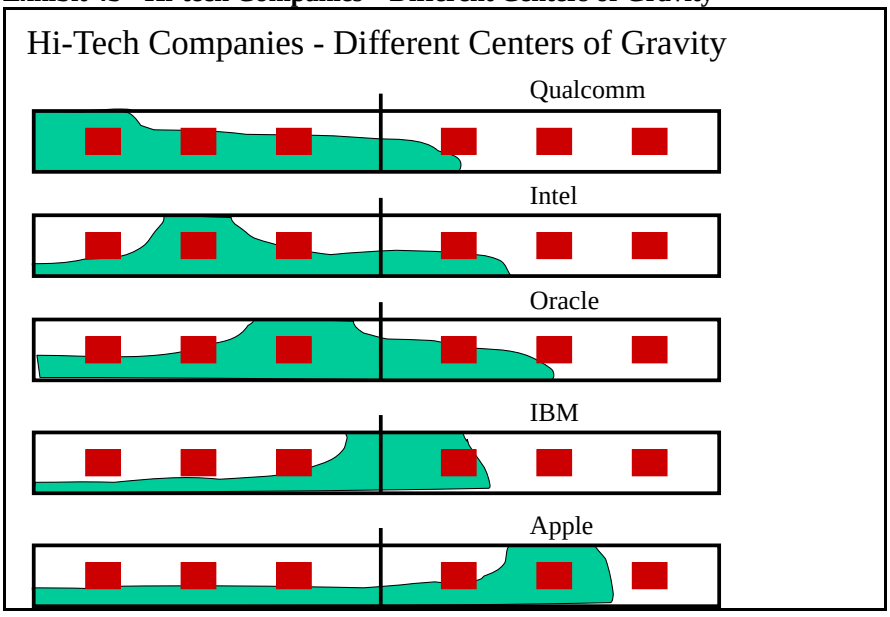



**Exhibit 4b - Hi-tech Companies – Different Centers of Gravity**




Each separate center of gravity requires a different mode of HR interaction and this can significantly hinder the design and implementation process. One immediate conclusion we can draw is that the wider a company is spread across the value chain, the more challenging the HR management becomes along the other three factors of implementation. The inability of functional

groups to understand their impact on one another is the most common barrier to collaboration for resolving value and supply chain trade-offs (Glatzel, Groβpietsch, Silva, 2011).

For this very reason, hi-tech companies that find themselves in almost always fast moving environments, will resist the temptation to integrate deep into the value chain, even when prescribed by financial logic – witness JDS Uniphase which did not integrate deeply enough into their value chain. Widely diversified companies with many centers of gravity are essentially different companies that have their own management logic that is often incompatible with the logic of the dominant center (e.g. downstream for Apple in Exhibit 4b). The upstream components of Apple are its present day tightly coupled suppliers which may become an integral part of the company eventually through M&A in full market maturity. But even if this does not happen, the tightness of the supply chain will evolve into a quasi-integrated Apple anchored industry value chain. The recent acquisition by IBM of Cognos had the net effect of extending backwards IBM's value chain as Cognos becomes an internal supplier of business application software to IBM's dominant corporate IT consulting practice. Of course the status of internal supplier implies a potential loss of competitivity in the long run as the supplier is now sheltered from the external pressures as a monopolist supplier; conversely a successful internal supplier may outgrow the volume needs of its own value chain and attempt to seek out customers outside the chain which the anchor of the value chain would see as "dealing with competition". The former is illustrated by IBM's past involvement with chip manufacturing, the latter by the Sony /Samsung relationship where Samsung, an original supplier to Sony, became a more than equal competitor.

## 6. Value chains can grow up

One crucial challenge in HR is the incentives regime for upstream and downstream managers: upstream would be compensated on volume of production, within specified quality tolerances, whereas downstream incentives would aim for margins management and customer satisfaction. These two are often incompatible, as the downstream end of the company may not be able to move all of the volumes generated by the upstream companion company, and conversely an exceedingly high sales volume at downstream end may mean bottlenecks for the upstream production units.

So optimization of HR may be impossible in such situations and only a compromise solution may be attainable that fully satisfies neither component, nor management, despite the fact that new research in neuroeconomics suggests that appropriate incentive pay programs is a more powerful motivator than previously thought (Bevilacqua, Singh, 2009).

## 7. The Global Value Chain

The continuous and rapid changes in the corporate structure are driven by the globalization of product, capital and labour markets and by various managerial and organizational innovations (e.g. modular form of the firm etc.). The permanent character of the corporate restructuring (e.g. Business Process Reengineering) results in the fluidity of the organizational architecture of the firm, which is the central arena of the various restructuring initiatives. As a better understanding and assessment of this complex change process, it is worth using the approach/perspective of the Global Value Chain (GVC) instead to focus on the individual firm or corporation. "The value chain is a phrase used to describe each step in the process required to produce a final product or service. The world 'value' in the phrase 'value chain' refers to added value. Each step in the value chain involves receiving input, processing them, and then passing them on the next unit in the chain, value being added in the process. Separate units of the value chain may be within the same company (in-house) or in different ones (outsourced). …The term 'value chain' sometimes used synonymously with the overlapping concept of the 'supply chain', was originally coined to describe the manufacture of goods but it is now increasingly applicable to services, both public and private."(Huws, 2006:19).

