Innovation Dimensions in the Industrial Product Design Landscape: East vs. West Comparison Case Study

Donna Hahn
University of Pennsylvania

Follow this and additional works at: http://repository.upenn.edu/wharton_research_scholars

Part of the Business Commons

http://repository.upenn.edu/wharton_research_scholars/123

This paper is posted at ScholarlyCommons. http://repository.upenn.edu/wharton_research_scholars/123
For more information, please contact libraryrepository@pobox.upenn.edu.
Innovation Dimensions in the Industrial Product Design Landscape: East vs. West Comparison Case Study

Abstract
Under the supervision of the Operations and Information Management department, Victor Castro and I sought to re-create an innovation framework to effectively measure quality of innovation in companies. In this paper, we outline the process of creating the Innovation Spider Web and testing its effectiveness. Assuming global applicability, I then use the web to understand different points of innovation for competing companies in the U.S. vs. China that have gained worldwide financial success. Considering the limited scope, I’ve set some boundaries. Due to contextual circumstances, the paper focuses particularly on companies in the industrial product design landscape from late 1990s to today. The 3 case studies outlined look at main comparable competitors with headquarters in U.S. and China respectively. These companies are #1 and #2 globally, with China leading the way. The purpose of the case studies is to set up for generation of hypothesis of the posed question... Is China capable of innovation? Would these financially successful Chinese companies have higher innovation ratings than U.S. companies? Are there certain dimensions that tend to stand out for these more “innovative” companies? These are some of the questions that the paper aims to answer.

Keywords
Innovation, Innovation Framework, Industrial China, Product Design

Disciplines
Business
Innovation Dimensions in the Industrial Product Design Landscape: East vs. West Comparison Case Study

WRS 299

Donna Hahn

5/6/2015

I would like to express my sincere gratitude to Professor David Robertson from the Operations and Information Management at the Wharton School for his patience, understanding, and insightful guidance throughout. I would also like to thank Dr. Utsav Schurmans, the Director of Undergraduate Research and Scholars Programs, for his influential role in furthering undergraduate research and the opportunity to be part of the WRS community.
Abstract

Under the supervision of the Operations and Information Management department, Victor Castro and I sought to re-create an innovation framework to effectively measure quality of innovation in companies. In this paper, we outline the process of creating the Innovation Spider Web and testing its effectiveness. Assuming global applicability, I then use the web to understand different points of innovation for competing companies in the U.S. vs. China that have gained worldwide financial success. Considering the limited scope, I’ve set some boundaries. Due to contextual circumstances, the paper focuses particularly on companies in the industrial product design landscape from late 1990s to today. The 3 case studies outlined look at main comparable competitors with headquarters in U.S. and China respectively. These companies are #1 and #2 globally, with China leading the way. The purpose of the case studies is to set up for generation of hypothesis of the posed question... Is China capable of innovation? Would these financially successful Chinese companies have higher innovation ratings than U.S. companies? Are there certain dimensions that tend to stand out for these more “innovative” companies? These are some of the questions that the paper aims to answer.

Keywords

Innovation, Innovation Framework, Industrial China, Product Design
A. Introduction

Introduction to innovation frameworks

Existing frameworks for innovation primarily focus on how to identify innovation within a firm. Traditionally, a firm can be said to be innovating if it is:

- Extending an existing offering to a new customer base or market
- Introducing a new offering to existing customers
- Combining these two, putting forth a new offering to a new customer base.

This is commonly represented in a matrix format, often with slightly different axes and quadrant definitions. Examples of these depictions can be found below in Appendix A.

The initial stages of our research have focused not on identifying innovation, but on rating it. We have adapted an existing “Innovation Web” framework to allow for more accurate and more standard judgments about the quality of innovation within a firm.

Redesigned Innovation Web

The original innovation web sought to not only help identify innovation but also rate it; this version, created in 2013, is attached below. Fundamentally, this framework was used as a tool to help individuals understand how certain companies excelled in their respective industries by mapping out different aspects of the company’s innovation strategy. The dimensions utilized a lot of strategic management factors, encompassing the touch points relevant to many businesses - ranging from brand offerings to supply chain management, involving both customers and internal processes. When attempting to apply the “web” to analyze companies, we found that there were various shortcomings in the original version, which can be seen below in Appendix B.

Shortcomings of Original “Web”

The first issues we discovered in attempting to apply the existing web were with regards to the dimensions of innovation. As it stood, the dimensions were not mutually exclusive or collectively exhaustive, which created problems both in classifying innovations that fit into multiple categories or not into any. Additionally, some of the dimensions were highly internal to a firm’s operations and were difficult to evaluate. In order for an individual to complete the web sufficiently, he or she would like have had to possess intimate knowledge of a firm’s supply chain procurement, the organization of the corporate headquarters, or other hard-to-obtain information.

