Analysis of Vested Third Party Influences on New Venture Organizational and Architectural Norms in the Commercialization of Disruptive Technologies

by

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ABSTRACT

In the presence of a disruptive technology, current research in the management of technology highlights major disadvantages of the incumbent due to norms and values built inside the incumbent to the present franchise. This research illustrated a specific environmental variable of a Vested Third Party (an equity partner) that can be used to introduce the norms and values required to properly commercialize the disruptive technology.

Three Case Studies of disruptive technologies within a single Parent were investigated. The control of the thesis, Case Study Alpha, did not possess a VTP and was limited in its ability to correctly position the technology for full extraction of value. Case Study Beta, which was organizationally separate but still financially linked, possessed a VTP and was able to evolve to better address the needs of its specific technology. Case Study Gamma, which was both organizationally and financially separate from the Parent, possessed a VTP and was best able to evolve.

The role of the VTP in the organizational and architectural evolution was not distinctly evident in the researched data set. During the analysis, other environmental factors were uncovered such as the role and previous experiences of the leadership and the relative linkages with the Parent Dominant Design that were influential in the overall strategy of each Case Study. It was also shown that the influence is a function of timing due to architectural and organizational momentum effects. In addition, it was not conclusive if the changes suggested by the VTP were not preexistent in the respective Cases prior to the VTP introduction. It can be stated, however, that the VTP assisted the required change by its endorsement of the change as opposed to initiating the change; the VTP added validation that the Parent required to enable the change.

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I Introduction

1.1 Speciation Models in Biology and Technology Evolutions

"Speciation" – Formation of a new species caused by the separation from the antecedent. In evolutionary biology, the survivability of a new organism is highly dependent on the environment that it is placed in and its ability to adapt. Researchers have also found periods of high evolutionary activities that correlate with the physical separation of populations. This spurt of activity is almost contradictory to the classical Darwinian concept of gradual evolution through evolving modifications.

Adner and Levinthal have used this evolutionary biological model to develop analogs to the evolution of technology. The speciation model provides a key insight into the domain dependencies of technologies and inevitably of the participating organizations that deliver those technologies. Adner and Levinthal also offer examples of major growth markets such as wireless communications that have resulted from technologies that are placed into different application domains.

The motivation of this study is to extend this model and investigate a specific domain influence on the "speciated" firm. This study investigates the influence effects of a vested third party ("VTP") on the evolution of the organizational and architectural norms when a speciation event occurs such as a spin out or another form of organizational separation. A VTP is here defined as an organization other than the Parent Firm that is strategically aligned with and committed to the success of the new venture through a form of an equity-based alliance.

1.2 The Driving Forces for Organizational Speciation

In the face of a disruptive technology to a firm's franchise, there is strong consensus that the incumbent firm is at a major disadvantage. This non-intuitive conclusion lies counter to the strength and expertise of the incumbent firm. Numerous analyses have shown that the attributes
that have enabled the rise of the incumbent (ex: architectural, organizational design, resources, processes and values) may actually be impediments to the deployment and subsequent value extraction of the disruptive technology.

Understanding this scenario, many firms have opted to deploy a form of organizational separation to allow the disruptive technology to flourish without being encumbered by the parent firm. These forms range in structure from an internal incubation to a formal spin off. Several key decisions such as organizational design and leadership structure are typically also made that greatly affect the environmental aspects of the new venture.

1.3 Vested Third Party ("VTP") Influences on the Success of the Speciation Event

The thrust of this work will look into one of these environmental influences: the introduction of a vested third party as a means of challenging the parental norms. A vested third party in this research is defined as another organization that has mutual interests in the success of the venture reinforced by an equity position. While an autonomous organization may seem to be a viable solution on the fascia, there is an explicit danger that the frameworks of the parental firm will become fully imported into the new organization. While some frameworks may be applicable in the new context, others may prove to be detrimental. For example, a parental view on architecture may lead to a certain organizational design that may be counter productive to the new organization due to architectural differences. The vested third party is sometimes introduced not only for financial and positional purposes (ex: shared risk, complementary assets) but also for its domain experience and ability to inject new frameworks.
2.0 Management of Technology: Prior Art

To present a context and baseline for this work, an analysis of research in technology management and the use of VTP arrangements as a means of mitigating uncertainty is presented. The analysis illustrates several sources of uncertainty such as market, technology, and organizational dynamics. The factors are driven by an amalgamation of internal factors such as technology maturation and also external factors such as market adoption dynamics. As a response to the technology and market factors, organizational dynamics also need to consistently evolve. While the research in the management of technology provides a treatment for addressing these issues, the research in VTP arrangements is more focused on the mitigation of technology and market uncertainties as opposed to organizational uncertainties.

In the case of a technology disruption, the internal conflicts within an organization add to the already volatile technology development environment. This scenario of high risk and internal conflicts has led many organizations to spin off disruptive technologies. In this highly tenuous situation, the VTP arrangement may provide an opportunity to better direct the proper organizational alignment to the market and technology requirements.

To address the state of technology and market uncertainties, some firms have chosen to introduce a VTP. While a VTP may provide advantages such as mutually benefiting strategies, it may also provide a mechanism for the new venture to mature as a separate entity, which is the thrust of this research. This maturation is represented here as an organization’s ability to design the organizational processes that are applicable to its respective market. The new venture may be able to leverage the influences of the VTP to reengineer processes such as the product delivery and management decision processes.

Technology professionals should analyze their specific contexts against the frameworks that have been developed to create a thorough set of scenario analyses. Numerous historical case studies have reinforced certain key influences such as architecture and organizational
capabilities on the success of new technologies. With this knowledge, professionals can integrate these analysis methods into their respective daily decisions.

2.1 Technology Adoption Dynamics; Societal Acceptance of Technology

To offer an understanding of uncertainty derived from ever changing market dynamics, the role of adoption dynamics to technology is presented. The analysis reinforces the need for organizations to evolve their value proposition to meet the very different population segments. Some of these transitions are quite difficult and require almost diametrically opposite value and behaviors.

The VTP may be a vehicle for providing the guidance and impetus for this migration of values.

2.1.1 Technology Adoption Dynamics

According to Rogers', the success or the adoption of a technology is a function of the market's propensity for new technologies. Rogers' model of population adoption behavior follows a classical bell curve distribution:
As the technology matures, the attributes of the technology should address the specific needs of each population segment. For example, while Early Adopters are more willing to adopt a new technology, the Early Majority typically will be more pragmatic in their behavior and wait for an emerging standard or dominant design.

### 2.1.2 Adoption Curve Discontinuities and the “Chasm Effects”

According to Moore, this repositioning of the value proposition as the technology matures is actually discontinuous in that there are major gaps between the population segments that often prevent technologies from becoming more mainstream. The largest of these gaps lies between the Early Adopters and Early Majority. The value proposition is almost diametrically opposite in the two segments. Where the Early Adopter segment would value the newness of a technology,
the Early Majority values the holistic view of the technology such as the complementary assets of service and support. This repositioning has ramifications to organizations, as they need to contemplate the needs of very distinct population segments and the implications on the technology architecture and the organization’s ability to deliver on the new requirements.

2.2 Technology Lifecycle

The type of uncertainty induced by the maturation of technology is different based upon where the technology is on its life cycle. Research has shown that technology markets are cyclical in their behavior. As a technology matures, different experiences and organizational values are required.

While firms have shown great success in managing the phases of extracting value from their technology, the management of a discontinuous technology presents challenges that are quite difficult as will be illustrated in the following section. The difficulties may be facilitated through a VTP since the VTP may offer a methodology and skill set to evaluate the new technology without a preconceived bias.

2.2.1 Cyclical Framework

The evolution of technology is very similar to a classical Darwinian biological evolution pattern. Initially there are several organisms that are positioning to be the dominant species. The strongest or more precisely the most adaptable and environmentally acceptable species will survive in the long term. The rate of change of organisms is typically very large at the initial stages. After a dominant species emerges however, the change rate typically declines. At this stage, it becomes prone for extinction from another species whose features make it more adaptable to the ever-changing environment.

Tushman and Rosenkopf provide a very good model to view the cyclical nature of technology maturation:
Era of Ferment: At the beginning of the lifecycle there are numerous technologies and architectures of these technologies that compete with each other for dominance. In this period, there is often confusion in the marketplace as to standards and which design provides the safest buying decision.

Selection: From the population of architectures and technologies, a dominant design emerges. The timing of this event is highly contextual to each situation. A discussion on the dynamics of dominant designs is provided in Section 2.2.3 Dominant Design Development. After this selection, the value chain (suppliers and consumers) assumes the product/technology to contain the dominant design. For example, when a person purchases a car, there is an inherent assumption that they will need some type of petrol to operate the car. Hence the gas (or diesel) engine is the dominant design of the passenger car engine.

Era of Incremental Change: Once the dominant design has surfaced, the focus of the industry shifts to incremental changes of the dominant design. This period is illustrated by numerous product innovations that build upon the dominant design rules and numerous
process innovations that make the product more robust in its application. Innovation, however, is not at the architectural level in that the assumption of the dominant design rules is still maintained.

**Technology Discontinuity:** The somewhat complacent nature of the industry leaves it highly vulnerable to a technology discontinuity by the introduction of a new architecture that challenges the previous dominant design. In the previous example of the passenger car, the emergence of the electric car poses a technology discontinuity to the automobile value chain through the challenge of the fossil fuel engine dominant design. After this discontinuity occurs, several architectures of the new technology compete which starts the next cycle of the Era of Ferment.

The Technology Life Cycle is continuous but the attributes of the value chain are not as smooth flowing. There have been numerous instances where the technology discontinuity destroys not only the incumbent firm that employs the dominant design but also the entire value chain. In the Era of Incremental Change, entire supporting industries are developed around the dominant design. In the case of the gas engine passenger car, gas stations, car mechanics, and part manufacturers are just some of the elements of the value chain that are heavily linked to the dominant design. A radical change in the dominant design could be detrimental to these elements if they cannot find a new value proposition associated with the new dominant design.

### 2.2.2 Technology S Curve Framework

Another framework that illustrates the evolutionary dynamics of technology is the Technology S curve. This analysis represents the growth trajectory of performance or value metric as a function of cumulative industry effort. Synergistic with the Technology Life Cycle model, one can view the relative positions of the Life Cycle with respect to the value evolution.
The following is a sample Technology S Curve with the overlay of the Technology Life Cycle:

![Technology S Curve with Technology Life Cycle Overlay](image)

**Figure 3: Technology S Curve with Technology Life Cycle Overlay**

The emergence of the technology discontinuity is highly contextual and can take various positions with respect to the S curve of the dominant design as illustrated in Figure 4. For example, in situation (A), a new technology initially starts with lower performance relative to the leading technology. After a certain period however, the performance exceeds that of the incumbent. At this point, the new entrant becomes the standard technology set for the application. In situation (B), the new entrant is initially much higher than the incumbent. The lack of a dominant design, however, prevents the complete technology transition. The transition may occur when a new industry architecture using the new entrant technology is chosen. In both situations, the transitions provide numerous challenges to the value chains of the incumbent technology.
2.2.3 Dominant Design Development

The emergence of the dominant design is a hallmark in the evolution of a technology. At this point, the elements of the technology become embodied in the lexicon of the architects and often the users of the technology. Accepting a dominant design coincides with an industry boom in process improvements since the resources shift to optimize the value chain (such as manufacturing and distribution) around that architecture.

The identification of a dominant design, which can offer a tremendous competitive advantage to the industry participants, is quite difficult and has been argued not possible except in retrospect.\textsuperscript{viii} The various schools of thought on the source of the dominant design are:

(1) Dominant designs are the result of chance events; the use of a certain design may be due to availability of certain resources at the time of need.
(2) Or that elements within the technology set will predict the dominant design; there may be only a few ways that the architecture can evolve due to Laws of Nature.

(3) Or that social and organizational factors drive the selection of the dominant design. As in the case of the typewriter, the dominant design of the keyboard emerged due to the large population of typists knowledgeable with the QWERTY layout.

(4) Or finally that too many factors are involved to correctly determine the absolute point except in retrospect when the industry and market have chosen the dominant design.

The lack of a definitive signaling event of the emergence of the dominant design adds to the high uncertainty involved in the Era of Ferment. This uncertainty surfaces in the difficulty in developing business models, value chains and organizational constructs. An additional factor is if the dominant design has the potential of supplanting a firm's franchise. This conflict is discussed in the Section 2.3 Management of Disruptive Technologies.

2.2.4 Evolutionary Nature of Organizational Architectures

In navigating through the various stages of the Technology Life Cycle, Tushman and O'Reilly argue that successful firms dynamically change the components of the organizational architecture to best meet the needs associated with each stage. As the technology matures, the requirements of organizations change dramatically in almost diametrically opposite directions. This thesis of constant change poses a challenge to the concept that organizational form needs to be always rigidly defined. Being cognizant of this cyclical nature will aid the technology professional to not only best design the appropriate organizational form but also to communicate the need for future change, paced by the technology and market needs.