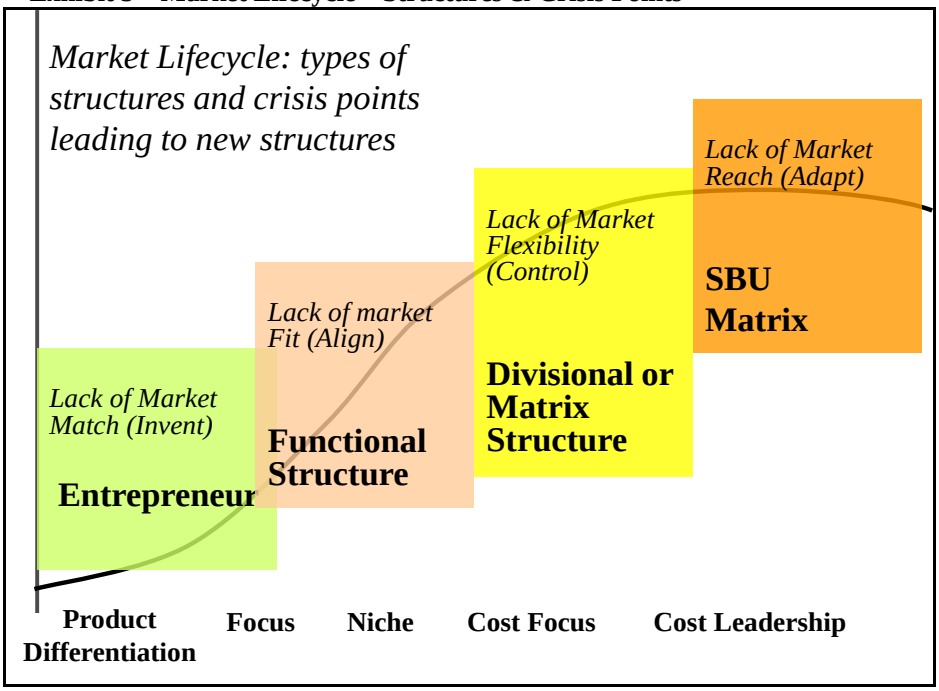
The approach of GVC is still not widely adapted in the studies of firms in Central and Eastern Europe. For example, one could be the approach of multi-disciplinarity or the power distribution/sharing within the GVC. In our comparative company case study research using the GVC perspective, we intended to understand the process of "upgrading", "downgrading" or "freezing" within the chain (Makó-Illéssy-Csizmadia-Kirov-Todor, 2009). Using the method of the company case study in various sectors (traditional manufacturing and high-tech firms), we had to recognize the enabler or facilitator role of the skill development (both formal competence development (via schooling/training) and on-the-job training or 'situated learning') and some organizational principles (e.g. team work, multi tasking + multi skilling, project-based work, etc.) in the process of 'upgrading' in the GVC (Makó-Illéssy-Csizmadia-Kirov-Todor, 2011).

So HR is at the core of the development of global value chains, an indispensable competitive device in the hi tech sector and radiating out to the modern economy.

## 8. The Discipline Imposed by Lifecycle Structural Changes

It is well known that organization structure evolves along the market lifecycle and the various structural adjustments have been documented and studied. Among many useful conclusions one stands out: when firms change strategy and adopt appropriate structural forms to deliver this strategy, the firm that adopts the appropriate matching structure the fastest, delivers superior financial results in the long run. The structure becomes a facilitating conduit for the strategy and the notion of structural adjustment to regain fit is advanced (Donaldson, 1987). The various types of structures along the lifecycle are shown in Exhibit 5:

**Exhibit 5 – Market Lifecycle – Structures & Crisis Points**




As the organizational forms progress along the market curve, the structure becomes more rigid, wider and deeper, as functions are added and layers within each function develop. It also becomes internally more complex with the degrees of freedom of interaction among units increasing geometrically for each incremental addition, inducing a network effect In addition, intra-structure relationships and communications become more complex in form and content: for example, marketing will have a formal communication policy to deal with production and finance, which evolved from the ad hoc relationship that prevailed during early growth.

The corresponding challenges for HR become one of finding and/or training people to live within the confines of these new structures. The progression of staff characteristics moves from extreme risk takers in the early phase, to risk avoidance in the maturity phase and from a focus exclusively on the market, to one which deals primarily with internal issues of the firm.

From decision making under high market uncertainty, to massive data analysis in late stages, we arrive at the new option, which is often very costly with long time horizons of implementation and shelf life.

Gaining experience during the informal interactions in incubation and the loose discipline of growth, entrepreneurs generally tend to be rather poor at managing within the formally defined protocols of the emerging silos in the maturity phase. They frequently yield leadership to professional managers, whose hallmark is talent for properly assessing the market conditions and aligning these with the firm's resources. The recent replacement of RIM original founding co-CEOs is one good example. This distinguishes the firm from what would otherwise be the entrepreneur's singular and adamant focus on the market. Organizations led by visionaries who are not properly supported by strong managerial leadership are less effective and not as likely to achieve sustainable wealth (Rowe, 2001).