The next issues stemmed from the ranking rubric itself, initially based on a scale of 1-7. The original ranking system identified the highest rating to be equitable to “introducing a novel innovation strategy that has substantial customer value and product sales.” Simply
because a company introduces a strategy does not necessarily mean that the strategy is more innovative. The ranking system identified a score of 7 as the introduction of a novel strategy and a score 6 as the creative improvement or application of a strategy. This does not necessarily track innovativeness, considering some of the best work has been produced by quick followers and copiers. Also, more practically, the number of different ratings (7) was simply too high. It is a non-intuitive scale and leaves too little room for distinction between the different innovativeness scores.

Due to these shortcomings, we found that there was no consistency in evaluating companies between different surveyors. Additionally, the results could not be utilized to evaluate the actual “innovativeness” of a company because the dimensions were not necessarily measuring for innovation as we had defined it.

**Redesign Process**

We wanted the dimensions to be indisputable driving forces behind all strategic business decisions that outsiders (to the business operation) could identify to be a crucial component of the operation of the business. We’ve lumped all internal processes and capabilities together into one category, since we’ve identified it to be the hardest and least transparent aspect of the company to evaluate but still crucial.

We wanted to ensure that the dimensions where mutually exclusive and collective exhaustive in terms of capacities in which firms could innovate while still being applicable to diverse set of industries. For example, while platform might be crucial for an e-commerce firm, it might not be as crucial for a manufacturing or a product development firm. In order to do this, we started with the 4 core competencies of any company and expanded from there: product, customer, strategy, and financial. The product is the business - it’s what the company sells, whether it’s a physical product or a service, the product itself needs to be evaluated. In the case of GoPro vs. Sony, or the Nook versus Kindle, there are heated debates about whether the winning product is actually superior in product. For both instances, industry analysts argue that superior product is not necessary to become a leader in that industry. Customers drive sales, and we wanted to capture the importance of the company understanding, identifying, and communicating to customers in a new, innovative way. Strategy is the most internal aspect of this web and perhaps where there’s more room for subjectivity.

Above all, we wanted to dictate the process of evaluating firms, not just the web itself. We had noticed early on, unless you dictate and limit a timeframe at which you’re evaluating competitive firms, the ratings could be highly contingent on time. Sony in the 1990s innovated in a very different than Sony does now. McDonald’s shaped the food industry early in its existence, but now smarter, more innovative players such as Chipotle, cognizant of the changing landscape, are beating it out.

In the end, we arrived at a final iteration of the “web” and rating scale, pictured below in Appendix C.
What is effectiveness for an innovation rating framework?

What we hope to achieve with our redesign of the web framework is the construction of a widely applicable, repeatable, and accurate innovation quality rating system. It is only in the creation of such a framework that hypotheses based on this model (or variations of this model) are valid.

In order to test this redesign and ensure its viability, we organized trials of this framework by Wharton School undergraduate students. By using students with similar academic training and business acumen, providing them with the same information base, and using companies whose business processes the students will be largely unfamiliar with, we can create a controlled environment for testing.

To fulfill these requirements, we chose a sample of Wharton undergraduates and provided them each with a short, two-page overview of the innovation efforts of two related pairs of firms as well as information about our web, rubric and how to rate innovation using them. The chosen pairs of firms were Oracle and SAP and GoPro and Sony Action Cameras. The chosen firms are intentionally competitors with disparate performance records in recent years. This makes for the most accurate reflection of how this framework would be used by professionals or academics: comparisons of firms within industries for identification of winners and losers, leaders and followers.

Results of testing and conclusion

The set of charts displaying the results of our testing of 7 students can be found in Appendix D.

The charts show, through a combination of small ranges, similar mean and median ratings (with an average difference of 0.39 across all ratings), and relatively small average standard deviations (average of 0.94 across all ratings) that the redesigned innovation web and descriptions were shown to allow for consistent ratings overall. Assuming a common knowledge within firms, this innovation framework is a viable option for leadership and management to gain an understanding of their own firm’s innovativeness.
B. Context Selection

My Goals

The above framework is meant to be widely applicable for businesses across industries and business models, fully encompassing the avenues through which a firm may innovate. What is not to be ignored, however, is that some of the dimensions of innovation are likely more important for certain cultures or contexts.

Under the assumption that the framework is globally applicable, I hope to set up for generation of hypothesis to identify differentiating factors in innovation between the East and the West. I will be defining the time frame as late 90s to today for companies with headquarters in China vs. the U.S.

Why China?

As previously stated, we hoped to create a web framework that extends beyond identifying innovation. We wanted the web framework to be an applicable, repeatable, and accurate innovation quality rating system. By applying the framework to various case studies, we hope to understand different industries, companies, and even context and see which dimensions are emphasized and which are crucial for success.

In 2014, Alibaba’s IPO marked the biggest global IPO in history. Despite its huge financial success, Alibaba spurred a lot of discussion on why China still can’t innovate – how it’s perfecting the game of imitation but not innovation.