The following architectural model illustrates the individual components of the Tushman, O'Reilly organizational form.
Figure 5: Organizational Architecture: A Congruence Model of Organizations

Overlaying the architecture over the Technology Life Cycle, one can see the constant changes that are required to address the specific environmental needs of each phase:
Of particular interest are the diametrically opposite characteristics of the Era of Ferment and the Era of Incremental Change. The organizational architect needs to not only migrate the elements but also be cognizant of the new interrelationships between the elements and the organizational influences such as norms and values.

Figure 6: Organizational Architectures and Technology Cycles
2.3 Management of Disruptive Technologies

The incumbent firm is posed with numerous challenges when confronted with a potentially disruptive technology. Research has shown that the challenges are not only of technical nature but also of organizational norms that are built around a dominant design and architecture. Several countermeasures are offered by scholars of this field that attempt to address some of the challenges facing organizations in this predicament.

The main thrust of this research is to investigate the influences of a VTP as a means of addressing these challenges. The VTP may offer the appropriate analysis methods and norms to properly extract value from the disruptive technology.

It is useful to understand the nature of the technology innovation to understand the subsequent implications. Innovations have been classified as being radical or incremental relative to the improvement of the underlying technology. Incremental advancements allow firms to leverage their core capabilities and complementary assets. In comparison, radical innovations offer new performance through innovations in the underlying technology principles. In the telecommunications industry, an example of an incremental innovation may be the ability to forward calls to another phone number. A radical innovation may be the ability to reduce costs within a campus environment through the use voice over IP.

While the two types of innovations have different organizational implications, they are incomplete in capturing the problems that firms face in the light of architectural advancements. An incremental innovation is organizationally reinforcing in that the firm is able to leverage its knowledge. A radical innovation will potentially require not only a new set of organizational capabilities but also a new set of analysis methodologies due to different technological contexts. An innovation, however, may involve only a minor advancement to the core technology set but still pose threatening problems to a firm through minor changes in the architecture.
Henderson and Clark term architectural innovations as those innovations that "change the way in which the components of a product are linked together while leaving the core design concepts (and thus the basic knowledge underlying the components) untouched". In this case, firms are able to retain their knowledge of the core component concepts but the relative aggregation of the components into architecture may not be able to be leveraged.

Extending the notion of incremental and radical innovations relative to the underlying technology, Henderson and Clark offer an analysis matrix that is inclusive of architectural advancements by mapping an innovation's impact on components to the impact on the components' linkages:

<table>
<thead>
<tr>
<th>Linkage between Core Concepts and Components</th>
<th>Reinforced</th>
<th>Overturned</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unchanged</strong></td>
<td>Incremental Innovation</td>
<td>Modular Innovation</td>
</tr>
<tr>
<td><strong>Changed</strong></td>
<td>Architectural Innovation</td>
<td>Radical Innovation</td>
</tr>
</tbody>
</table>

Table 1: Mapping of an Innovation's Impact on Components to the Impact on the Components' Linkages

While they suggest that the intent of the matrix is not to compartmentalize innovations into definitive boundaries, it does offer insight into the architectural change vector that needs to be contemplated by the firm.

Relating this analysis to the evolution of the industry provides insight into the importance of even minor architectural innovations. As previously stated in Section 2.2.3, as a technology matures, a dominant design will emerge. Norms based around the dominant design will become
accepted not only by the firms in the industry but quite often also by the marketplace. Such norms may include processes such as problem solving procedures and supply chain design principles. In the post dominant design era, innovations tend to be more process oriented (to achieve scale-based efficiencies) and more focused on component optimization. Via an analysis of the photolithographic alignment industry, Henderson and Clark illustrated the detrimental effects of a seemingly minor change in architecture primarily driven by the incumbent’s inability to properly respond to an architectural innovation.\textsuperscript{xii} As the organization of a firm emulates the product architecture, it becomes more susceptible to failure due to architectural changes since they typically require alterations in the communication and work process mechanisms.

Christensen added the qualifier of technology being disruptive with regards to the core value proposition as another means of looking at causes for the failures of incumbents.\textsuperscript{xiii} Using this classification, innovations are termed as being sustaining in that they enable an improvement to the performance of established products along historically accepted metrics. As stated previously, the dominant design imparts certain performance expectations from the industry and marketplace. Disruptive technologies in comparison typically offer worse performance in the short term but they introduce a new value attribute that is valued by a very specific market segment. In numerous cases, the growth of this “fringe” market segment can supplant the mainstream dominant design. Disruptive technologies typically introduce new value attributes such as compactness, lower cost, and ease of use. In continuing the telecommunications example presented previously, a disruptive technology would be the emergence of Short Messaging Systems where the value is in the reduced cost and ease of use. The counter to SMS offered by the centralized model of the mobile industry would be a centralized operator assisted paging or an Internet enabled email system. While both solutions offer more options than SMS, the ease of use and increased immediate customer enjoyment offered by SMS accelerated its growth.

The other theory introduced by Christensen is the notion that technology providers typically overshoot the requirements of their marketplaces leaving an opportunity for a disruptive
technology to enter at a lower performance level and eventually fulfill the true market needs with a positive trajectory. This is illustrated in the following graph:

Figure 7: Impact of Sustaining and Disruptive Technological Change

Christensen noted that, in the disk drive industry, the emergence of the miniature disk drive was disregarded by the incumbents due to its relatively poor performance with regards to the predominant value attributes of the larger drives such as disk capacity. The miniature drive however gained prominence in the "niche" portable computer market segment, which valued the compactness. The increase in portable applications enabled the miniature disk drive market to enable scale effects and technology investments enabling it to surpass the performance of the incumbent larger drive market. The incumbents of the older drive technology were not able to address the threat after the acceptance of the miniature drive as a dominant design.

The relationships between innovations at the product and the value proposition levels are shown in the following map:
As this mapping illustrates, an innovation can be Radical in that it introduces a new science and architecture but still provide a value proposition that is Sustaining in that the historical metrics of value are used. This mapping also illustrates that a seemingly small innovation in the science and architecture can still be positioned as being Disruptive in that it may introduce a new value definition. This research is focused on innovations that are Disruptive and Radical within a Parent firm and the associated challenges.

The issues raised by researchers in this field highlight several difficulties for incumbent firms that make addressing technology changes quite difficult. Strategically there are conflicts in managing disruptive technologies since the incumbent is driven to improve the performance of its value proposition to its customer base. This manifests itself in the technology research and development portfolio of the incumbent. Firms will typically invest in those projects that will improve their value performance. Organizationally, issues with regards to architectural innovations require the firm to address the difficult task of quickly reorganizing its core structure, communication channels and subsequent skills base which can be quite difficult as shown by Henderson and Clark.

Christensen suggested that successful incumbents are those that have established a form of organizational separation to address the threat of disruptive technologies. This enables
the new organization to dedicate the required resources and focus on the success of the disruptive technology without being diverted by the requirements of the incumbent's market. The new organization will be better able to address the needs of its specific markets and develop the corresponding value sets such as acceptable profit margins and skills growth. Christensen also argues that organizational separation should not be viewed as an overall solution to technology change but more to address the inherent conflicts that arise due to disruptive threats; there are many instances where the incumbent was able to address very complex sustaining technology threats.

2.4 Formation of Vested Third Party Relationships as a Means of Delivering Disruptive Technologies

In light of the tenuous situation of both internal and external turbulence, the formation of a Vested Third Party relationship may offer a means of operationally extracting value from a disruptive technology by accelerating the maturation of the new venture relative to its specific needs.

Research in this area highlights the ability of a VTP to address some of the uncertainties in a new venture. For example, Dyer and Singh presented that the fundamental reason for a technology alliance is to mitigate "market uncertainty" which is an aggregate of both customer demand and technology development uncertainties. It should be noted that the term "alliance" as used by Dyer and Singh embodies both equity and non-equity based relationships though equity based relationships reinforce the model further.

The following research offers to extend this notion of "market uncertainty" to also include "organizational uncertainty". In the case of a disruptive technology there also exists an organizational uncertainty in that the organization may not be able to mature the capabilities and values to extract value from the innovation. The VTP may offer a mechanism of addressing this uncertainty through the injection of new frameworks.
2.4.1 VTP Strategies as a Function of Market Uncertainty

The model presented by Dyer and Singh offers a categorization of a VTP relationship as a function of the "market uncertainty" context. With this categorization, an understanding of general expectations relating to the competitive advantage offered by the alliance is developed. The basic premise is that as market uncertainty is reduced, the VTP strategy evolves from one of developing a risk sharing technology portfolio to one of developing scale based advantages through aggregate complementary resources. The strategic evolution according to Dyer and Singh is one of "Windowing" maturing to "Optioning" and finally to "Positioning" as illustrated by the following graph:

![Graph showing Alliance Strategies as a Function of Technology and Demand Uncertainty](image)

Figure 9: Alliance Strategies as a Function of Technology and Demand Uncertainty
At each stage the characteristic and the driving forces of the VTP relationship also evolve as illustrated in the following table xvi:

<table>
<thead>
<tr>
<th></th>
<th>Windowing</th>
<th>Optioning</th>
<th>Positioning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategic Objectives</strong></td>
<td>Learning Monitoring</td>
<td>Building Platforms</td>
<td>Scale-based</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Advantages</td>
</tr>
<tr>
<td><strong>Key Success Factors</strong></td>
<td>Effective Tracking</td>
<td>Scalability</td>
<td>Scale, Operational</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>effectiveness</td>
</tr>
<tr>
<td>Knowledge Absorption</td>
<td></td>
<td>Ability to evaluate</td>
<td>Ability to identify</td>
</tr>
<tr>
<td></td>
<td></td>
<td>technologies</td>
<td>complementary</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>resources</td>
</tr>
<tr>
<td><strong>Key Difficulties</strong></td>
<td>Leakage of knowledge</td>
<td>Value of option</td>
<td>Speed and</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>responsiveness</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(Partner dependency)</td>
</tr>
</tbody>
</table>

Table 2: Alliance Strategy Descriptions

The "Windowing Strategy" for a VTP relationship is one of developing several different architectures or pathways to address potential market needs or uses of technologies. Several networks of alliances are also introduced to reduce the risk even further. At this stage, the focus is on the developed knowledge and building the appropriate knowledge transfer and management routines. The difficulties are in the leakage of the information and the subsequent loss of appropriability.

The "Optioning Strategy" involves investigating a set of potential architectures that may emerge as the dominant design. The strategic options become more focused on the delivery mechanisms and architecture scalability. As with most options, which inherently hold some form of risk, the determination of the optimal direction based on the calculation of the option value is typically complex.
The "Positioning Strategy" is most appropriate when the dominant design has emerged and the VTP relationship would facilitate value extraction through complementary resources such as manufacturing systems, market access, brand, and product delivery mechanisms. The key at this stage is to develop scale-based advantages as efficiently as possible while retaining appropriability of the knowledge.

2.4.2 Effective VTP Relationship Strategies in the Presence of Varying Market Uncertainty

Dyer and Singh offer certain relationship strategies to address the difficulties of the varying nature of the VTP arrangements:\n
1. Create knowledge sharing mechanisms
2. Chose complementary partners
3. Build and manage co-specialized assets
4. Establish an effective governance process.

The emphasis is that one needs to contemplate not only the initial position (the strategic and cultural complementarities) of the partners but also develop the supporting structures such knowledge sharing and governance processes that will enable the evolution of the relationship and finally effectively manage the results of the relationship.

1. Create Knowledge Sharing Mechanisms:

The ability of any organization to recognize and understand new information and develop the respective commercialization processes is a key to its success. The extraction of value in technology markets requires both knowledge of the underlying data and the commercialization process. With this understanding, the parties involved in the venture need to develop the knowledge sharing mechanisms. This absorptive capacity of a relationship will be driven by not
only the knowledge of the individual organizations and but also of the intensity and frequency of
the knowledge sharing.

2. Chose Complementary Partners:

The selection of the partners should be in the context of not only the strategic synergies
of complementary assets but also of organizational synergies. The ability of the new venture to
extract value from the relationship is a function of its organizational compatibility in items such as
decision-making, control systems and culture.

3. Build and Manage Co-Specialized Assets:

As the partnership evolves, certain partnership specific assets will be developed. The
specificity of the assets can by viewed as being either site, physical or human related. The site
specificity relates to the geographic co-location of the partners to facilitate the design and build of
the technology. The physical specific assets such as machine tools or software code are those
assets that are customized for the partnership. The human specificity relates to the development
of knowledge processes that facilitate the execution of processes. This typically increases with
time, as people become more aware of the internal processes of the joint venture.