That is why the CEO of Newbridge Corporation in the IT sector relinquished his role to professional managers once the company started to approach maturity. Similarly, this is why Steve Jobs came back to Apple once the company decided to rejuvenate itself as a niche player focusing on innovation. Transformation and innovation is primarily an entrepreneur's game, and entrepreneurs are born, not made. Through proper training, the skills required of professional managers and later stage administrators, can be mastered through education and experience, but administrators can seldom be recycled as entrepreneurs. And that lesson was learned by Silicon Valley North firms during the last boom in the industry, when staff shortages forced some young companies to hire managers from the public sector, who often lacked entrepreneurial spirit and could not master it even under supervised tutelage.

## 9. The Influence of Culture and Leadership

Two of the most important hygiene factors for HR management are the leadership style of the company and the underlying cultural background. Both of these evolve along the market lifecycle and assume markedly different characteristics as the company moves from the incubation stage to maturity and beyond, to decline.

Young companies are anchored by visionary leaders, who are usually the start-up entrepreneurs. Their culture is creative to the point of being totally undisciplined and seeking constant disruptive innovation. By the time the firm graduates to the maturity phase, the innovation culture is washed out and severely constrained as blue sky product innovation is replaced by incremental production type innovation (Koplyay et al, 2010). In both cases, HR is the key issue.

Early on, it is essential to determine how to motivate the individual product designers to create 'home runs', yet later be adept at re-channeling their innovative spirit to permit marginal innovation while protecting the existing investment base (e.g. TQM - Total Quality Management, which is a team sport where success is premised on the cumulative effects of incremental changes).

Exhibits 6 and 7 outline the evolution of corporate cultural traits and the associated leadership styles. Exhibit 8 defines the motivational theory underlying specific leadership styles.

**Exhibit 6 – Market Lifecycle – Evolution**

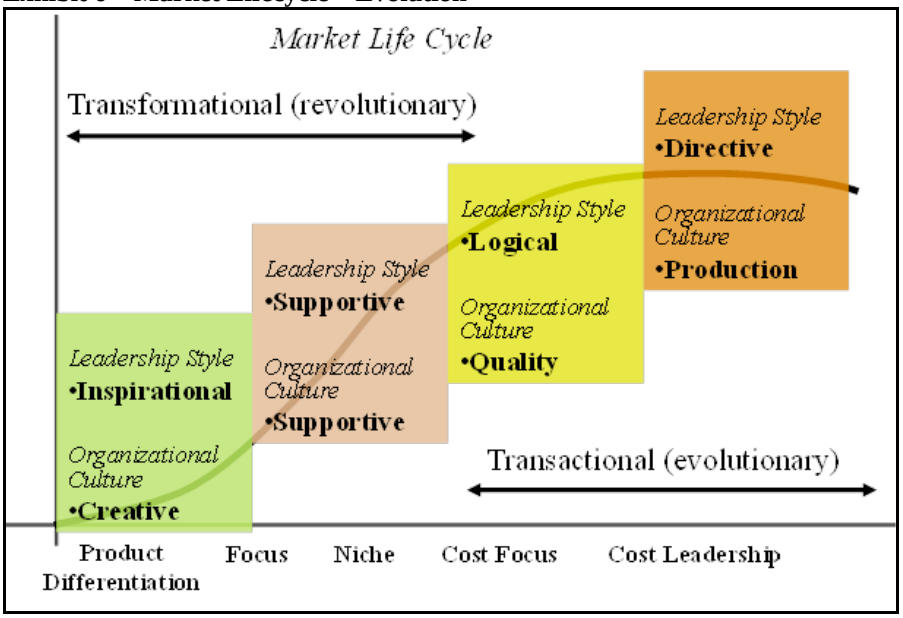


**Exhibit 7 – Efficiency & Effectiveness**

| Efficiency | Effectiveness |
|---|---|
| **Logical**<br>Production/people based<br>(IBM system integration)<br>*Theory J* | **Inspirational**<br>Creativity based<br>(IBM software)<br>*Theory E* |
| **Directive**<br>Production/asset based<br>(IBM chip manufacturing)<br>*Theory X* | **Supportive**<br>Team/knowledge based<br>(IBM outsourcing)<br>*Theory Y* |

**Exhibit 8 – Types of Motivational Theories underpinning each leadership style**

## Types of Motivational Theories

- **Theory X** - Control
- **Theory Y** - Incentives
- **Theory Z** - Paternalistic (Japanese) hierarchy, rigidity
- **Theory J** - X + Y
- **Theory E** - Opportunistic

- **Change hygiene factors**
  - Executive style
  - Corporate Culture
  - Individual values
  - Organizational commitment