China still exhibits an interesting landscape with many institutional and organizational bottlenecks (Baark 1987, Baark 1992, Simon 1989, Simon and Goldman 1989, Sun 2002a, Suttmeier 2002). As a result, the context all points to the fact that innovation is not possible in China. However, in these pivotal times, China made big strides in forcing innovation out of its people, for bringing innovation internally to the country as evidenced by institutionalizing “Zhizhu Chuangxin” as a nation wide development program. In context of these juxtaposed forces, I’d be interested to see how these industrial companies that did achieve global market success map out on the innovation quality scaling. This would be under the assumption that our innovation spider web is a global scale, meant to capture any companies of different cultural contexts and different industries.

Since the reiterative process of redesigning the innovation web has taught me how important it is to outline the time frame and the context of the case study, I will specify within the Chinese context. In particular, I will focus on 3 sets of very comparable and successful industrial product design and manufacturing companies of the late 90s that are headquartered in U.S. vs China. For this case study, I will focus on the baby-stroller

---

industry, the computer hardware industry, and the consumer electronics industry. The narratives will be the basis for side-by-side comparison ratings, using the web framework.

**Cultural Context**

I wanted to focus particularly in China as the geographical and cultural context in the timeframe of late 1990s to today. Why? It was a transitional time in the industrial landscape for China because that is precisely when government started to recognize the need for technology to advance its economic standing in the global forum. In the 90s, governments at all levels in China started to allocate vast amounts of resources into invention, innovation, and education with the end goal being to enhance their economic competitiveness. As a result, there was a boom of engineers and focus on importing in technology sources, but it was done in a rigorous way. China is believed largely to be a land of “rule-bound rote learners -- a place where R&D is diligently pursued but breakthroughs are rare.” The largest criticism is that China, while in pursuit of innovation, never set themselves up for innovation -- by investing heavily in engineers and R&D, by focusing too much on test-taking and not enough on thinking outside the box. However, looking at the U.S. many of the successful companies have been founded by engineers and the basis of technology advancements came from exponential increase of research centers.

While the talk of innovation for China came with the 21st century, China made first strides in the 90s. In 1994, Dr. Chen Jin referenced to his research on technological led innovation in electronic industry in China by coining the term Zizhu Chunagxin, roughly translated as "indigenous innovation." In 2006, the president of the people’s republic of China formerly announced its "Guidelines for the National Medium- and Long-term Science and Technology Development Program (2006-2020)" (The Levin Institute, 2006). In this program, the Chinese government has brought up the role of Zizhu Chuangxin again, which has come to be translated in many ways (independent innovation, indigenous innovation, internal innovation, and self-guided innovation). The focus is more or less on identifying and nurturing self-guided development and innovation in the science and technology field.

For developing countries, technology transfers from foreign advanced economies and the spillover effects from foreign investment have been considered the most important sources of innovation -- since countries lack the capital and the talent to conduct state-of-the-art research. Prior to research, I believed that industrial design and production would be the one landscape that China could excel in without ever relying on innovation -- since

---

market success is highly contingent upon cheap manufacturing processes.\(^9\) If even necessary, their sources of innovation could then come from elsewhere, from external sources. However, a critical study by Yifei Sun and Debin Du in "Determinants of Industrial Innovation in China" shows that in-house R&D developments played the most critical role in China's industrial innovation, beating out technology transfers, spillovers, or foreign direct investments. That being said, there are multiple moving parts and complex relationships among R&D, technological innovation, and economic development. It's hard to say that R&D alone translate directly into innovation or market success.

One of these so called moving parts at this time was federal direct investment (FDI). China became the hotbed of federal direct investments. FDI provides about one-quarter of China's industrial employment, 30% of its sales, and 57% of its export in 2004 (China State Statistical Bureau, 2005). In 2007, China attracted $74.8 billion and accumulated FDI (stock) has reached about $760.2 billion (China State Statistical Bureau, 2008).

Considering all the moving parts, it would be all the more crucial and interesting to see how these companies that achieved global market success may have innovated not just beyond foreign investments, technology transfers, but also beyond cheap manufacturing and successful R&D processes.

After selecting very financially successful and globally renowned companies, I am hoping to backtrack to understand which dimensions these companies strategically decided to excel in, during that transitional time of the 90s when China invested a lot into becoming “innovative” in the industrial space. If innovation were to ever exist in China, this would be the perfect timeframe and context to look at. I would hypothesize that we’d be surprised to see how rigorously innovative -- not just financially successful -- these Chinese companies prove to be. I am mostly setting up the case studies to develop hypotheses, but I would want to understand:

1.) If holistically, the ratings skew toward 1-2... reaffirming the widely held belief that the concept of "innovation" still has a long way to go in China, and they are still midst if imitation.