4. Establish an Effective Governance Process:

A governance process that reduces the transaction costs of the partnership is optimal for
achieving efficiencies. This governance process may be formalized in the case of contractual
agreements or informal in the case of personal relationships. The characteristics of the
governance process need to also contemplate the requirements of the technology. In the early
stages of a technology, the partners need to be flexible to respond to changing scenarios. A more
definitive contract may be more appropriate during the latter stages of the technology where
conditions are easier to articulate due to a more stable environment.
3.0 Hypotheses and Research Design

3.1 Hypotheses

From numerous personal conversations with individuals and organizations involved with developing new venture strategies around technologies that are both disruptive and evolutionary, the theme of organizational influences emerged as a key management issue. A literature search on the management of technology revealed two distinct areas of focus. The first focus was on the difficulties associated with commercializing disruptive technologies leading to a generalized conclusion that the internal influences are too conflicting and a separated organizational form was the most desired solution. The second focus was on the management of alliances and how they can be used as a complementing strategy in the face of market uncertainty.

To bridge these areas, several hypotheses were developed to formulate a broad understanding on the influences of Vested Third Parties in the commercialization of disruptive technologies.

H1. Organizational context is extremely important in a new venture strategy that is in the pursuit of a disruptive technology due to potentially new capabilities and culture required. 
Source: From previous research in the management of disruptive technologies.

H2. The introduction of a vested third party provides a check and balance to the tendency of the new venture to migrate back to the norms of the parental firm.
Source: From conversations with colleagues and personal experiences.

H3. A management process that monitors the evolutionary process of the new venture is key to preventing regression to the parental norm.
Source: From conversations with colleagues and personal experiences.
H4. Timing of a third party introduction is key due to organizational and architectural momentum effects.

Source: From conversations with colleagues and personal experiences.

3.2 Research Method

To address the hypotheses, a research design involving the analysis of various Case Studies within a single firm (or “Parent”) was developed. Each Case Study possessed an attribute that modeled it as a disruptive technology either to the immediate franchise of the Parent or to a specific industry. A cluster grouping within a single Parent was employed to partially negate Parent-to-Parent differentials. In each Case Study except for Alpha, a Vested Third Party was introduced during the commercialization of the technology.

For the Parent and each Case Study, a detailed investigative analysis was performed to better understand not only the conditions of the technology but also the dynamics within the organizations. This analysis took the form of

- Interviews either face to face or through the phone,
- Review of internal documentation, and
- Review of publicly available financial and technical information.

In each investigation, the influence effects of the VTP were highlighted and investigated further.

To protect the anonymity of the Parent and each Case Study, the Case Studies were coded. The analysis of each interview was also verified with each interviewee for correctness of representation of key facts and ideas.

The weakness of the Research Design is in the assumption that the VTP is the primary causal for a change when in fact there may have been several other factors that were either
positively or negatively reinforcing the propensity of the organization to implement the change. For example, there may be other environmental effects that drive the change such as the Parent’s financial conditions and the leadership within the Parent and the new venture. For this study, these sources of variance are partially discussed but not explicitly analyzed.

### 3.2.1 Matrix Design

The following matrix design illustrates the attributes of each of the Case Studies:

<table>
<thead>
<tr>
<th>Case Number</th>
<th>Case Name</th>
<th>Technology/Market Uncertainty</th>
<th>Technology Life Cycle</th>
<th>Vested Third Party Form</th>
<th>Purpose</th>
<th>Organizational Relationship to Parent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reference</td>
<td>Parent</td>
<td>Low</td>
<td>Incremental Change</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>Alpha</td>
<td>High</td>
<td>Ferment</td>
<td>None</td>
<td>N/A</td>
</tr>
<tr>
<td>1</td>
<td>Beta</td>
<td>Medium</td>
<td>Selection</td>
<td>Joint Venture</td>
<td>Positioning</td>
<td>Separate Internal Organization</td>
</tr>
<tr>
<td>2</td>
<td>Gamma</td>
<td>High</td>
<td>Ferment</td>
<td>Joint Venture</td>
<td>Optioning</td>
<td>Spun out from Parent</td>
</tr>
</tbody>
</table>

Table 3: Research Matrix

### 3.2.2 Case Group Descriptions

#### 3.2.2.1 VTP Strategy as a Function of S-Curve and Demand Uncertainty
The Dyer and Singh model of alliance strategy overlaid onto the technology S Curve framework provides an insight into relative relationships between alliance drivers and technology maturity. The Case Studies were mapped onto this aggregate model as a basis of comparison:

![Vested Third Party Strategy Diagram](image)

**Figure 10: VTP Strategy as a f(Technology Maturity and Uncertainty)**

Gamma was clearly on a new performance curve and attempting to define a new marketplace with its technology set. With the performance still rather low as compared to the dominant design form, there existed a very high degree of demand uncertainty indicative of a new emerging marketplace. The VTP strategy from the Parent was not only a windowing strategy but also an attempt by both the Parent and the VTP to develop a system of complementary assets around a new marketplace.

Alpha, the Control of this study, was ramping up the S-Curve having proved a new architecture to the industry. Several new entrants were emerging using some of the architectural rules of the Alpha technology set. The demand, however, was still uncertain due to its relative
infancy and lack of complete set of complementary technologies. There were no VTPs with regards to Alpha.

Beta was far along the S-Curve with the dominant design being set by several of the technology leaders including the Beta team. The demand was fairly understood with the marketplace accepting this technology set into their work processes. The VTP strategy possessed elements of both Optioning and Positioning. The Optioning strategy pertained to the desire to develop new platforms and options for the dominant design. The Positioning strategy related to the desire of reaching large-scale operational efficiencies of the current Beta application set. The VTPs involved also possessed a complementary set of assets that was lacking by the Beta team.

3.2.2.2 Technology Innovation Classification

While each Case Study was chosen for its disruptive nature, it is essential to understand the nature of the technological innovation and its implications. In all Cases, the technological innovation was Radical (See Section 2.3) in that both the core concepts and the linkages between the core concepts and the components were changed. In this sense, a very new learning environment was required in both core science and the aggregation of the science into a product.

Each Case Study was also considered a disruptive technology in that the initial performance along the historically accepted industry metric was poor but with a positive trajectory. Each Case Study also offered a new value attribute that was valued by a specific segment in its respective marketplace.

It is also essential to note the relationship of the disruptive technology with respect to the Parent. While each Case Study was disruptive, only the Beta Case was directly disruptive to the Parent's core franchise. The Alpha and Gamma Cases were disruptive to industries that were
external to the Parent's core franchise but still related. Alpha was disruptive to a critical subsystem within the Parent Dominant Design ("PDD") while Gamma was disruptive to an industry that the PDD participated in. A description of the relevance of the PDD is provided in Section 4.1 Parent Description. To present this difference in technology disruptions, the notion of a "disruption boundary" is presented. The following table illustrates the varying disruption boundaries:

<table>
<thead>
<tr>
<th>Case Study</th>
<th>Disruption Boundary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha</td>
<td>Subsystem within the Parent Dominant Design</td>
</tr>
<tr>
<td>Beta</td>
<td>Parent Dominant Design</td>
</tr>
<tr>
<td>Gamma</td>
<td>External and Emerging Industry that employed the PDD</td>
</tr>
</tbody>
</table>

Table 4: Disruption Boundaries of Case Studies

This classification may offer guidance in understanding the Parent's behaviors to each Case Study.

The Case Study reviews contained in Sections 4.2 - 4.4 illustrate the details of the disruptive nature further.

### 3.3 Research Process

For each hypothesis, a specific research process was developed where key data and findings were extracted from specific case studies. The Reference Case is the Parent and will be used as a measure of evolution. Alpha, which did not have a VTP, represents the Control Study and will be used to measure the effects of the VTP. The following are the key observations that were made with reference to each of the Case Studies and the Parent:

Product Development Process ("PDP"): 
This is the process by which the organization delivers solutions to its respective markets. Key attributes that were investigated include the degree of customization from the PDP of the Parent and VTP influences.

**Organizational Construct:**

The organizational constructs were reviewed to determine ability of the new venture to formulate an organizational structure that facilitated its business based upon architectural and market specific requirements and the extent that the VTP enabled the change.

**Management Decision Process:**

The Management Decision Process was focused on those processes that managed the resolution of market and architectural issues. The applicability of the Management Decision Process to the opportunity was analyzed from comments from the interviewees. Comparisons to the Parent management decision process were also made to understand the evolution, if any. The inclusion and frequency of the VTP in the decision process was investigated.

**Skill Evolution:**

The ability of the venture to cultivate new skills that were required for its specific business was investigated. The VTP influences on the skills were also investigated.
3.3.1 Hypothesis 1 (H1). Organizational context is extremely important in a new venture strategy that is in the pursuit of a disruptive technology due to potentially new capabilities and culture required.

Research Process:

- Compare organizational evolution and architectural differences of the Control and Case Studies 1 and 2 with Parent.
- Relate organization's absorptive capacity to the organizational context by analyzing the evolution of skills and fit to new market domain.

Analysis:

H1 is validated in the context of this research if:

1. Alpha was not able to acquire the appropriate skills to succeed in its markets.
2. Beta was able to develop the skills required for its markets.
3. Gamma was able to develop the skills required for its markets.

Description:

After confirming that a new skill set and culture was required by each venture organization, an analysis of the organizational construct and its influences on the resulting capabilities and environment were investigated. Key attributes that were compared to the Parent to confirm evolution include magnitude of new:

- organizational constructs,
- and skill sets.
3.3.2 Hypothesis 2 (H2). The introduction of a vested third party provides a check and balance to the tendency of the new venture to migrate back to the norms of the parental firm.

Research Process:
- Compare organizational processes of Case Studies 1 and 2 with the Parent and the VTP, pre and post VTP introduction.

Analysis:
H2 is validated in the context of this research if
1. Management Decision Process evolved and was influenced by a VTP in the Beta and Gamma Cases.
2. The Management Decision Process for Alpha remained similar to the Parent.
3. The skills evolved to better align with the new opportunity and were influenced by a VTP in the Beta and Gamma cases.
4. The skills for Alpha remained similar to the Parent.

Description:
Two specific areas of evolution were investigated: the management decision process and the organizational skills set. The management decision process provided an insight into a key organizational process that develops organizational norms. Complementing this analysis, the skills of the organization were viewed as an artifact of the organizational norms. By investigating evolutions of both of these areas and the potential VTP influences on the evolution, an understanding of the organizational growth as a whole can be obtained.
3.3.3 Hypothesis 3 (H3). A management process that monitors the evolutionary process of the new venture is key to preventing regression to the parental norm.

**Research Process:**
- Investigate organizational processes pre and post introduction of the VTP for Case Studies 1 and 2.
- Identify monitoring process, if any.

**Analysis:**
H3 is validated in the context of this research if
1. If H2 is validated.
2. There existed an effective monitoring process for the evolution of Skills, Product Delivery Process and Management Decision Process for Beta and Gamma.

**Description:**
Leveraging the research data for H2, the existence of a monitoring process for any organizational process was investigated. The monitoring process was viewed as a process that routinely views the progress of the organization against the desired state and makes periodic adjustments. While this classically would implicitly be the responsibility of the Senior Management, this tends to be ad hoc. The existence of an explicit monitoring process was researched.
3.3.4 Hypothesis 4 (H4). Timing of a third party introduction is key due to organizational and architectural momentum effects.

Research Process:

- Compare results of Case Studies 1 and 2, focusing on the timing of the introduction of the VTP and the technology life cycle.

Analysis:

H4 is validated in the context of this research if:

1. The timings of the introduction of the VTP in the Beta and Gamma cases are compared with the respective VTP’s abilities to positively influence the organization and architecture.

Description:

Case Study Beta will be compared to Case Study Gamma in that a VTP was introduced at different stages of the technology cycle. The specific results that will be measured include

- architectural improvements suggested by the VTP and implemented by the venture
- and market extensibility suggested by the VTP and implemented by the venture.
4.0 Case Analyses

4.1 Parent Description

The Parent, a multi billion-dollar firm in the high technology field, had a very long history of technology management. Its focus on technology management has allowed it to inject leading edge technologies into its various franchises with very positive results. The Parent’s commitment to technical excellence has had other benefits besides its product portfolio advancement in that its research labs have attracted some of the leading researchers in their fields.

This collection of research labs has enabled the Parent to possess a knowledge position in many diverse technical fields. The fields that are synergistic to the Parent’s franchises possessed a clear commercialization path. Those innovations that were disruptive to the Parent’s franchises or were foreign to the Parent’s competencies were often either lost to other competing firms that were able to appropriate the value or floundered internally without a clear strategic direction.

To address this issue, several corporate level countermeasures were developed including the development of an internal organization chartered with incubating the innovations apart from mainline product delivery processes. One of the goals of this organization for those disruptive technologies that were not a direct threat to the mainline franchise was to stage the innovation for the equity markets. In this fashion, the Parent would be able to extract value from the invested intellectual property.