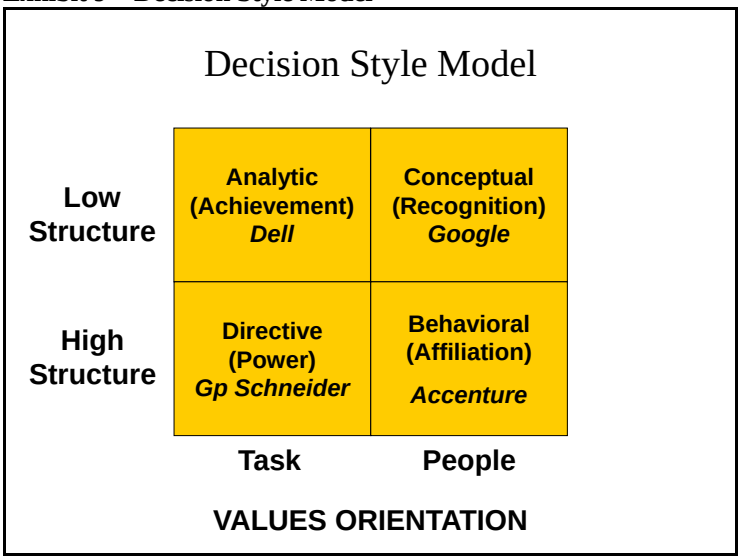
It is important to note here that whenever a firm's culture and leadership are out of phase, or unsynchronized, the company is in jeopardy. A risk-taking leader of the incubation and market traction phase cannot readily cope with the challenges of the more structured and analytical approach required for a firm in the leveling off and shakeout phases of the market. Ford Motor Company CEO Nasser tried too hard to apply an entrepreneurial approach to the mature organization and was unsuccessful, leading to his termination.

The logic of the evolution of the leadership/culture has an immediate consequence for the styles of decision making in the company, and of course the decision making style dictates the type of individual that must be present

to execute against this style. Hence, HR hiring and training policies must track this marked shift in performance requirements.

Exhibit 9 provides instances of these different styles in four hi-tech companies:

**Exhibit 9 – Decision Style Model**




Low structure environments are found in the early market phase, high structure environments in the maturity phase. Upstream companies tend to be task and quality oriented and downstream ones focus primarily on people and relationships. This implies that incentives/performance for upstream organizations can often be defined through specific formulae that remain constant and measurable, whereas downstream organizations, or ones with primarily low centers of gravity, are more people oriented.

Intel, being a high center of gravity company, can easily compensate most of its staff with standard and easily measured indices related to production (e.g. quality, volume, design, originality of computer chips), but Google or Amazon are more downstream operations and hence their compensation measures would tend to be more interpretive and sensitive to existing internal and market conditions. We shall look at the rewards scenario later in this article.

## 10. Impact of the Lifecycle

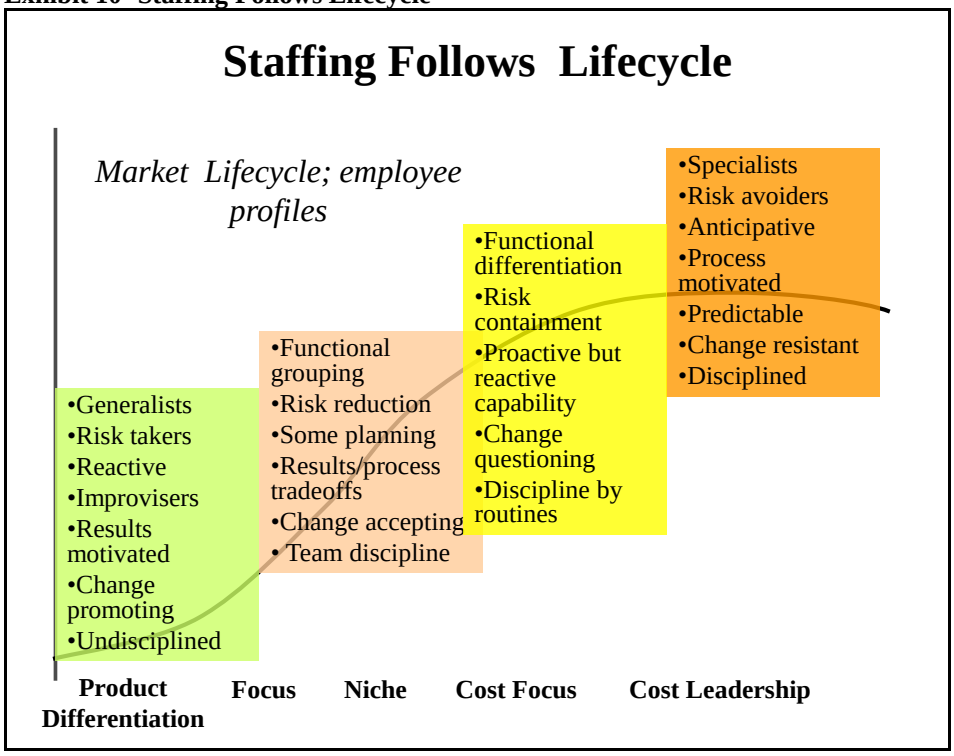
The evolution of almost any major organizational function and activity can be mapped along the market lifecycle. Marketing, finance, production,

innovation, decision making, HR, strategy and leadership/culture are the major ones that we have managed to profile so far along the market curve.