2.) More importantly - if different emphasis has been put on the dimensions of innovation in China?

---

C. Case Studies

Using the new web framework as the basis of my analysis, I hope to do case studies on the follow companies by looking at:

- Overview
- Product (Product mix, platform)
- Strategy (internal process and capabilities and where to compete)
- Customer (brand, customers)
- Financial (value capture and presence)

In my analysis, I look to U.S. – China headquartered companies in the industrial product design landscape with 3 specific industries of: juvenile goods, white goods, and computer hardware. The 3 competing companies would be

- I. Goodbaby vs. Dorel
- II. Lenovo vs. Hewlett Packard
- III. Haier vs. Whirlpool

I. Goodbaby vs. Dorel

Goodbaby

Overview

Goodbaby (GB) changed the global landscape of the juvenile durable goods industry. Before it became the international holdings company with 15,000 employees, nine manufacturing facilities in China, and design centers around the world, it was first a small local manufacturing company. Now, Goodbaby is the largest stroller supplier in the world, with its products sold under own-brand or under other company's brand names. It has created multiple famous self-owned brands and has also established a long-term strategic partnership with internationally renowned durable product brands. Their strength lies in product development (research, development, and design), but the company covers all grounds. It designs, researches and develops, manufactures, markets and sells strollers, children's car safety seats, cribs, bicycles, and tricycles. As it stands, GB has nearly 6,000 active product patents. In a landscape with little to no brand loyalty, GB has become household name for markets in in North America, Europe, and China.\(^{10}\)

---

It has captured its leading position in the juvenile durable goods industry by eventually establishing a solid vertical and horizontal integration of the business. It built a complete and prominent brand portfolio, a sales and service network which covers most major markets across the globe, an innovative research and development system, technical development facilities, and one-stop manufacturing capabilities. It has strategically bought out companies to diversify its portfolio with other durable goods companies.

It all started in 1989 when the chairman of GB international invented the "push and rock" stroller and founded the Goodbaby brand. By ‘93, the strollers were ranked number one in sales in China. By '96, they had entered the U.S. market and by '96, they had become the largest supplier of strollers in North America. After domination in U.S., Europe, and China market, GB won series of awards throughout the 2000s for its innovative product design. During this 10-year frame, it won 7 Red Dot Design Awards for 4 consecutive years.11

**Product (Product mix, platform)**

Product mix: To reiterate, the popularity of GB and its strength lies in its seamless production control and supply chain management system. Instead of relying on branding, it relies on its physical quality of the product to speak for itself. I could argue that the company had focused solely on baby-strollers and making it a superior product, then building a business process around it. That being said, while the product itself is superior – its product mix isn’t anything out of the ordinary. It provides a wide array of juvenile goods at different purchase points and brands, but nothing revolutionary or necessarily innovative.

Platform: Platform dimension is status quo for Goodbaby.

**Strategy (internal process and capabilities and where to compete)**

Internal Process and Capabilities: Now, in its closely monitored management system, GB efficiently analyzes and monitors their production capacity, quality control, and consistency. GB claims that they distinguish themselves from their competitors with their technology skills as well as their efficiency and stable production control. Their supply chain management has enabled them to respond faster and more flexibly than their competitors to changing market demands - including demands that require them to ramp up production on short notice, deliver products in different locations, or modify complicated products to suit different needs. Its internal process is really superior to any I’ve seen.

Where to Compete: Its strategy is rooted in insecurity and humility, but the incessant need to be different and to do better. Until they listed internationally, they were not sure if they were going to succeed… They were keenly aware that if they were innovating/competing as an original equipment manufacturing (OEM) company (which is what the competitors were doing), they wouldn’t be able to. This sense of concern is their drive. The only thing they identified as their edge was this inability to innovate, boldness

---

about innovation… It was really easy to innovate because everyone else was content in being an OEM company. They identified, ironically enough, that their only advantage is this ability to innovate. I say ironic, because that is the singular advantage most companies strive for today. In either case, it was really easy to innovate because everyone else was content in being an OEM company (E. Keh, personal communication, April 9, 2015).

Customers (brand, customers)

Brand: #3 Again, Goodbaby’s focus had not been on branding but actually creating a superior design experience for its customers by focusing on the end-users, despite being a manufacturing company. Brand dimension encompasses a lot of attributes of business branding: brand management, brand value, etc. Goodbaby’s brand presentation had never been its focus but came about organically. Regardless, its value is worth a tremendous amount.

Customer Experience: Goodbaby recognized the need for superior products in the Chinese customer base and thereby met an unmet need at the time. OEM companies were sticking to their business model of cheap manufacturing processes and delivering low-priced, efficient products to their customers. It was almost revolutionary in China to have focused so much on the end-user as a manufacturing at the time.

Financials (value capture and presence)

Value Capture: Value Capture dimension is status quo for Goodbaby.