4.1.1 Dominant Design Maturity and Influences within the Parent

The Parent was considered an innovator in its business having revolutionized its industry with its technological approach. This followed a classical S Curve discontinuity with the new curve offering a markedly improved value proposition from the previous approach. This innovation heritage was evident in reviews of internal corporate literature and press coverage on the Parent.
The evolution of the technology followed the classical technology evolution path as stated in Section 2.2. In the initial stages there were tremendous improvements to the architecture. Once the architecture became stable, more entrants emerged to deploy the technology with their specific complementary assets. In many cases, the complementary asset was a well-refined manufacturing system. An industry around the Parent Dominant Design ("PDD") was developed and recognized by the users of the technology as the de facto standard. The shift then was on process improvements to extract more value from the technology. Advancements to the architecture were often heralded as being revolutionary, but they were actually evolutionary to the core value proposition in that the core architectural rules were still maintained. The evolutions were also not architectural competency destroying in that the core skills sets were leveraged effectively. Several complementary assets and subsystems however did witness severe disruptions in that innovations in their respective fields heralded a completely new architecture and non-classical value propositions. The Alpha Case illustrates one example of this event.

4.1.2 Competitive Advantage Evolution of the Parent

The competitive advantage of the Parent evolved with the PDD, highlighting a case of disaggregation of the holistic value proposition in the presence of mature architectures. In the initial stages of the PDD, the value proposition was structured around the holistic solution offering of sales, service and product. As the PDD matured, several industries were formed around specific elements of the solution architecture, such as service, that forced the Parent to reevaluate the value proposition per market segment while still maintaining cross segment brand recognition.

The complementary assets of the Parent were a major competitive advantage in that it had built the scale required to deliver cost-effective solutions. This focus on scale-based efficiencies is indicative of a mature industry since the complementary assets are primarily built around the PDD.
4.1.3 Parent Organizational Construct

As stated in Section 2.3, the architecture of an organization often emulates the architecture of the dominant design. This was highly evident in the case of the Parent. The Parent possessed deep functional knowledge of the subsystem interactions in the context of the PDD. The Business Groups (the engineering and design organizations) structured their delivery teams following the architecture of the PDD. The structure of each delivery team matched almost completely to the architectural decomposition of the PDD.

From the overall corporate perspective, the Parent was a highly functionally based organization, with research and key supply chain functions, such as manufacturing, centrally located as separate organizations. The business units were integrated end-to-end delivery units with relationships to the centralized organizations. The strategic and funding attributes of these relationships will be discussed in Section 4.1.4.1.

The following diagram illustrates the generic organization structure with information flows:

![Diagram showing the generic organization structure with information flows](image)

Figure 11: Parent Operating Units with Sample Information Flows
In this example, Business Group 1 does not have any interactions with Manufacturing and Research while Business Group 2 has both relationships. This flexibility was an outcome of the congruence process discussed in Section 4.1.4.1.

4.1.4 Parent Process Management

4.1.4.1 Strategic and Financial Management Processes

The Parent's Strategic and Financial Management Processes were well integrated. The Strategy development process involved essentially a cascade process with responses aggregated back to the corporate office. For example, a corporate directive is issued to the operating units. Each unit then formulates their response to the directive by developing the required horizontal relationships (the information flows noted in 4.1.3). Included in the response are the resources (ex: head count, expense and capital funding). The responses are then aggregated at the corporate office for consistency. Financial targets and annual budgets are then issued to the operating units with another test for feasibility similar to the cascade-feedback process of the strategic plan development process.
The funding of research projects is based upon the objective and the timeline to revenue:

<table>
<thead>
<tr>
<th>Objective</th>
<th>Timeline to Revenue</th>
<th>Funding Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Basic&quot; Research</td>
<td>&gt;10 years</td>
<td>Corporate Funded via a Business Unit “tax” based on revenue</td>
</tr>
<tr>
<td>&quot;Basic&quot; leading to Applied</td>
<td>5-10 years</td>
<td>Business Unit; research is specific to a market space</td>
</tr>
<tr>
<td>Applied Research for Product</td>
<td>1-5 years</td>
<td>Business Unit; research is specific to a product</td>
</tr>
</tbody>
</table>

Table 5: Parent Research Funding Models

While the "Basic" Research funds are calculated at the corporate level and issued to the Research Labs, the other two categories, "Basic" leading to Applied and Applied Research are negotiated as part of the horizontal linkage establishment during both the Strategy and Financial Development Processes.

4.1.4.2 Parent Product Development Processes

The Product Development Process ("PDP") was highly structured and encompassed the full delivery cycle from technology and strategy planning to product delivery and subsequent post sales customer relationship management. The structure of the PDP emphasized a business group centric platform development approach with value chain elements such as manufacturing providing inputs and responses. The strategic plans were reviewed by the Corporate Staff from not only the perspective from the business groups but also from the value chain members. The
value chain members were viewed as a common "back plane" that enabled all of the applicable business groups plans. This enabled a strategic, marketing and operational congruency and provided a common framework to bound issues. For example, to enable a certain platform, issues around Manufacturing’s commitment to ramp up assets would be discussed in the context of all of the other platforms that Manufacturing was supporting in the same time horizon.

Upon design initiation of the product, a structured phased development process was used to manage the operational activities of the entire supply chain. The phase reviews involved two distinct steps:

1. An initial Peer Review, which involved several sub teams that specialized in or possessed previous delivery experience in specific areas such as Customer Service.
2. A formal Program Review, which involved a Management Decision Team comprised of Business Team and key Supply Chain senior managers.

The output of the Peer Review was a recommendation to the Management Decision Team to pass the product to the next phase, redirect the product to a previous phase or suggest the cancellation of the product. Final decision authority was solely on the Management Decision Team. The design of the PDP Phases was such that the decisions were linked to substantial financial implications such as an increased headcount or new capital spend.

While the local Business Groups managed the operational execution of the PDP, the Corporate Staff routinely audited the process for compliance. Compliance was mandated as a corporate directive and was mandatory for any product delivery and the subsequent release of funding.

Operationally, however, while the PDP was shown to be highly successful in certain areas, several operational organizations were very concerned about the highly structured nature
of the process as an impediment to delivery schedules. In several instances, the development would essentially stop in preparation for a phase gate review. While deviation from the process was sometimes granted, it required a release from several levels of management including a corporate officer.

### 4.1.5 Parent Relationship to Case Studies

Each Case Study was chosen due to not only its internal merits but also due to its uniqueness of its relationship to the Parent. The following diagram illustrates the relationships between each of the Case Studies to the Parent:

![Parent Corporate Structure Diagram](image)

**Figure 12: Relationships between Parent, Cases, and VTP**

As depicted in the diagram, the Value Chain around the Parent Dominant Design was the major emphasis of the Parent. The interlace of each of the Case Studies and the Control to the Parent can be viewed from the perspective of their relative relationships with the Parent Dominant Design Value Chain Process. While Alpha, Beta, and Gamma possessed their own value chains,
each differed in their relative integration points with the PDD. Alpha was a key technology that
was integrated directly into the next generation PDD. There existed strong linkages between
Alpha and the Design and Manufacturing elements of the PDD Value Chain. However, Beta was
a potential replacement threat to the PDD and possessed a completely stand alone Value Chain
very similar to the PDD Value Chain. Both Alpha and Beta were retained in the control of the
Parent Corporate Structure. Gamma differed in that it was actually spun out of the formal
Corporate Structure with the Parent retaining controlling equity interest. It was managed by a
separate corporate structure with its own industry specific objectives and possessed a very
unique value chain.
4.2 Case: Alpha

4.2.1 Value Proposition

The core value proposition of Alpha was to address a potential performance gap in the Parent Dominant Design ("PDD"). This gap became prominent, as a new implementation of the PDD, Platform A, was being architected. In order for Platform A to function properly, a major performance breakthrough was required from one its subsystems ("Subsystem X"). The first implementation of Alpha was to address this issue. Alpha was viewed as being a radical innovation in that it provided a performance value that set the industry benchmark with revolutionary new architecture and technology sets. It was also viewed as being disruptive in that it offered a new value attribute that was not historically typical that was valued by a small segment of the industry.

It should be highlighted that even though Alpha was a disruptive technology, it was integrated into an evolutionary PDD. While the new implementation offered numerous new options and features, the core architectural rules of the PDD were still leveraged.

4.2.2 History

The history of Alpha was, as one of the interviewees stated, "success by chance". Throughout its development, issues with regards to the radical nature of the architecture and the Parent's somewhat inability to correctly evaluate and position the technology added to the unstable delivery process.
The following is the historical timeline of key events in the Alpha commercialization:

![Timeline Diagram]

**Legend**
- A: Processes
- M1: Milestones

**Figure 13: Alpha Historical Timeline**

The following accompanying table illustrates the chronological progression:

<table>
<thead>
<tr>
<th>Event</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process A</td>
<td>Concept is identified and developed.</td>
</tr>
<tr>
<td>Process B</td>
<td>Technology feasibility is demonstrated 6 times to various groups.</td>
</tr>
<tr>
<td>Milestone 1</td>
<td>Corporate Office selects Alpha as technology of choice.</td>
</tr>
<tr>
<td>Milestone 2</td>
<td>Platform A selects Alpha</td>
</tr>
<tr>
<td>Process C</td>
<td>Complementary assets (ex: manufacturing, supply chain, service) are ramped up</td>
</tr>
<tr>
<td>Milestone 3</td>
<td>Platform A is launched.</td>
</tr>
<tr>
<td>Process D</td>
<td>New opportunities are investigated.</td>
</tr>
<tr>
<td>Milestone 4</td>
<td>Platform B selects Alpha.</td>
</tr>
<tr>
<td>Milestone 5</td>
<td>Platform C selects Alpha</td>
</tr>
<tr>
<td>Milestone 6</td>
<td>Platform D selects Alpha</td>
</tr>
</tbody>
</table>

**Table 6: Case Study Alpha Chronological Progression**
In Year 1, several researchers had predicted the potential gap in Subsystem X based upon the technology vectors of the PDD. In order for the PDD to maintain its integrity, a breakthrough would be required to improve the performance of Subsystem X using either of the following two options:

1. Leverage the emerging dominant design for Subsystem X
   This option, while it would leverage the industry volume and learning effects, was found to be inferior due its extraordinary cost required to achieve the PDD requirements. It was also argued that an implementation would be at the upper limits of the dominant design's capabilities.

2. Develop a new architecture to eliminate the cost and performance gaps by leveraging some of the PDD integration skills of the Parent.
   This option, while allowing the Parent to possess higher appropriability, would require the development of a new supply chain with skills that were foreign to the Parent and the industry.
The advantages and disadvantages of each of the options are listed below to better frame the decision for Subsystem X:

<table>
<thead>
<tr>
<th>Option</th>
<th>Strength</th>
<th>Weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Leverage Dominant Design</td>
<td>• Leverage industry learning and cost curves.</td>
<td>• Inability to meet system requirements.</td>
</tr>
<tr>
<td></td>
<td>• Reduced supplier switching costs due to larger supplier base using common architecture.</td>
<td>• Required resolution of performance gap through the use of non-standard components within the dominant design increasing risk and implementation costs.</td>
</tr>
<tr>
<td>2. Develop New Architecture</td>
<td>• Ability to meet system requirements at significant cost savings.</td>
<td>• Required new skill sets foreign to Parent and the Industry.</td>
</tr>
<tr>
<td></td>
<td>• Ability to integrate seamlessly with system architecture.</td>
<td>• Required new supply chain.</td>
</tr>
</tbody>
</table>

Table 7: Option Analysis of Alpha vs. Industry Dominant Design

It was decided that a group should be formed to insure that the Parent was able to position itself properly. This enabled the Parent to maintain some appropriability and develop a technology understanding of Subsystem X. The research however was not directed at a specific product.

As the technology of the overall PDD advanced, various groups in the Parent became very interested in this potential divergence between the PDD requirements and the performance of the dominant design of Subsystem X. Several geographically and organizationally separate
research groups were formed to develop solutions. The progress of these solutions and the requirement of substantial incremental capital investment from the Parent required a decision to be made to focus on one solution.

In Year 12, members of the Parent's Corporate Staff convened for several days to review the technology readiness of each of the technology sets and choose the direction for the Parent. The core option set for the future Subsystem X within the PDD was to:

1. Implement Alpha into the next PDD evolution,
2. Implement a competing technology set supported by two other research groups,
3. Or finally to drop both technologies and revert to the industry dominant design.

After a thorough analysis with all the leading members of each group, the Corporate Staff selected Alpha as the technology of choice.

The selection of Alpha triggered several events. It not only formalized the acceptance of the Alpha technology but it also initiated the ramp down of the activities of the competing technology sets. This required the redeployment of several key technologists and engineers. The other groups that had developed the competing technology set also did not implement Alpha as was originally discussed. They reverted to the dominant design and accepted the performance gap within their designs of the PDD. After Alpha was commercialized, one of the lead engineers of the competing technology set commented: "We will never implement Alpha in our products due its performance issues". This was despite the market data to the contrary.