A couple hundred case studies have supported this research and the level of confidence is correspondingly high to the extent that this approach is ready to graduate from a model status to a quasi theory, with both explanatory and predictive powers [forwards and backwards in corporate time], the bare minimum that a good model must satisfy.

Exhibit 10 provides the summary of the HR issues evolution along the curve:

**Exhibit 10- Staffing Follows Lifecycle**




The early stage hi-tech company hires risk takers and dreamers who are ready to respond to the needs of the young market, as soon as these needs are discovered by the entrepreneur founder of the company. There is minimal market study as the dynamics of the market may not even be properly understood. The tasks within the firm are ill-defined with generalists often performing self-assigned or even cannibalized tasks. The only exception is the product designers who are the specialists that aim for the most advanced design feature attainable. The market itself matches these design dreamers with the innovators and early adaptors in the early customer base who are

ready to embrace breakthrough products. The client base hi-tech skill sets often match the skills found within the firm. As a matter of fact, this early consumer base often serves as critical beta test feedback for the firm's product introductions.

The firm is driven by results as measured by the market traction of the offerings. The organizational climate is risk promoting and there is a lack of discipline in the execution of the firm's strategies and tactics. Almost all of the activities are project based with short time horizons and parallel undertakings, many of which are anticipated to be less than successful. The environment is a "pirate" based corporate culture – risk-taking, daring, outside the norms of other business cultures.

The individual incentives are based on stock options, as this financial mechanism saves today's cash and offers tomorrow's payoffs, aligning perfectly with results-based philosophy. By the time the firm successfully emerges from incubation [80% of these firms don't emerge but rather fall into the chasm] and enters the high growth stage of the market, the HR landscape changes substantially.

Functions such as marketing, logistics and finance emerge and the undisciplined internal situation is left behind. The focus is still on results but the time horizons are now based on meeting the quarterly numbers. The reason for this is the infusion of venture capital that imposes its own expectations of success and insists on a structured and well defined management.

The leadership of the firm changes from the entrepreneurial style to the professional manager, who can understand both the market and the firm's dynamics. The specialists who are now hired including marketers, finance types and logistics experts, begin to insist on less blue sky innovation from the product designers and look for scaled down innovation that turns out products which fill the channels being built for the consumers. The customer base is shifting to the early majority that asks for better product quality, more competitive pricing and less product complexity. Product innovation is still welcome if it is well embedded in the product and out of sight.

It is the role of logistics and production to ensure that this requirement is met through better designed and simpler products that are easier and cheaper to manufacture, either by the suppliers, or progressively by the emerging internal production capability of the firm. The simpler product requirement also caters to need for higher reliability. This lesson was learned the hard way by Silicon Graphics a couple of decades ago when the head of production had to forcefully remind his colleagues of the importance of quality oriented execution.

The firm begins to rely on longer term planning as long as quarterly results are achieved. More of the functions are now performed on a

continuing basis as opposed to being project based and the firm begins to train its staff. Until now, training was not desirable as the only retention mechanism was the stock option plan which did not always meet employee expectations. But now other incentive mechanisms are introduced to encourage staff retention: education plans, pension plans and stock purchase plans. Once you can retain the employees, you can invest in them through training. Further, the returns from managing people in ways that build high commitment, involvement, and learning and organizational competence are typically in the order of 30 to 50 percent (Pfeffer, 1998). The "pirate" culture starts to disappear and is replaced by a "naval" style culture – every ship in the fleet has a particular role, and a way to fulfill that role within the mission of the navy.

The culture of the firm now accepts change and goes along with the proposed changes but does not initiate change. Each function in the firm has investments to protect and major change scenarios can endanger these investments. By the time the firm reaches leveling off in the market and is past the shakeout period, it becomes a lot more conservative. Many investments need to be safeguarded now: financial assets, built up customer relationships and goodwill, sales channels and existing supply chain relations, and overall knowledge and experience gained to date.

The customer base is now both early and late majority and has very well-known attributes - among these is the focus on best price and simplest product. The product offerings are becoming commoditized and the competitive edge shifts from identifying market trends to delivering well-functioning products. The firm starts looking at itself internally and at the competition, instead of the client base. Andy Grove, CEO of Intel, once remarked that when Intel was at this stage, it was spending too much time analyzing its customers and not enough time trying to understand its major competitors' moves.

There is a strong logic behind this: commoditized products need to be sold at more or less the same price, hence profit margins must now come from superior production methods that decrease costs. Knowing how competitors are executing this strategy gives the firm an idea of future price pressures.

Much of the market dynamics from this stage onward are predictable and routine. Policies and administrative procedures begin to emerge within the firm with the intent of controlling and directing reactions to likely scenarios both externally in the market, and internally within the firm. This imposition of internal discipline further drives out the spirit of risk taking and innovation from the firm. People are now beginning to resist change and innovation comes in small doses.