Presence: Goodbaby built its design centers around the world to be able to cater to different cultural and design needs of specific geographical locations (while still maintaining its manufacturing facilities in-house in China). As a result, it’s able to keep its prices low but cater very specifically to customers through an innovative point of presence.

Dorel

Overview

Dorel Industries is a Montreal-based company founded in 1987 through a merger between Dorel Co. LTD, a juvenile company, and Ridgewood Industries, a ready-to-assemble (RTA) furniture company. It initially started in Canada, but expanded to the U.S. market and also created Dorel U.K. in 1988. It now operates worldwide in 25 countries and operates in three distinct business segments: Juvenile, Recreational, and Home Furnishings. It has annual sales of US $2.4 billion and employs approximately 6,400 people in facilities. Its management team is entirely based in Canada, but its operating locations are worldwide with different centers for the three distinct business
segments. It’s well regarded for its successful acquisitions of varying manufacturing companies in different parts of the world.\textsuperscript{12}

Goodbaby was actually a major supplier for Dorel before it became a competitor "supplier turned competitor" by purchasing factories and decreasing dependency on third-party manufacturers. However, unlike Goodbaby, it won its first award for product design late in the game in 2014.

**Product (Product mix, platform)**

Product Mix: It is well diversified in its product mix, designing and manufacturing for 3 distinct industries of Juvenile, Recreational, and Home Furnishings. It helps to minimize risk by highly diversifying. However, they mostly operate under the same brand, so the 3 distinct industries tend to clash for other dimensional business strategies - to be expanded upon later on in the case study.

Platform: Goodbaby’s platform dimension is status quo.

**Strategy (internal process and capabilities and where to compete)**

Internal Process and Capabilities: Within each of the three segments, there are several operating divisions or subsidiaries; these are operated independently by a separate group of managers. Senior management of these segments manages and maximizes cross selling, cross marketing, procurements, and other complementary business operations. 2/3 of children and infant products are manufactured in China - including car seats, strollers, high chairs, and play yards.\textsuperscript{13} Idea is to eventually bring all that production in-house at the new factories, lowering costs and eventually making it easier to compete in Asia with other Chinese manufacturers of children's goods. Production in-house came much later. It is only in 2014 that Dorel looked for edge on competitors by taking production in-house. During that year, Dorel takes over 3 facilities in China and one in Taiwan -- including factories, office spaces, and a R&D center. Past 5 years starting in 2013, Dorel has spent on average over $31 million per year on new product development through design and product development centers. In order to strengthen its internal process and capabilities it made smart acquisitions. They purchased an HK based factories from Lerado group; they're very technically quick in responding and they build a good product. Earlier in 2000, it pushed into heart of central Europe with a Polish company purchase.\textsuperscript{14}

Where to Compete: It started in North America and continues to rely heavily on North America. It wasn’t able to transition smoothly into China, perhaps because its internal process and capabilities didn’t allow for it. It relies on successful M&As but its strategy in market or customer segmentation would be hardly considered innovative.

**Customer (brand, customers)**


\textsuperscript{13} Corporate Profile. (n.d.). from http://www.dorel.com/eng/corporate-profile

Brand: Brand is strong, but it does give mixed signals. As previously mentioned, it operates in 3 very distinct industries but utilizes the same branding for all 3. To advocate for “safety” for both home furnishings and juvenile goods is ineffective. That being said, by revamping its internal process and by continuing to emphasize its customer experience, Dorel could soon replace Goodbaby.

Customer Experience: Dorel is realizing late on that it needs to focus more heavily on improving its product design capabilities. However, it has created superior experience for its customers. Permanent Dorel teams in close proximity to major accounts worldwide. For example, there are 250 employees in Mainland China and Taiwan, offering both divisions and customers a variety of services: quality assurance, supply certification, sourcing of materials, and uninterrupted flow of products and freight forwarding. I think it benefits from having multiple distribution channels and presence points.

Financial (value capture and presence)

Value Capture: Its acquisitions has led to new processes and even new revenue streams, but for the most part, Dorel’s value capture dimension is status quo.

Presence: Well-diversified in the design and manufacturing industries of Juvenile, Recreational and home furnishings. It sells through multiple distribution channels, which vary by segment - but overall largest customers are retail chains. It operates through: department stores, club format outlets, merchant discount chains, independent boutiques and juvenile specialty stores. It is also relying on growth in internet retailers by working with Amazon and WalMart.
II. Lenovo vs. Hewlett Packard

Lenovo

Overview

Lenovo was founded in 1984 in Beijing, China\(^{15}\). The brand itself didn’t come into existence until 2004 but it grew in China and Hong Kong to be the largest PC company in China prior to then.\(^{16}\) Today, it is a $30 billion electronics company and the world’s largest PC vendor. It currently serves the computer hardware and electronics industries. It employs 30,000 people and operates in more than 60 countries. Lenovo has been the fastest growing major PC Company for 3 consecutive years. It is headquartered in China and the U.S., and its current CEO is Yang Yuanqing. Considering it’s operating in a fiercely competitive landscape with low product differentiation, Lenovo has been widely regarded as a success story. Today, it’s praised for its high quality products at low price points, winning more than 100 major design awards and acquiring 6,500 globally recognized patents. Thanks to its disciplined approach to geographic expansion, slow and steady approach to business diversification, and intense emphasis on internal processes, Lenovo will continue to reign.\(^{17}\) While PCs are still its core competency, Lenovo will continue to grow its mobile devices and enterprise solutions.