Alpha did not gain momentum until it was finally specified in a new implementation (Platform A) of the PDD in Year 13. The Chief Engineer of the new implementation drove the decision to not only implement Alpha but also to organizationally take responsibility for the ramp-
up. The members of the Alpha technology team were organizationally combined into the product delivery team. This aggregation provided better focus on the lead product requirements.

The funding was directly from the program budget despite the fact that there were still many technical issues that would have been classically termed as being research oriented. Several innovative attempts to get outside funding via government assistance and venture capital were pursued to reduce the risk exposure but were unsuccessful.

There were however still many dissenters that did not fully agree with the Chief Engineer on the Alpha decision. This was partially due to the disruptive nature of the Alpha technology set and the lack of any baseline in the industry. The readiness of the technology was verified six times in the course of the commercialization efforts. The uncertainty of Alpha remained until a year before Platform A launch when the Product Delivery Organization was asked to develop a dual architecture approach to validate the competitive edge of using Alpha. The first architecture used the baseline Alpha set while the second architecture employed the dominant design approach for Subsystem X. It was found, once again, that the dominant design could not meet the system requirements at the cost targets required by the market. The Alpha architecture was reaffirmed again.

The lead product from Platform A was launched in Year 17 with very good market success. The performance gap was not only eliminated but the quality of the Alpha technology set the industry benchmark. Alpha became a key product attribute that was competitively differentiated at the system level while offering substantial system level cost savings.

Organizationally, in Year 17, the Alpha group required a new home since the Parent possessed a functionally organized model; the manufacturing unit of Alpha was required to be separate from the product delivery team. Reporting to the Chief of Worldwide Manufacturing, a new organization was developed that was responsible for the technology ramp-up, supply
assurance, and the development of new opportunities for Alpha. The engineering team, however, remained in the Product Delivery Organization.

The leader of the new manufacturing organization possessed a background of technology entrepreneurship, having started technology firms and organizations prior to joining the Parent. The person developed the ties that were required to maintain the flow of information and the momentum of the technology maturation. The leader also volunteered to have a dual reporting structure into the Product Delivery Organization, which while greatly facilitated the transition. This arrangement was the only relationship of its kind in the Product Delivery Organization.

The strategy of Alpha was initially to enable Platform A and its variants. The Alpha Extended Team (the Manufacturing Team and the separate Engineering Team) aggressively pursued other opportunities, leveraging the momentum of the initial design win. The extensibility of the architecture enabled the capture of three new platforms (B, C and D) within the Parent.

The incentives of this market expansion were not fully aligned. For example, the Manufacturing Team needed to maintain a certain volume throughput to enable both cost and learning scale effects. The Engineering Team possessed an awkward position of reporting to a specific Product Delivery Organization but actually supporting several organizations throughout the company. The Manufacturing Team, by its charter of being a centralized function, possessed the business process such as financial transfer control, which facilitated this model. The Engineering Team did not have the processes for enabling centralized support and were required to develop numerous non-standard work arounds.

The funding mechanisms of the Alpha Extended Team were solely focused on enabling the current Platform set. Very little to no work was sanctioned to long-term research. The research that the Team believed necessary was performed on a bootstrap basis while performing
the deliverables of the immediate Platform members. The Alpha Extended Team did not have the linkages to the Corporate Funding model for research since they resided partially in a Business Group and partially in the Manufacturing Organization, which both typically were not recipients of basic nor applied research funds. This form of research would have been performed in the Central Research Labs of the Parent but they did not have the skills required since they were not typical of the PDD.

Since the Alpha Extended Team were tightly coupled with the strategic and financial processes of the Parent, it suffered from changes to its operating plan due to changes in the Parent's other initiatives. For example, if the Alpha team required a certain investment to maintain its competitiveness, the acceptance of the investment would be a function of the Parent's overall financial position and not of the criticality of the investment.

4.2.3 Architectural Evolution

The architecture of the Alpha technology set remained fairly consistent throughout the development phase. There were several improvements made to some of the functional boundaries based upon emerging industry dynamics but the core definition remained in tact.

The challenge to the Alpha Extended Team was to satisfy the diverging needs of the four different customers (Platforms A, B, C, and D) with a core delivery platform. Each customer requirement was negotiated in the context of each of the other customers to minimize the changes, which were very expensive, according to the Alpha Extended Team. Potential changes to the design architecture, for example, would have negatively impacted the manufacturing costs. This negotiation was greatly facilitated by the fact that each customer brought incremental volume that benefited all of the Alpha users.

The architectural evolution however was directed towards fulfilling the immediate needs of the Platform members and not focused on longer-term horizons. The architecture began to
slowly enable those specific market needs as opposed to the needs that were required by the
greater market as a whole. This divergence, which may have been an artifact of the funding
mechanism since the Alpha Extended Team did not receive any research funds, surfaced during
several major design bids that were lost to other architectures.

4.2.4 Organizational Evolution

The organizational evolution can best be framed as 3 very distinct Phases as illustrated
below:

<table>
<thead>
<tr>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platform A</td>
<td>Platform A</td>
<td>Platform A</td>
</tr>
<tr>
<td>Alpha Extended Team</td>
<td>Delivery Organization</td>
<td>Delivery Organization</td>
</tr>
<tr>
<td>Communication Flows</td>
<td>Interconnection</td>
<td>Integration Team</td>
</tr>
</tbody>
</table>

Figure 14: Alpha Organizational Evolution

In Phase 1, the Alpha team was integrated into the Platform team. Upon the launch of
Platform A, the team was separated to match the organizational construct rules of the Parent as
shown in Phase 2. In Phase 3, a new hybrid evolved where the Alpha Extended Team engaged
new Platforms and developed several triads of communication flows. The communication flows
consisted of essentially architectural and integration knowledge which was required to facilitate the integration.

While the Parent supported the communication flows of Phases 1 and 2, Phase 3 was developed through the leadership of the Alpha Extended Team. The new construct was required to compete against outside vendors that offered a complete end-to-end delivery of the dominant design. This new construct also facilitated the system integration of Alpha, which was still evolving as new uses were being developed.

4.2.5 Skills Evolution

The skill set of the Alpha Extended Team evolved greatly during the commercialization process. While the emphasis initially was on the core technology set, it evolved to more of an application focus as new Platforms chose to deploy Alpha. The availability of skills associated with integrating Alpha into new applications was one of the critical decision points for potential new customers due to its relative newness in the industry.

The application form of each new Platform bounded the type of skill that was obtained by the Alpha Extended Team. For example, Platform B was focused on high performance and not on cost. Platform C also possessed some of the same attributes. Platform D possessed more cost related issues but still valued the Alpha extensibility attributes. The Alpha Extended Team skills improved along this vector but lacked experience in areas that were becoming more of a competitive advantage in the marketplace such as low cost and high volume capabilities.

This gap of high volume skills and integration knowledge of low cost implementations, surfaced in numerous design bids losses against the dominant design. Competitors that leveraged the dominant design were able to offer a more inexpensive solution for those Platforms that were more price sensitive and less performance based. The competitors also possessed more credibility in the system integration of low cost architectures.
There also existed a major gap between the skill sets of the Alpha Extended Team and the Parent that was never resolved. The very unique nature of the Alpha technology set required very specialized skills that were not available in any other organization within the Parent. This gap posed several problems such as:

1. The inability to request help from the Parent with regards to technical issues due to the very different contexts.
2. Difficulty in hiring personal from within the Parent due to the lack of qualified candidates.
3. The inability to convey the technical and operational issues to the Parent senior management who were trained on the Parent Dominant Design.

4.2.6 Process Evolution

The Alpha team deployed all of the work processes of the Parent that related to a subsystem provider. This was partially due to the very tight organizational and architectural relationships that it maintained with the Parent. There were many advantages to this strategy such as common technical interface terminologies and planning synchronizations with the other Platforms within the Parent.

This focus on the process integration forced the process knowledge to be highly specific the respective Platform. For example, the processes established by Platform A were specific to the Parent's view of delivering into a specific marketplace. The Alpha Extended Team was requested to synchronize all of their deliverables to this plan. Eventually, all of Alpha work processes became specific to that particular marketplace.

In an attempt to break this trap of limiting domain knowledge, the Alpha Extended Team developed a cross Platform approach of delivering to the various Platforms that leveraged the core supply chain assets. This work process was developed internally by the Alpha Extended
Team and then later endorsed by the Parent as a best practice. This process knowledge, however, was in the ability to operationally deliver the applications within the Parent that could leverage the Alpha architecture as opposed to identifying and delivering to those markets that would maintain the Alpha competitiveness.

The Parent work processes and those of the industry in which Alpha Extended Team was competing in were quite different. While the Parent was in a more stable area of the technology curve, it was able to perform strategy and financial synchronizations on an annual basis. The Alpha technology, however, was competing in a very competitive environment that had planning cadences measured in weeks. To compete effectively, Alpha needed the work processes of low cost high volume suppliers, which were not in the process domain of the Platforms that were being supported. This is similar to the skills evolution issue discussed in Section 4.2.5.
4.3 Case: Beta

4.3.1 Value Proposition

Beta possessed a very interesting attribute in that it was directly disruptive to the Parent franchise. Users were migrating some of their applications away from the PDD to this new technology due to lower cost and increased ease of use while forfeiting some of the traditional performance value offered by the PDD. From the view of the Parent, this was a technology that could potentially supplant the PDD but the timing was unknown. In the Technology Life Cycle framework, this can be modeled as potentially crossing S Curves.

4.3.2 History

Beta had an almost 20 year history within the Parent. Throughout this time period, the Parent consistently questioned the viability of the technology while competitors continued to make significant strides using the elements of the Beta technology set. The history was exhibited by constant repositioning and vested third party injections to address PDD conflicts and risk sharing.
The following is the Beta historical timeline that illustrates the commercialization efforts:

![Beta Historical Timeline](image)

**Legend**
- A: Processes
- M1: Milestones/Key Events
- VTP: VTP Introduction

**Figure 15: Beta Historical Timeline**

The following accompanying table illustrates the chronological progression:

<table>
<thead>
<tr>
<th>Event</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process A</td>
<td>Technology is discovered and explored.</td>
</tr>
<tr>
<td>Milestone 1</td>
<td>Formal Beta group started in Research Organization.</td>
</tr>
<tr>
<td>Process B</td>
<td>5 Products initiated and cancelled.</td>
</tr>
<tr>
<td>Milestone 2</td>
<td>Core Beta group moved to Centralized Manufacturing Organization. Other groups remain scattered in Research and Development.</td>
</tr>
<tr>
<td>Process C</td>
<td>5 Products initiated and cancelled.</td>
</tr>
<tr>
<td>Milestone 3</td>
<td>Platform A launched using Beta.</td>
</tr>
</tbody>
</table>
Milestone 4 | Core Beta group moved to Research. Other groups scattered in Manufacturing and Research.
---|---
Vested Third Party 1 | First VTP derived products are launched.
Process D | New opportunities are pursued.
Milestone 5 | Beta group centralized in research. First formal end-to-end organization.
Vested Third Party 2 | First VTP 2 derived products are launched. VTP1 was cancelled.
Milestone 6 | Platform B launched using Beta.
Vested Third Party 3 | First VTP 3 derived products are launched. VTP 2 was cancelled.
Milestone 7 | Beta group moved to Business Unit.
Milestone 8 | Platform C launched.

Table 8: Case Study Beta Chronological Progression

Attempts to extract value from the Beta technology in the first 10 years failed with numerous perturbations in the funding mechanisms and corporate support. Having its roots in the research labs of the Parent, a very strong intellectual property portfolio was developed. However, the extraction of value from this technology set also required several major investments from the Parent in developing other complementary assets. These investments and the skills around these investments were very foreign to the Parent since they were not represented in the PDD.

While the technology was being proven in the labs, several members from the Parent’s mainline business questioned the viability of the Beta technology often highlighting the inferior quality, cost and performance relative to the PDD. The analysis was in the context of the Parent’s business using standard procedures that were well deployed in the Parent.

During this time, other competitors entered the market and developed a strong brand around their implementation of the technology. This also enabled them to develop a complete set of complementaries that aided in the technology diffusion.
The first product using the Beta technology was launched in year 11. This product was developed using a partner (VTP 1) that was experienced in high volume manufacturing. Several products were launched using this supply chain. Success was limited however by conflicts with selling models and channels of the Parent and also by the stiff competitive field that had developed in the marketplace.

In year 13, VTP 1 was replaced with a new partner (VTP 2) that also had experience in high volume design and manufacturing. VTP 2 offered increased market access and offered to develop new channels for the product. Success was again dampened by the emerging gap between the competition and the Parent.

By year 15, the competitive field had increased dramatically. The future investments including all of the costs required by the entire value chain were a major concern to the Parent. A decision on the strategic direction was required to either continue the technology, which would require a several orders of magnitude increase in the investment, or to look for alternatives to exit the business. The decision was made by the Corporate Office to officially endorse the technology and position the Beta technology as a major strategic thrust. The objective was to develop a global joint venture and introduce stronger value chain partners to support the initiative. By this time, the Parent had also exited the relationship with VTP 2.