Innovation focus has moved from products to production and customer service (Koplyay et al, 2010). Silos are now often entrenched and the firm needs to spend resources on improving internal communications and information flows, reinforcing common culture and the understanding of long term corporate goals.

We no longer can even envisage a “pirate” culture in the organization, and indeed, see an organization which has to work very hard indeed to create what we call “pockets of pirates” to introduce the occasional visionary products into the company.

IBM, Apple, and Cisco are examples of a large organization, very far along the life-cycle curve, which creates “pirate pockets” or “skunk-works” around the world to help them develop products at the beginning of the life-cycle.

A device that is often used to reinforce common culture is a strategic planning exercise, not necessarily because strategy needs to change, but rather to ensure that everyone is on the same page as far as the strategy is concerned. It becomes an HR educational tool in itself.

In the maturity phase, process becomes as important as results: how you deliver the results matters as much as the results achieved. The competitive edge now fully depends on the internal functioning of the firm and its efficiency.

The strategy becomes cost reduction in the face of commoditized products where pricing strategy has lost its power, unless the firm retreats into a niche market where customization allows for some price inelasticity and generates higher margins. Therefore the only way to produce superior profits is to increase margins by reducing costs. The firm is in a cost leadership- seeking position. Discipline in executing this strategy is the key. Routines, procedures, policies and a culture that emphasizes discipline and tight focus are the essential ingredients.

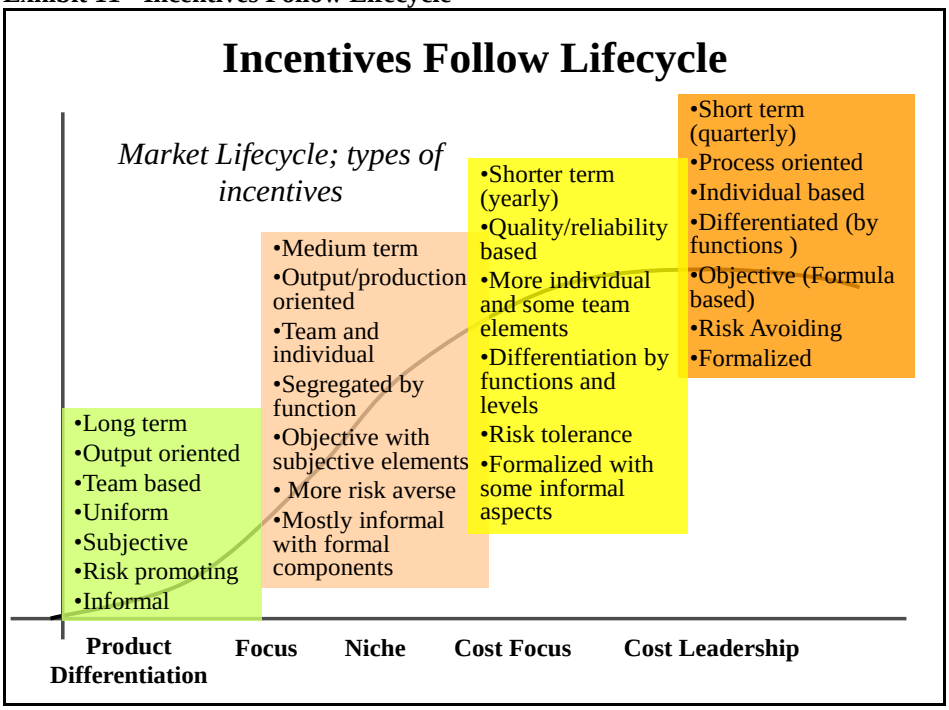
At the helm of the firm, administrators take over from professional managers, and most of the executive tasks are related to strategy implementation and dealing with the internal situation of the organization. The market is now predictable and only the external dynamics of competitors’ unexpected moves could upset the equilibrium. For this reason a new function emerges: business intelligence, which attempts to map competitor actions.

The staff within the firm becomes totally risk averse and very thorough in their assessment of corporate options. They are incremental in their approach to innovation, with no breakthrough innovation introduced unless it completely meshes with the existing asset base or corporate culture. Under dire circumstances, when restructuring becomes unavoidable, the management of this change becomes a principal and risky task.

To improve its competitive position, the firm will often turn to Mergers and Acquisitions (M&A) to expand horizontally. This is done to increase market share, which in turn leads to improved economies of scale and lower costs, thus aligning with the cost leadership strategy. M&A is a particular instance of corporate growth with its own list of HR challenges. When two firms are merged, the best case scenario is where both are found to be at the same center of gravity of the market. This more or less assures a comparable culture, mode of operations and minimal HR "distance", with similarities in compensation, type of individuals, and existing incentives. Furthermore, it also helps when the two firms are in the same market phase, otherwise many new variables will need to be considered in designing HR policies (Koplyay et al, 2006).