Product (Product mix, platform)

Product mix: It is the largest supplier of PC in the world. Lenovo products range from tablets, to laptops, desktops, workstations, servers, and ThinkVision. They are complemented by extensive assortment of accessories and upgrades. Lenovo designed an upgrade for all new Lenovo products as of late called Enhanced Experienced 3 (EE3) to boost your PC’s efficiency by 40% than a typical Windows 7 computer.

Platform: Lenovo creates a full range of personal technology, and has since early 2000s grown to be the 4th largest smartphone company in the world. They're #3 in the world in what IDC calls "Smart Connected Devices," which seamlessly combines PCs, smartphones, and tablets.

Strategy (internal process and capabilities and where to compete)

Internal Process and Capabilities: Lenovo is grounded in low-cost production process and 50% in-house production in China. They have a “global-local” model – in order to form deeper roots into each major market, they invest not only in sales and distribution at those countries but also in manufacturing and R&D. From the beginning, it emphasized vertical integration by understanding China’s market but also by exhibiting competency in mergers and acquisitions, in obtaining patents. Today, Lenovo's end-to-end business model with its vertical integration leverage allows seamless product development and supply chain operations. It is very unique among PC makers and has become its source of competitive advantage. Consequently, it allows them to be more flexible and


innovation. It also operates 46 world-class labs, including research centers all around the world.

Where to Compete: It recognized India’s rapidly growing smartphone market and established themselves there early on, which has been helping their global growth.

Customers (brand, customers)

Brand: The Lenovo brand is strong in developing economies, but less so in developed economies. It’s practical in brand development. The brand Lenovo came into existence only in 2004. In order to handle its growth in range of products, it split its main business into two as of 2013. The Lenovo group focuses on computer, mobile internet, and digital household businesses, and the Think Group would look after high-end corporate customers. This is an attempt to simplify Lenovo’s brand strategy. Lenovo helps to achieve sales volume while Think focuses on high-end market. The separation is likened to the separation of Lexus and Toyota, which has proven to be widely successful.

Customer Experience: As a manufacturing company, Lenovo doesn’t directly deal with consumers. However, it recognized different global needs of consumers when it adapted the “global-local” model. Its number one value has been in “serving customers.” It does so by having its R&D team improve customer experience simultaneously while driving down the cost of ownership.

Financials (value capture and presence)

Value capture: Lenovo’s business is built not only on product innovation and highly efficient global supply chain, but also on strong strategic execution. It knew where to position itself at the right time at the right place, and did so without rushing its process. Its strategic acquisition of the Think brand from International Business Machines (IBM) in 2005 has provided a premium cachet for Lenovo. It also helped them to expand its global market share in PCs, smartphones, and media tablets in a crucial time.

It focuses majority of development on ideas that can be brought to market within 24 months, recognizing how rapidly changing the landscape of PC can be. However, Lenovo complements this with investing in longer-term research, targeting “game changing” ideas. Investing in R&D, even in down cycles, has allowed them to be ahead of the curve.

Presence: Lenovo’s presence dimension is status quo.

---

Hewlett-Packard (HP)

Overview

HP is an American multinational information technology corporation headquartered in Palo Alto, California, U.S. Its scope is large - providing hardware, software, and services to consumers, small-and-medium sized businesses and large enterprises. For the purposes of this case study, I will focus on the sector that competes directly with Lenovo - in the hardware and software divisions in the B2C sector from late 90s to today.

Bill Hewlett and Dave Packard, electrical engineers from Stanford University, founded the company in the garage of Palo Alto in 1939. HP incorporated in 1947 then went public in 1957. Its peak was in, again, late 90s to early 200s. It peaked in 2007 to 2013, by being the world's leading PC manufacturer. After 2013, however, Lenovo remained ranks ahead of HP.

In the 90s, HP expanded their computer product line to work directly with consumers. Previously, they had worked with universities and business users. Later in that decade, HP opened hpshopping.com as an independent subsidiary to sell online, direct to consumers. In 1999, all of the businesses not related to computers or storage were spun off to form Agilent Technologies. The spin-off was the largest IPO in the history of Silicon Valley, creating $8 billion company with about 30,000 employees.