This new Venture included a new VTP set (firms VTP 3-C1 and VTP3-C2). VTP3-C1 provided an increased level of design and manufacturing expertise than VTP 2, including new market reach. VTP3-C1 also provided some financial support for the startup of the new architecture. VTP3-C2, which was part of a different joint venture of the Parent, provided design expertise in new applications of the technology set along with financial and market reach support.
In year 18, the first products of this new architecture developed by the Venture were launched.

4.3.3 Architectural Evolution

The architecture of the Beta evolved through the course of the different Platform delivery processes. The core architectural elements however were maintained. This was partially due to the strong patent positions of the Parent and the competition; several key architectural patents greatly bounded the technology.

The migration of Platform A to Platform B involved the presentation of a new value proposition to the customer base through a new attribute. This value proposition also became associated with the brand development. This evolution became a part of future architectures and part of the lexicon of the Beta technology; each future implementation was assumed to possess this attribute. The initiation of this architectural change was driven by the Beta team as a method of developing brand awareness around a different value attribute than the competitive landscape.

Platform C presented one of the biggest changes to the architectural approach in that modularization was raised to a higher level to enable a wider application set. New applications would be able to leverage more of the base architecture without the need for costly engineering and tooling changes.

The extensibility studies in the context of a specific application were performed jointly by the Beta Team and VTP3-C2 with VTP3-C2 leading the task. The requirements were driven back to the Platform architecture team and integrated into the new releases. The focus of VTP3-C2 on new applications assisted the Beta team to test the extensible nature of the architecture while being able to focus on releasing the first products of Platform C.
4.3.4 Organizational Evolution

The history of Beta in the Parent has been termed as one of organizational instability, resulting from not only very complex funding mechanisms but also the conflict to the PDD and the organization constructs built around that PDD. The Beta organization was placed into Research, Manufacturing, back to Research, then finally into a Business Unit. As stated previously, each functional organization had particular funding and strategic mechanisms with regards to the Parent's integrated approach of achieving financial and strategic congruency. This made certain transitions very difficult and slightly confusing. For example, the Research organization possessed funding processes to receive funds but did not fully understand the mechanisms required to run a manufacturing site. On the other hand, placing Beta, which required substantial research and capital investments, in the Manufacturing Organization also posed issues. The Manufacturing Organization typically was viewed as a cost center and a generator of internal efficiencies to the Parent via a reduction in the cost of goods. As an interviewer who participated in the reviews of the Beta technology but was not part of the Beta team stated, "No one knew what to do with Beta. How do we insure the right organizational form, function and the subsequent funding mechanisms?... We had to participate in this market".

Since the Beta architecture did not resemble the Parent Dominant Design, there were great difficulties in developing the correct organizational form since there were no reference implementations except in competitors' firms. Several consultants were used to assist in these studies but they were not successful. The Parent applied its values as to optimal organizational design to the construct of the Beta Team. The organizational construct became very functionally oriented.

The aggregation of all the functions into a single organization greatly facilitated the emergence of a coherent organizational definition. The Beta organization began to evolve and focus on optimizing the transactions between the functional groups such as the Beta Research and Beta Manufacturing Groups. This coherent organizational definition enabled the introduction
of VTP3-C1 and VTP3-C2 since there were clear information flows already built into the organization. The linkages between the Beta organization and VTP3-C1 and VTP3-C2 could be defined, documented and coordinated.

While the last reorganization helped the Beta organization develop a separate identity away from the PDD, the tight financial linkages were still problematic in that the investments and operating plans were often changed due to changing strategies and operational performance of the Parent. In situations where the Parent's overall operations was not performing well, the Beta team would be requested to alter their operating plan. This linkage prevented Beta from focusing on solely the opportunity and added a variable of uncertainty that caused confusion of the several members of the Beta Organization as to the overall commitment of the Parent to the Beta technology.

A new management system was developed into the Beta organizational structure that attempted to reduce the transaction costs between the various firms and align the organization for the markets being addressed:

![Figure 16: Beta Management Structure](image-url)
Each team was populated with members of the Beta and VTP3-C1 and VTP3-C2 Teams. Members of the Planning team collaborated on product specifications to satisfy their specific market requirements. Respective engineering teams responded to the product goals and eventually a compromise architecture was accepted by the Core Team, which was comprised of senior officers of each firm. The Senior Management Team resolved high-level problems during the development phases with any issue escalated to the Core Team.

While this process enabled congruence along many different vectors such as market feasibilities and feature analyses, several of the interviewees highlighted the process as being overly arduous and time consuming. Improvements were being made, however, to facilitate the future product delivery programs.

Another issue that is particular to Beta was the lack of product level system integration experience exhibited by the Parent in the context of the Beta technology set. The evolving organizational construct was focused around the maturation of the Beta technology and not on the system integration of Beta and the other complementarities required for the product level success. Various supply chains were attempted such as using an internal product delivery team within another Business Team and using an external VTP for developing the complete product. This lack of being able to appropriate this knowledge posed numerous challenges to the Beta organization. Often it was difficult to correctly decompose architectures without the system level knowledge.

**4.3.5 Skills Evolution**

The skills required for Beta were not readily available in the Parent organization, which prohibited the smooth transfer of people and knowledge between the Beta organization and the Parent. Few if none of the architectural rules of the PDD could be transferred into the Beta organization. A comment from one of the interviewees as to the lack of career development
(cross-pollination with the Parent) was seen as a side effect of this disparateness of architectural knowledge.

While the Beta team became knowledgeable with each Platform launch, several of the interviewees posed a growing concern of the gap of system integration expertise. To enable the delivery schedule, the product architecture was partitioned to enable each partner to deliver almost independently of the other. The system integration was the common responsibility of all the partners. This common responsibility structure posed several process related problems in issue discover and resolution.

Even with these issues, the Beta organization was able to learn from the VTP3 set. The input of VTP3 set and its ability to execute on the schedule was highly valued and also as seen as a Platform C success enabler.

A new skill that emerged as a result of the partnership and the architectural flexibility was the ability to differentially aggregate the Beta technology elements to meet the needs of new market segments. This was an outcome of the VTP3 set providing requirements based on their specific markets and performing the architectural studies.

4.3.6 Process Evolution

The Beta organization, as an internal organization of the Parent, was mandated to follow the Product Delivery Process of the Parent. While this had some benefits, such as being able to converse with other divisions within the Parent, the process was sometimes viewed as being cumbersome relative to the Beta technology. This gap was seen in almost every functional area. For example, the Beta Manufacturing Team required very lengthy lead times to enable mass production. These lead times and dollar values of the commits were not typical of a classical product within the Parent. The research processes were also very different and were more typical of a different industry than that of the Parent. To facilitate the PDP within the Beta organization,
several customizations were made. The overall structure and methodology were however maintained.

There was very little process sharing or optimization during the first Platform C product between the Beta Team and the VTP3 set. The focus was on delivering the immediate product and the individual delivery processes of each organization were essentially maintained. VTP3-C1 and VTP3-C2 reorganized their deliverables to meet the process inputs and outputs of the Beta PDP. The PDP was changed slightly to facilitate the information flows.

It was the intent of the Beta Team and the VTP3 set to make improvements to the subsequent products. Initial results were positive as one interviewee commented on the entire team's willingness to make future improvements to the overall system.

### 4.3.7 Vested Third Party Interlace

#### 4.3.7.1 Impetus and Objectives

In the Beta case, three different implementations of a Vested Third Party form were attempted by the Parent to extract value. It should be noted that the level of equity participation varied greatly with each VTP implementation. VTP3 represented the largest and most significant VTP with regards to both levels of VTP equity participation and overall commitment of the Parent.

Each implementation possessed different objectives indicative of the associated risk levels:

<table>
<thead>
<tr>
<th>VTP</th>
<th>Parent Objective</th>
<th>VTP Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>To obtain product-level system integration and low cost manufacturing.</td>
<td>To leverage core assets in manufacturing.</td>
</tr>
</tbody>
</table>
Table 9: Beta VTP Objectives

<table>
<thead>
<tr>
<th>VTP</th>
<th>Parent Objective</th>
<th>VTP Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>To obtain low cost manufacturing.</td>
<td>To strengthen core assets in manufacturing. To get access to Beta technology set for private label sales.</td>
</tr>
<tr>
<td>3</td>
<td>To establish a worldwide presence. To obtain low cost manufacturing. To share risk and reward for full commitment.</td>
<td>C1: To leverage core assets in design and manufacturing. To get access to Beta technology set for private label sales. C2: To get access to Beta technology for future design implementations.</td>
</tr>
</tbody>
</table>

4.3.7.2 Influences

A key point investigated in the interviews was the VTP influences on the Beta technology and processes. In this case where several VTPs were used, the analysis will review all three implementations with a focus on the latest VTP.

VTP 1:

The interviewees were generally very positive with the working relationship with VTP 1. This was facilitated by the very effective working relationship. The Beta technology set was still in its infancy and required numerous interactions between the participants to understand design and implementation latitudes. Platform A, which was jointly developed with VTP 1, was the Beta team’s first attempt at commercializing its technology. The architectural influence from VTP 1 was well received and integral to the product’s success. VTP 1 was effectively able to leverage its manufacturing expertise from similar products to enable Platform A.

This relationship was however terminated to look for a partner with more global reach and efficient cost structure.
VTP 2:

The VTP 2 relationship possessed several issues that led to its termination after the launch of Platform B. VTP 2 was chosen for its global reach and its ability to jointly sell the Beta technology. It was assumed that VTP 2 was able to leverage its manufacturing assets and knowledge to the context of Platform B. Several issues in the system integration led to the termination of the partnership and the search for another partner.

The Beta team became more cognizant of the system level integration and supply chain issues that were leveraged in the VTP 3 selection.

VTP 3 (C1 and C2):

The interviewees were consistent in their interpretation of the VTP 3 influences. They were concerned about the highly arduous management process that was created to manage the VTP 3 interests, calling it "highly bureaucratic" and "torturous". The management board consisted of all three participants with each having equal say irrespective of their financial contribution. This presented numerous challenges with respect to gaining congruency. Several low-level decisions were routinely escalated to the management board, which delayed the process.

With respect to delivery process integration, the Beta team’s process dominated the overall delivery process definition. Little changes as a result of VTP 3 set were integrated into the overall delivery process.

Even though there were few changes to the actual delivery process, the fruits of the partnership were noticed in the subsequent iterations. Improvements from the first delivery were being implemented into the next iteration. These included not only work process improvements but also optimizations of the architecture. Two of the partners took the lead to focus on one architectural extension to meet their respective market requirements.
There was a concern however that the Beta team was losing the product level system integration experience. An interviewee suggested that the Beta team should place more emphasis on this skill by appropriating this knowledge locally.

Another concern was the difficulties in system integration across time and space; the partners were all geographically dispersed. The intensity of the product schedule also prevented any opportunity to build team building and social relationships.
4.4 Case: Gamma

4.4.1 Value Proposition

The core value proposition was to address a critical need in an industry that was not immediately core to the Parent. This value proposition was highly disruptive to this new industry and was considered a key enabler for a new breed of markets and business models; it offered a new definition of value to a preexisting industry that was valued by a relatively small segment. It should be highlighted that this disruption was not to the Parent’s franchise or PDD but to an industry that the Parent did not have a major presence. However, there were several application sets that were envisioned enabling the PDD and Gamma in a potentially new market segment.

4.4.2 History

The 6-year history of Gamma was the shortest of the three cases. In this time span, a new technology set was developed for a new market, attempted to be delivered through the channels of the Parent and finally spun out with a VTP equity partnership. The rapid evolution was primarily led by a charismatic leader and entrepreneur (hereby referred to Director X) who joined the Parent after several successful assignments in various industries. The VTP relationship also had different attributes than the Beta case. Where the Beta VTP arrangements were to leverage complementary assets, the Gamma VTP arrangement was part of the VTP’s initiative to build an ecosystem around a new marketplace that the VTP was building. The VTP arrangement was also a new method for the Parent to extract value from its patent portfolio.