An example is the incentives situation illustrated in Exhibit 11:

**Exhibit 11 - Incentives Follow Lifecycle**

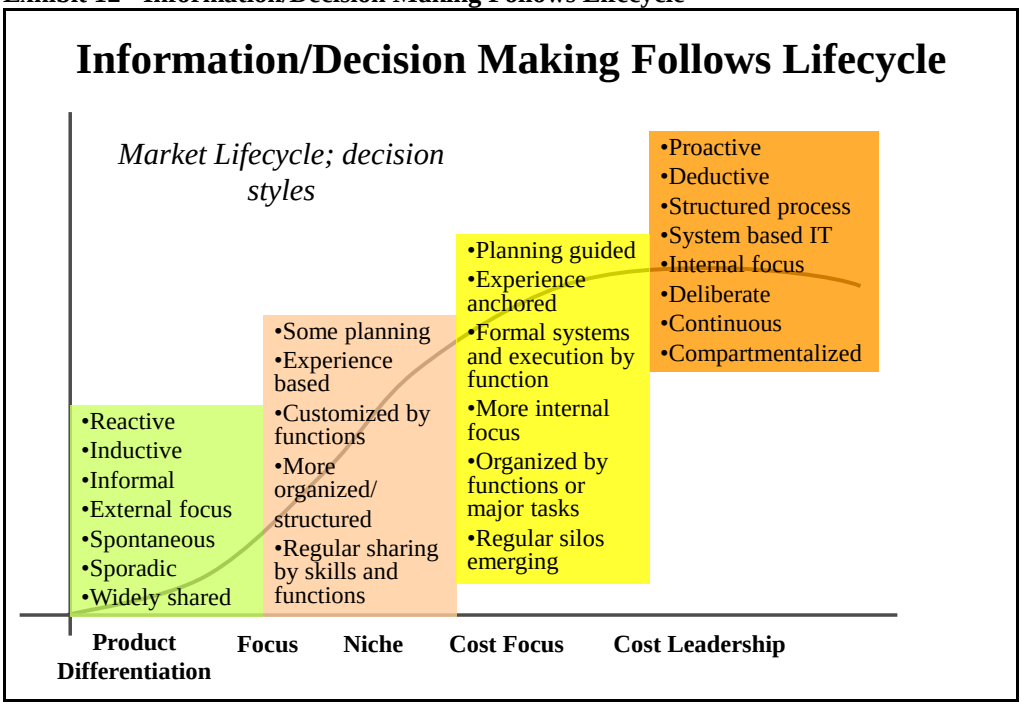



Sometimes the firm expands vertically and becomes a player spread wide in the value chain with several different centers of gravity: JDS Uniphase, prior to the high-tech "meltdown", is a good example of an organization owning many parts of the value chain with multiple centers of gravity. In this case, the HR problems are magnified and the complexity of integrating the new acquisition increases. Therefore, vertical integration is an order of magnitude

more challenging than horizontal integration, but may become unavoidable if security of supplies is an issue.

In vertical integration, the corporate center of gravity is likely to shift and new policies may be necessary to satisfy the merging new company. A suitable manner in which to illustrate vertical integration complexity is to highlight the different information needs of companies distant in the value chain and firms distant in their degree of market maturity, as depicted in Exhibit 12.

**Exhibit 12 - Information/Decision Making Follows Lifecycle**




## 11. The Impact of Projects

Given that much of the corporate activity throughout the market lifecycle in hi-tech is project-based, the nature of projects and their evolving profiles along the lifecycle also bear upon the design and management of HR.

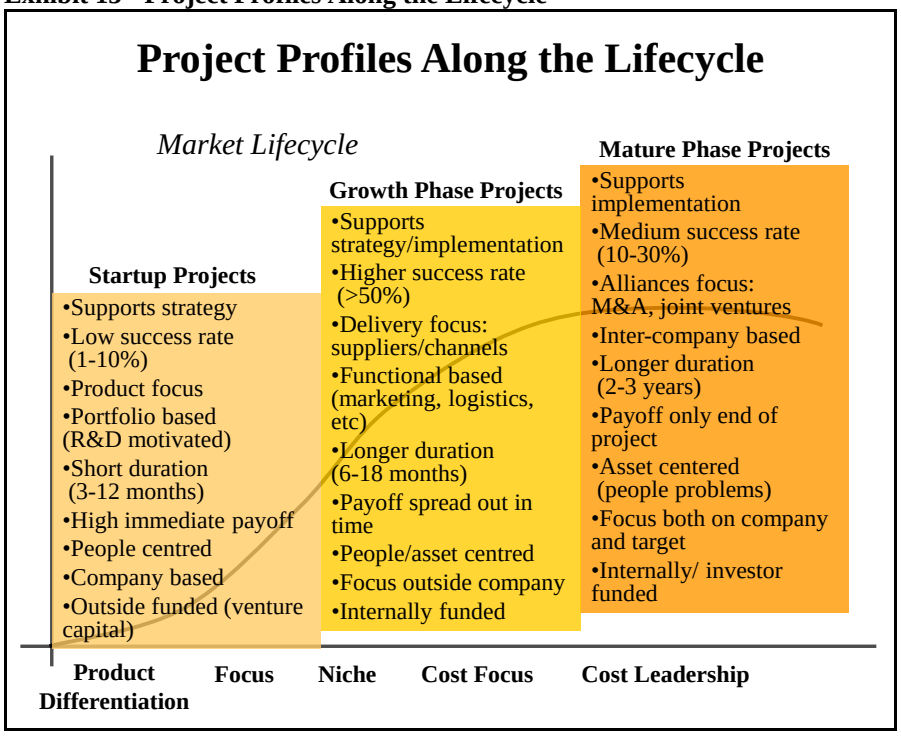
The fast succession of product generations, the payoff timelines of venture capital the relentless innovative push, the shifting alliances, mergers and acquisitions along with the constant search for new customer base and entry/exit of on shore and off shore competitors combine for a total of project based activities that hovers around 70% of all corporate functions.