Several unsuccessful mergers in 2000 became the downfall of HP. On top of that, in 2011, HP concluded that their PC division was too integrated and critical to business operations and brought it back. Today, it’s fighting for its position as one of the largest PC suppliers in the world in its second position.

Product (Product mix, platform)

Product Mix: Hewlett-Packard (HP) has diverse range of products, contributing to a good product mix. There's nothing innovative about its mix, as it is a pretty traditional mix of laptops, tablets, desktops, printers, ink & toners, and monitors. It provides complementary accessories, but biggest differentiating factor from Lenovo is its lack of smartphones and its presence in tablets is really poor. It's adding a new project, Blended Reality, to the product mix which will perhaps discover an unmet customer need, create new innovation point of presence, and re-identify revenue streams – should it be done well. Blended Reality aims to blend the digital world with the physical world by making "technology more tangible and humanized." Some of the projects in the works is Multi Jet Fusion, which is a new 3D printer technology and is the most productive highest quality 3D printer in the market place. Sprout Workspace allows you to scan images, work on projects, create and explore app.

Platform: Its attempt to seamlessly become a hardware and software company by imitating Apple’s platform model more or less failed in late 2000s. Today, it stands as a status quo in terms of computer hardware business models.

**Strategy (Where to compete; internal processes and capabilities)**

Where to Compete: In the transitional time when Lenovo gained grounds, HP had a wrong idea of “where to compete.” HP overreacted to the tech shift when the tablets arrived and essentially rushed to launch the TouchPad, a webOS tablet at $500-600 that went down to $99 within a single month. During that same month, HP spinne off its PC business. During this time, it acquired an enterprise software company Autonomy, which turned out to be one of the worst acquisitions in recent history. By over-reacting to the technological shift, they missed their shares there but also missed the opportunity to enter the mobile space. Lenovo stayed firm in the PC market when everyone was shifting away from it, innovating very aggressively. It was after then that it made its steady decrease in dependency on desktops and laptops and increase in dependency on mobile devices. For the future, HP's focus seems to be more on providing innovation in core markets in terms of cloud, security, and big data. HP believes that the world is "facing a data explosion.

HP Labs is currently focused on "The Machine," which is the preemptive solution for this future. It hopes to reinvent the fundamental architecture of computers in order to enable a leap in performance, efficiency, and security. The problem is, while this is still in the works, Lenovo has already introduced certain items in this line.

Internal Process and Capabilities: Its operations are centralized in U.S. with 37 operation sites throughout the states. Beyond that, it owns and leases more than 770 sites in 95 countries worldwide. It continues to emphasize its environmental friendliness of its production facilities, which ties back to the brand management well. Rather than supply chain management or R&D, its entire hp operations report focuses on its commitment to the environment and society. Beyond that, corporate internal process and capabilities today does not necessarily allow for creativity. Internal “voice of the company” survey revealed that employee morale was low, and the employee autonomy process had led to that low morale as well as low creativity. Acquisition of more technology related patents has allowed it to excel in the recent past, but company acquisitions have been proving to be ineffective.

**Customers (Brand, customers)**

Brand: The strength of its brand has changed a lot since its inception in 1939. I will focus on 1989 and onward. Its strength in branding increased with its new, innovative product introductions throughout the 90s and early 2000s. In 2009, HP was ranked world’s 11th

---

27 SWOT Analysis of HP. (2013, February 16).
most valuable brand in BusinessWeek Study. For branding, they are under HP for both home and for work (for consumers and businesses). It really markets its Corporate Social Responsibility otherwise known as "Living Progress," which makes this manufacturing company more accessible. Due to a lot of poor business decisions made in late 2000s, it’s actually caused a huge decrease in brand value. But overall, as a hardware company, I think it’s done a good job of branding itself as very accessible. It missed pivotal business decisions that could have helped to shape its brand value and making them significant to enterprises as Lenovo had done.

Customer Experience: It has good relations with customers, attributing to its high-ranked brand value.

Financials (Value Capture and Presence)

Value Capture: It was quick to abandon where it was effectively excelling in due to changes in the tech landscape. Some argue that HP’s downfall could be attributed to its decision to stay in the slow hardware market and not making the shift as IBM had. Yet, Lenovo’s increase in profit and success during the time of decline shows that hardware industry isn’t dead. As previously emphasized, HP reacted too aggressively to the tech shift. It left a lot of value to be captured by Lenovo in late 2000s. In its attempt to define new revenue streams, HP rushed through the introduction of its tablet and produced something that wasn't true to HP's innovative spirit. It ineffectively spun off its PC business only to bring it back a year later.

Presence: Its presence is relatively status quo.