The Gamma technology set was a disruptive technology to a preexisting industry. While offering very different value attributes, Gamma was in direct conflict with an established dominant design. In comparison to the metrics used by firms that employed the dominant design, the Gamma technology set was clearly inferior but it the improvements were envisioned to improve rapidly.
The following is the historical timeline of the key events in the delivery of Gamma:

![Gamma Historical Timeline](image)

**Figure 17: Gamma Historical Timeline**

The following accompanying table illustrates the chronological progression:

<table>
<thead>
<tr>
<th>Event</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process A</td>
<td>Research Initiates</td>
</tr>
<tr>
<td>Milestone 1</td>
<td>First Patents are issued for Gamma</td>
</tr>
<tr>
<td>Milestone 2</td>
<td>First license is granted</td>
</tr>
<tr>
<td>Process B</td>
<td>Product using Gamma is engineered by Parent using Parent's delivery system</td>
</tr>
<tr>
<td>Milestone 3</td>
<td>Parent Product Launched</td>
</tr>
<tr>
<td>Vested Third Party</td>
<td>VTP invests in Gamma organization</td>
</tr>
<tr>
<td>Milestone 4</td>
<td>Gamma organization spins out of Parent</td>
</tr>
<tr>
<td>Process C</td>
<td>New Product Portfolio is engineered focusing on Gamma markets</td>
</tr>
</tbody>
</table>

*Table 10: Case Study Gamma Chronological Progression*
In Year 1, the first patents were issued that established the core of the Gamma technology. The patents were considered "basic" research by the Parent. There were no immediate applications for the Gamma Patent Set but it enabled features that were foreseen to be potentially critical in the future. There was little to no relationship to the Parent Dominant Design and as such it received relatively very little attention from the Parent.

Without a business plan or endorsement from a business team, the Gamma Patent Set was considered a potential candidate for licensing. This was the predominant route for technology patents that were considered out of scope by the Parent. The Gamma Patent Set did not yield any licensing revenues until Year 5 when a system integrator requested and subsequently received a license to use elements of the Gamma Patent Set.

At the end of Year 5, the Parent initiated a global study on the technology direction of the company and how to address potential opportunities that were emerging in the marketplace. The marketplace for the Parent's portfolio was rapidly changing and new technologies were rapidly redefining work processes that could have potentially impacted the Parent's core value proposition. New organizations were also being funded in the capital markets to aggressively pursue these opportunities. The result of this strategy analysis was to aggregate disparate activities to better focus the efforts. The Gamma technology was reorganized into this new initiative being a part of Director X's portfolio.

In conjunction with this reorganization, it was determined that the market conditions had subsequently changed warranting the conversion of Gamma into a product as opposed to maintaining a licensing strategy. A product development team was formed to address this new opportunity.

A product was developed and launched in Year 6, receiving numerous recognitions from the industry. The product was first in a new class of products that were defining a new market
place. It was also foreseen that the Gamma technology would eventually provide a key infrastructure element for other businesses. Even though there was recognition of the potential value of Gamma, there was still a very large market and technology uncertainty due to relative newness of the industry and very disruptive nature of the business; there were no immediate reference points for comparison.

After the product launch, the VTP approached the Parent to obtain access to the Gamma Patent Set. The VTP was also interested in building a network of relationships that would enable a new marketplace. Recognizing the potential joint opportunity, Director X and the VTP negotiated a revenue model that was aligned with the market use of Gamma and an equity relationship with the VTP. To enable this model, Gamma needed to be separated from the Parent. From an interview with Director X, one of the significances of this event was that it was a validation to the Parent that the Gamma had very significant potential.

In Year 8, the Gamma organization was spun out of the Parent with the VTP holding a minority position. The people that had belonged to the Gamma organization were given the option of moving to the new spin out or staying with the Parent. Moving to the new spin out would require them to formally resign from the Parent and no guarantee of a future job with the Parent was provided. To enable diversity in hiring from different geographies, several centers were opened around the world. The activities of the centers were essentially focused around a particular function; for example Marketing was co-located in one center with Engineering in another center.

The charter of the new organization was to enable a new technology standard that could operate with existing processes and technologies with which businesses could be developed. This included those complementary assets that were not from the VTP. The decision was made that to increase the adoption of this disruptive technology, there required more cross industry commitment and applications. Firms would then be able to compete based upon implementations
and other complementary assets. Thus, the Gamma organization released the specifications of the Gamma technology to the industry. Numerous organizations requested the specifications and initiated their respective efforts.

### 4.4.3 Architectural Evolution

The architecture of Gamma evolved as new opportunities were established. This was enabled by the extensibility that was engineered into the product architecture. While elements of the architecture were designed to enable the first market, the team was cognizant of the value of Gamma as being a core infrastructural component for other businesses.

The VTP provided a good reference implementation for the Gamma organization. As stated previously, the strategy of the Gamma organization was to be able to work seamlessly with the complementary assets of technology sets from many different firms. While the Gamma technology was integrated with the VTP technologies, there existed the need to be implementation agnostic.

### 4.4.4 Organizational Evolution

The Gamma organization evolved from its origins in the Parent’s Research Labs to a Product Delivery Team and then finally as a separate stand alone organization with a VTP. This evolution forced the Gamma organization to change the work behaviors and culture to meet the new context. While some evolutions reinforced the alignment to the market requirements, others presented major conflicts.

While in the Research organization, the focus was on basic research as opposed to a specific market application. As such the organization was loosely defined in the context of a research group.
When the Gamma organization was formed to develop a product, they were mandated to employ the processes of the Parent. To the Parent, the Gamma technology was another product within its portfolio and as such, it was required to follow all of the norms of the Parent's product portfolio. According to Director X, this integration posed numerous conflicts with the Parent since the Parent's processes (which were typical of a stable dominant design driven by incremental innovation) were found not to be valid for a new and emerging technology that was defining a new market. For example, the Gamma product was distributed using the direct sales channels of the Parent. The sales force of the Parent was not knowledgeable in the core proposition of the Gamma technology and lacked the skills to properly sell the solution. Tradeoffs were often made by the sales force leading them to sell better-known products to their normal clientele. These other products had typically lower sales cycles and better compensation schedules. Incremental to these issues was the new business model that Gamma was enabling, which was foreign to the Parent. Another issue that was highlighted by interviews was the market segmentation predicated by the Parent did not fully leverage the potential of Gamma.

The spin out with the VTP enabled the resolution of the business model alignment. As a separate organization, Gamma was able to develop the appropriate dedicated value chain (Research through Post Sales Support). In contrasting to the sales force issues stated previously, the new dedicated sales force possessed knowledge of both the core technology knowledge and the specific market segment enabling them to better address the customers' needs. Their compensation plans also were solely based on Gamma sales, which provided better focus. The strategy and business models were also were much better aligned with the opportunity. According to Director X, the resource levels were focused on the opportunity as opposed to a function of the Parent's allocation, which changed on a yearly basis based on the Parent's market conditions. Director X also pointed out that Gamma would probably have failed if it remained inside the Parent organization.
The linkages with the VTP were at not only management level but also at the working level. The VTP had a position on the Gamma Board of Directors. A member of the Gamma Engineering Team also resided in the VTP organization, which was geographically distant from the Gamma centers. This structure facilitated the information flows at various levels.

### 4.4.5 Skills Evolution

Director X was very conscious of the new culture that would need to be developed based on past experiences that the person had with both the Parent and with other ventures. The concern stemmed from the large percentage of former Parent employees that were in the new Gamma organization (“I am very concerned that they may bring the principles of the past, which may not be applicable anymore”). This transfer of explicit and also tacit knowledge from different domains and the ability of people to understand the requirements of a new domain posed very real concerns to the Director.

The organization was going through a "re-education" phase, according to Director X. There were many processes that may have been applicable for a large organization like the Parent but were not appropriate for the size of the new organization or the opportunity before the Gamma organization. Specific instances highlighted included the need for more streamlined decision and hiring processes. One interesting countermeasure that the Director instituted was the hiring of outside personnel and pairing them with internal people as a method of complementing the work processes.

### 4.4.6 Process Evolution

The Gamma organizational processes evolved with each organizational context change with the most significant changes occurring between the internal product delivery organization phase and the subsequent spin out phase. While in the Parent organization, the Gamma organization was mandated to use the Parent PDP with its established management decision process. The Director challenged certain aspects of the PDP by enabling rapid multiple product
releases supported by fast customer feedback and subsequent engineering responses as opposed to the single product release method that was typical in the Parent.

After the spin out, the Gamma organization developed a customized process by leveraging some of the practices of the Parent PDP but also added in new practices that were relevant to its new industry. This process was verified by one of their customers as being benchmark.

The management decision process for the phase gate reviews was also modified. The decision for the individual phase gates was the sole responsibility of Engineering and Marketing. The Director was only involved in the customer release decisions (beta and final).

To maintain architectural integration, the Gamma organization established peer reviews with the VTP. This practice was not typical of the Parent and was initially met with some challenge within the Gamma organization. The endorsement of Director X facilitated this practice, which was found to be helpful in analyzing issues.

The check for the process evolution and its relevance was found in the job description of an Engineering Senior Manager. The organizational roles and responsibilities were routinely reviewed at the Gamma Organization Senior Management level. Among many other tasks, the person was responsible for "culture/pace setting" for the Engineering Team. While this was limited to just the Engineering Organization it was not a typically stated responsibility in other organizations within the Parent. From several interviewees, the Director was found to have assumed responsibility for the overall culture of the organization.
4.4.7 Vested Third Party Interface

4.4.7.1 Impetus and Objectives

In the case of Gamma, the VTP arrangement was a result of a negotiation on the use of Gamma as opposed to a pure complementary asset leverage strategy as in the case of Beta. The Gamma technology was designed to be agnostic of the implementation and was able to be used by several of the VTP’s competitors. The introduction of future third party arrangements was also announced.

The relationship with the VTP was considered to be both concurrently a strategic positive and a challenge. While the introduction of the VTP validated the technology, competitors of the VTP were sometimes concerned about adopting the Gamma technology due to the VTP’s involvement.

4.4.7.2 Influences

The VTP influences were evidenced at various degrees in the Gamma organizational processes. The degree of influence may be a function of the embryonic states of the relationship and marketplace targeted by both Gamma and the VTP.

The Gamma Product Delivery Process was essentially engineered by the Gamma team based upon their relative industry best practices. The significant addition was the inclusion of the VTP in the peer reviews. This practice was not typical of the Parent and was shown to be very effective in problem resolutions.

The VTP influence on the skills of the Gamma organization was shown in the increase of integration skills since the VTP offered a reference implementation for the Gamma technology. These skills could be leveraged to the integration of technology sets from other firms. The tight partnership also enabled more access to VTP personnel as evidenced by the inclusion of a member of the Gamma organization into the VTP engineering site.
The management decision process may have been structurally influenced by the VTP since the spin out was most probably accelerated by the interest of the VTP to gain access to the Gamma technology. The comment of Director X pertaining to the VTP arrangement validating the strength of the Gamma technology to the Parent appears to reinforce the notion that the Parent would have delayed its commitment to the Gamma specific needs.

The VTP also possessed a seat on the Gamma Board of Directors, which allowed for visibility for both parties as to process and strategic alignment. Data was not available as to the progression of this structure and relationship most probably due to the relatively newness of the structure and confidentiality concerns. A comment was made however by one of the interviewees that future Board representation would probably increase to include other firms or representatives to provide a broader visibility into the market place dynamics.
5.0 Results and Discussion

From the investigation of each Case Study, several observations were made as to the progression of certain organizational characteristics and the relative applicability to the respective opportunity:

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<td>Applicability to Opportunity</td>
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|          | Parent | Parent | Parent | Parent |
| Organizational Construct |        | Minor Changes |        | Changes |
| Applicability to Opportunity | High | Low | Low | High |

|          | Parent | Parent | Parent | Parent |
| Management Decision Process |        | Major Changes |        | Changes |
| Applicability to Opportunity | High | Low | Low | High |

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The applicability to the opportunity was subjectively determined based upon the responses from the interviewees and internal documentation. The details of the analysis are provided in the Section 5.1 where each hypothesis was resolved using the data from the Case Studies.

5.1 Hypotheses Results

H1. Organizational context is extremely important in a new venture strategy that is in the pursuit of a disruptive technology due to potentially new capabilities and culture required.

H1 is validated in the context of this research if:

1. Alpha was not able to acquire the appropriate skills to succeed in its markets.
2. Beta was able to develop the skills required for its markets.
3. Gamma was able to develop the skills required for its markets.

In all cases it was shown that there was a need for a new organizational context to best address the opportunities of the disruptive technology, confirming this hypothesis and also the previous research in the management of disruptive technologies. The need should be evaluated against the Parent’s ability to change and offer the specific environment. The Parent was very engrained in the elements of the Parent Dominant Design and, as such, consistently evaluated

Table 11: Case Study Observations

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### Case Studies

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each Case against analyses and methods that were common to the Parent. The systematic misalignment of value definition caused each Case issues that potentially diverted attention away from the issues of their respective markets.

1. Alpha was not able to acquire the appropriate skills to succeed in its markets:

In the Alpha Case, the tight linkage to the PDD prevented its ability to fully leverage the technology set. While the competitors were focusing on enabling very large-scale effects, Alpha was constrained to the skills offered by executing the projects within the Parent. The various projects were actually providing skills that were diverging from the industry, forcing Alpha to be very niche application focused as opposed to being able to offer a broader solution. The progression of Alpha also provided a sense of an ad hoc funding model further evidencing the lack of the Parent's recognition of the need for the specific Alpha requirements.