These projects have a very different flavor depending on the position the firm occupies along the lifecycle. In early stage the focus is primarily product innovation, finding reliable suppliers and survival funding. In growth phase marketing takes over with channel development, supply chain management to guarantee quality and market share expansion. The financial objectives shift from burn rate coverage to moving towards an IPO or a sale to a targeted established company.

Approaching maturity the firms focus on reintegrating components of manufacturing that are critical to product quality and constantly improving cost effectiveness to generate superior margins in a strategy environment where cost leadership often is the only strategy available. The financial skills are now honed on M&A of either direct competitors to enhance market share and economies of scale or expanding the value chain to capture more margins from the same customer base.

Every one of these activities are project inspired and the changing profile of projects helps in better understanding the succession of HR requirements and matching corporate HR practices and incentives to the particular lifecycle phase. Exhibit 13 provides a snapshot of the project profile evolution along the lifecycle.

**Exhibit 13 - Project Profiles Along the Lifecycle**



## 12. Conclusions

We have built on well known concepts about leadership, culture and structure by mapping against the market phases, in some detail, other critical functions along the lifecycle curve and the expansion of the value chain in maturity. We related the evolution of HR design and management challenges to the evolving profiles of these functions.

The degree of complexity in delivering appropriate HR policies is strongly influenced by the "organizational distance" between units of the firm, as measured by either the number of centers of gravity of the firm or the location of the firm's business units in the different market phases. The higher the number of internal centers of gravity, mix of incubation, growth and mature sub-units, the more pronounced the HR complexity. When firms seek quick strategic response, this fact must be kept as a key variable: HR can only deliver a new consistent policy regime when the degree of complexity is not pronounced.

Hi-tech companies that indulge in endless M&A must keep this lesson in mind, similar to Cisco's approach when it acquired small companies for its R&D requirements, and sought acquisition targets that were close to its culture, namely companies that were in the same phase of the market and had the same center of gravity.

Nortel's acquisition of Bay Networks, and JDS's acquisition of Uniphase represents the other extreme of this spectrum where the completed M&A deals languished without ever being incorporated into the parent. This indeed changed the center of gravity of these parent companies in such an extreme way, that they ended up causing irreparable harm. The acquisitions were distant with respect to market phase of the parent , and at different centers of gravity in the industry value chain, thereby posing a double integration challenge.

The strategic lesson here is that HR should be consulted *before* the firm makes a critical expansion move or when market conditions signal the next phase of development in the market to allow for HR policy adjustments regarding hiring, retention, evaluation and rewards.

An added complicating factor in hi-tech is the nature of projects that are found at each phase of the lifecycle. Much of hi-tech existence revolves around project based implementation of functional or business line activities. The project profiles and the type of individuals staffing these projects change significantly along the lifecycle to the extent that those who thrive in the young firm's environment would be totally lost in the mature company and conversely. Yet a clear road map exists that indicates the pending changes and HR departments can plan ahead staff requirements usually well in advance of the actual tipping points.

## 13. Future research

The focus for this paper is the hi-tech industry, which represents the extreme case of fast moving environments. The article advances the rationale and a series of models to map the corporate HR profile across two important dimensions of growth: the market cycle and M&A, which includes organic, or internally generated, moves along the value chain. It also flags the importance of project based thinking in HR to anticipate the changes as the firm transits from one phase to the next.

Future research should test these concepts in detail, with validation of the factors identified in the exhibits for the various HR design criteria. The validation can be done within the hi-tech industry, or any other industry that experiences pronounced market growth and value chain development, such as mass communications multi-nationals.

An examination of standard project management practices and how they can or even should be applied to HR design and management is an area of interest.

A further research question of importance is the relative importance that should be attached to each category; center of gravity factors and lifecycle factors, when these are present simultaneously. Within lifecycle one would also be interested in the relative weight that each factor, or groups of factors, carries at a lifecycle phase. Some candidates that approximate the hi-tech industry are: media, consumer electronics and health care.

An interesting example of a non-candidate is the pulp and paper industry [Cascades] and the consumer health products industry [Procter & Gamble]. Both of these sectors are, and have been, in maturity for quite some time, and market growth would not apply. However, the concepts of centers of gravity and types of project pursued and their influence on HR design is still testable as both of these sectors are substantially populated with vertically integrated competitors.

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