It should be noted that there was a case history of the Parent being able to integrate technologies of external suppliers into its PDD. This leads to the notion that if the Alpha organization was separated, the Parent could have leveraged its previous knowledge of subsystem integration and succeeded in the PDD deployment.

2. Beta was able to develop the skills required for its markets:

In the Beta case, the Parent consistently imposed standards that were relative to the PDD that were not applicable to the Beta technology set which delayed the process of extracting the optimal value. The delay in finally committing to the Beta technology set by the Parent caused the Beta team to lose first mover advantages.

The last reorganization effort, to aggregate all Beta skills into a single organization separate from the Parent Dominant Design organizations, was able to address the ability to properly grow the capabilities and culture. The organization was able to build its own identity and
values separate from the Parent. For example, incentive structures could be developed based solely on the Beta organization performance.

The complete separation was not made however since it failed to financially isolate from the Parent. Perturbations in the Parent financials effected the funding within the Beta organization.

3. Gamma was able to develop the skills required for its markets:

The Gamma organization was able to most effectively address the opportunity of the disruptive technology by establishing a separate organization (in both structural and financial terms) that was chartered to extract the full potential of the Gamma Technology Set. The financial separation allowed the Gamma organization to develop its respective operating plan without the concern that negative changes from the Parent's other businesses would cause reallocation of funds.

The skills were also grown to be more applicable to its new market as opposed to those of the Parent's. As stated in the Case, the Gamma organization, when inside the Parent, was required to comply with the process rules set by the Parent, which included the Product Development Process. The reliance on the Parent's marketing and sales channels also prevented the Gamma organization from developing the holistic value chain specific to their market needs, which were different than those of the Parent's. Complicating the situation further was the misalignment between the Parent market segmentation and those that best matched the Gamma opportunity. Once as a separated entity, the Gamma organization was able to build the organizational structures and incentives to better develop the skills required. Examples of this were the fact that they were able to co-locate with the VTP to acquire specific implementation skills and also they were able to customize the product delivery process to better match their market.
**H2.** The introduction of a vested third party provides a check and balance to the tendency of the new venture to migrate back to the norms of the parental firm.

H2 is validated in the context of this research if

1. Management Decision Process evolved and was influenced by a VTP in the Beta and Gamma Cases.
2. The Management Decision Process for Alpha remained similar to the Parent.
3. The skills evolved to better align with the new opportunity and were influenced by a VTP in the Beta and Gamma cases.
4. The skills for Alpha remained similar to the Parent.

This was validated in the context of both the Beta and Gamma cases though other influences need also to be considered such as the role of the leader and the preexistence of the need for change prior to the VTP. If the Parental norms are represented by the skills, product delivery processes and the management decision structures, it can be shown that in the Beta and Gamma Cases, the respective VTP enabled some form of change that enabled the Case to better align with the market needs. It is not conclusive, however, if the VTP provided a validation of a preexisting notion with each of the Cases; the modifications may have been desired by the Cases prior to the VTP but were not considered by the Parent to be viable. The role of the leader in each Case Study was also a major factor in the ability to influence organizational growth.

The leader was shown to be very influential in the ability to inject new frameworks and reinforce the required changes. This was evidenced in the Alpha and Gamma Cases. A Senior Manager of the Alpha Extended Team possessed an entrepreneurial background outside of the Parent. While the person attempted to leverage the past experiences in developing new constructs, the tight linkage to the Parent provided a difficult boundary condition. Director X, from the Gamma Case, joined the Parent after several assignments with other firms and new ventures. As such, the person was not trained and educated in the norms of the Parent Dominant Design but those of the other organizations. In a sense, Director X aided the organizational growth by
questioning preconceived norms of this team. Since Gamma was not within the Parent Organization, Director X was able to implement the appropriate structures. An interesting extension of this research would be the investigation of the leader's previous history as an enabler of organization change in the face of a disruptive technology.

1. **Management Decision Process evolved and was influenced by a VTP in the Beta and Gamma Cases:**

   The VTP of the Beta organization provided a check and balance through the management structure and also through the process integration. The post-VTP3 management structure involved the inputs of the VTP3 set and the Beta organization for all major and operational decisions. This allowed for input of the different VTP marketing requirements. With respect to the product delivery process, the Beta organization used a hybrid of the Parent. While this dominated the overall delivery process, the VTP and the Beta team showed their mutual desire to streamline the process further.

   The Gamma organization was essentially established with the assistance of the VTP. It was clearly stated that the Gamma technology would not have survived inside the Parent. The interest of the VTP validated the technology and offered the Parent a method of extracting value through a majority stake in an external joint venture. This may have been due to the fact that the disruption was to another industry that was slightly foreign to the immediate Parent business.

   The operational check and balance of the Gamma organization is in the inclusion of the VTP in the Board of Directors and also in the peer-to-peer reviews. The peer-to-peer reviews were also shown to have positive results.

2. **The Management Decision Process for Alpha remained similar to the Parent:**

   The control of the study (Alpha) lacked a VTP and as a result was mandated to follow the directions of the Parent, which was in a very different industry and technology life cycle. Hence,
the overall processes were very similar to those of the Parents. This can be shown by its adherence to the Parent's strategic, financial and product delivery processes.

3. The skills evolved to better align with the new opportunity and were influenced by a VTP in the Beta and Gamma cases:

   In the Beta case, the VTP provided new skills relating to architectural integration and low cost implementations that was lacking by the Beta organizations. These skills, which were recognized positively by the interviewees, proved to be very critical since they enabled the increase of the addressable market.

   In the Gamma case the primary evidence of skills sharing was in the peer-to-peer reviews and the reference implementation opportunity. The peer-to-peer review with a separate outside organization was not typical of a Parent process or behavior and proved to be valuable. The VTP also provided a reference implementation by enabling the integration of Gamma with its complementary technology assets. The Gamma organization needed these skills to be able to integrate with other firms' technologies and complementary assets.

4. The skills for Alpha remained similar to the Parent:

   While the skills of the Parent and Alpha were different on the fascia due to the differences in the technologies, the integration skills of the two organizations were very similar and focused on enabling the PDD. The applicability of the integration skills that were being acquired by Alpha were not aligned with what was required by Alpha in the future to properly compete in its marketplace. The internal projects did not provide Alpha with the skill set to compete with external suppliers of the dominant design of Subsystem X.
H3. A management process that monitors the evolutionary process of the new venture is key to preventing regression to the parental norm.

H3 is validated in the context of this research if

1. H2 is validated.
2. There existed an effective monitoring process for the evolution of Skills, Product Delivery Process and Management Decision Process for Beta and Gamma.

1. H2 is validated:

   It was shown in the H2 analysis that within the context of this research H2 was partially validated. While the effects of the VTP were beneficial in the commercialization efforts, it was not fully conclusive that the VTP was the sole cause for the required changes.

2. There existed an effective monitoring process for the evolution of Skills, Product Delivery Process and Management Decision Process for Beta and Gamma:

   While this was not formally found in the Beta Case, it was however evidenced in the Gamma case. As such, it cannot be conclusively assumed that an established management process will prevent the regression since both Cases were able to prevent regression to some degree.

   The monitoring of the culture is most probably embedded in the work processes of the Senior Management of both Cases but there is value in openly stating concerns and publicly displaying commitments. In the Gamma Case, there was a Manager that was explicitly responsible for "culture/pace setting". This reinforced cultural value and importance to the team and forced some form of status check.

   The different contexts may have been a causal for the difference between Beta and Gamma. While Beta was inside the Parent, Gamma was a stand-alone entity outside of the Parent and able to develop its own culture and identity. Changes to the Beta organization were
typically difficult since it was still inside the Parent organization. While the Beta organization attempted to form a separate culture, the linkages to the Parent provided more confusion than reinforcement. For example, changes to the Beta financial spend plan due to variability in the overall Parent performance provided confusion to the members of the Beta organization as to the overall Parent commitment to the Beta technology.
**H4. Timing of a third party introduction is key due to organizational and architectural momentum effects.**

H4 is validated in the context of this research if:

1. The timings of the introduction of the VTP in the Beta and Gamma cases are compared with the respective VTP's abilities to positively influence the organization and architecture.

   This timing of a VTP was found to be an important factor in both the Beta and Gamma Cases due to momentum effects.

In the Beta Case, the VTP3 set was introduced after much of the architecture and organization was established. The primary changes that could be enabled were in the applications domain of the architecture. The organization, which emulated the architecture, was also fairly established. New organizational constructs with regards to managing the VTP arrangement and the development of applications were developed but they were beyond the architecture domain of influence; these elements were not directly related to the internal architecture of Beta.

The test of influence can also be analyzed by investigating the influence of VTP1 on the Beta organization. In this instance, the architecture was nebulous. From the interviews, the influence of VTP1 was highly regarded due to their knowledge of integration. The influences were integrated into the work practices and the product architecture. VTP1, however, was replaced with VTP2 due to VTP2 extended market reach.

In the Gamma Case, the VTP was able to influence the organizational design and architecture since they were both embryonic. The VTP possessed a seat on the Board of Directors and also had a Gamma employee on site. The organizational design resembled typical
firms in the Gamma industry. The architectural influence was also evidenced by the integration of the Gamma and VTP technologies. This provided a very good reference implementation that provided feedback to the development of Gamma since the core strategy was to enable integration of technology sets from other firms.
6.0 Conclusion

6.1 Addressing Motivation of Thesis

The motivation of this thesis was to address a growing concern in the new venture field as to how to deliver disruptive technologies within a firm that possess an established set of norms and values and does the inclusion of a Vested Third Party facilitate the process. Research has evidenced that the formation of a separate organization either internal or external to the Parent organization is a major enabler. The qualifier is not the fact that an organization is internal or external to the Parent but that it is financially and organizationally separated and is able to grow its own set of cultures, values and objectives relevant to its opportunity and market.

In this research several Cases were studied that span various forms of separation. Alpha was not separated due to its strong ties to the Parent Dominant Design and was prevented from growing and maturing relative to its competitors. Beta was separated organizationally but not financially from the Parent and suffered from the perturbations of the overall Parent's finances. Gamma offered the most ideal situation in that the separation was both organizationally and financially. Gamma was able to develop a strategic and operating plan relative to its opportunity and not be influenced by the Parent's other businesses.

The role of the Vested Third Party in the evolution of the new venture is not as evident in that, while both Beta and Gamma evolved to better address their opportunities, it was not conclusive if the changes suggested by the VTP were not preexistent in the respective organizations prior to the introduction of the VTP. It can be stated that the VTP assisted the change by its endorsement of the change as opposed to initiating the change. The VTP seems to have added validation that the Parent required to enable the change. This became evident in the analysis of Gamma where the interest of the VTP validated the value of the Gamma technology and accelerated its separation and subsequent new culture formation.
The results of this thesis however may provide the basis to extend the Dyer and Singh notion of implementing an alliance strategy as a means to reduce technology and demand uncertainty to also include addressing organizational uncertainty. As was shown by the Case Studies, there existed a level of organizational uncertainty as to the ability of the organization to effectively commercialize the disruptive technology.

Timing is a critical factor in the ability of a VTP to provide influence. As an architecture evolves, the organization will structure itself to facilitate the information flows between the components of the architecture. Hence, the organizational construct will mimic the architecture. As an organization evolves, both explicit and implicit norms will develop and tested through time. The VTP or the injection of any outside influence seems to have the most effect at the embryonic stage of the new venture prior to the establishment of the new venture norms. Hence timing or more specifically the maturity of organization and architecture should be considered when attempting to inject a VTP to induce new contexts.

6.2 Future Work

The ability to establish finite conclusions is limited by the number of Case Studies investigated. Additional data sets may provide more data to establish a better understanding of trends and causalities. The addition of new data from a different Parent however needs to take into account the firm-to-firm differences.

The focus of this research to a single environmental factor of a Vested Third Party is a limitation that may provide impetus for other researchers to develop better understanding of other variables. A key variable determined from this research was the role of the leadership and its members' past history as a contributing variable to provide the required organizational change.
While timing was to be found to be a factor in the ability of VTP to influence a new venture, a quantitative correlation between architecture completeness and the ability to inject external influences would quantify this correlation.

An investigation in the organizational source of the disruptive technology and the resulting applicability of the organizational processes would provide insight into another variable in organizational development momentum. For example, the Gamma technology was originally from the Research Organization and spent a relatively short time in a Product Delivery Organization. The Gamma organization may have benefited from the fact that since the Research Organization typically was not involved in the product delivery process of the Parent, the Gamma organization may have had a higher propensity to try new methods; it may have been able to develop a new process specific to its needs separate from the norms of the Parent. However, innovations from the Manufacturing Organization, which was ingrained in the Parent PDD and many of the down stream product delivery processes of the Parent, may inherit many attributes of the Parent processes. These processes may or may not be applicable in the domain of the new innovation.
7.0 References


ii. Ibid.


xii. Ibid.


xiv. Ibid.

xv. Ibid, pp 3-59

xvi. Ibid, pp ix-XXVii


xviii. Ibid.

xix. Ibid.