---


III. Haier vs. Whirlpool

Haier

Overview

Haier Group is a multinational consumer electronics and home appliances company. It was founded in 1984 with its headquarters in Qingdao, China. It designs, develops, manufactures, and sells products including air conditioners, mobile homes, computers, microwave ovens, washing machines... etc. It is now the leading brand of white goods globally, with a 10.2% market share as of 2014. It is considered one of the most valuable brands in China. Its development can be grouped into 4 phases. First was from its founding days to early 90s, when the company significantly focused only on refrigerators. In the 90s, Haier focused on its diversification and development, by moving away from Single-product Company to a manufacturer with multiple product lines. From late 90s to the 2000s, it focused on globalizing the company to become what it is today, satisfying consumers’ needs worldwide.

Product (Product mix, platform)

Product Mix: Haier spent the first 10 years solely on building its company name by focusing solely on refrigerators, and it lacked product mixes altogether in early 90s. Now it has the largest market share in white goods, otherwise known as “major appliances.” Beyond that, it produces for household appliances, communication, IT digital products, home furnishings, real estate and bio-pharmaceuticals... essentially becoming a world leading life solution provider.

Platform: Haier has a very interesting entrepreneurial platform for businesses that speaks to how innovative this company sought to be. Makers and microenterprises gather on the two platofmrs of Qindao Haier and Haier Electronics to innovate and grow the Haier ecosystem.

Strategy (internal process and capabilities and where to compete)

Internal Process and Capabilities: It focused on an overseas market strategy of localized research and development, production, and marketing. Today, Haier has 5 research and development centers, 21 industrial parks, and 66 trading companies in 100 countries and regions. It has manufacturing bases in each of the continents it is operating in.

Where to Compete: Haier was slow and steady in its strategy of where to compete. As emphasized, it built its brand for the first 10 years by focusing solely on the product quality and building a process around that solely in China. By late 90s, Haier strategically began its global development with joint-venture contracts that would provide them the technology and equipment of European countries.
Customers (brand, customers)

Brand: Its branding is pretty much status quo. It let its items speak for itself. After giving that time, Haier was able to develop opportunities for other businesses, which have all been financially successful. Because it had grounded its inception in product quality, that has become the basis of its branding. Haier is a safe bet.

Customer Experience: Similar to Goodbaby, Haier recognized this need for superior design and product in the refrigerator industry in the 90s. It likewise focused heavily on meeting this demand for China, developing its reputation and position as the market leader in China. Despite starting as an OEM and not interacting with consumers directly, it thought innovatively about what customers wanted in China. Now, it continues to complement this customer experience with its internal process and capabilities by adopting overseas-localized centers.

Financials (value capture and presence)

Value Capture: Haier continues to grow not just organically but inorganically through definition and execution of new revenue streams. It is able to do so strategically well through its multiple brand points: Casarte, Leader, Goodaymart, AQUA, and Fisher & Paykel – but none of this is considered new or especially innovative. However, it diversified very successfully out of white goods industry (which Whirlpool either never attempted or executed well) into really distinct industries: digital & personal, integrated kitchen, real estate, and home appliances. While I want to focus my attention on Haier’s home appliances industry performance, I do think it’s provided Haier the growth opportunities in that industry by having such a successful value capture dimension as a whole.

Presence: Haier’s presence dimension is status quo.

Overview

Whirlpool Corporation is in the home appliances industry, operating specifically in the consumer electronics sector. Whirlpool Corporation is the #1 major appliance manufacturer in the world.\(^{31}\) It’s known for producing energy efficient appliances, with products ranging from dishwashers, microwaves, refrigeration, vacuum cleaners, air treatment products, etc. It’s mean for middle and upper class segments, by pricing it in the mid to premium segment. As it stands, it’s world’s largest major appliances maker by revenue, but it lost its position as a global leader of major appliances in 2012. It focuses on identifying unique consumer insights and designing high-quality products. In the U.S. it has been ranked Top 25 Most Reputable U.S. Companies and World’s Most Amired Company.\(^{32}\) It has 70 manufacturing and technology research centers around the world in more than 170 countries. Its strength is in North America and Latin America, but remains a relatively modest player in Asia. Its weakness could be said in having over dependence on North American region (half of its net sales in value was derived from this region). By only being present in the major appliances sector, Whirpool currently operates on low margins and high operation risks. This risk is further heightened by competition with low cost Asian manufacturers -- domestic players tend to freeze out foreign brands in China. It needs to take advantage of India industry since it’s predicted to grow in consumer appliances.

Product (Product mix, platform)

Product Mix: It specializes specifically in home appliances, so it’s hard to do a direct comparison to Haier. For the purposes of this paper, I will be focusing on just the home appliances divisions of both companies. Its product mix ranges from laundry appliances to refrigerators to dishwashers and compressors.

Platform: Whirlpool’s platform dimension is status quo.

Strategy (internal process and capabilities and where to compete)

Internal Process and Capabilities: It has manufacturing operations in more than a dozen countries. It tends to keep its marketing and distribution operations close together.\(^{33}\) It is also slow and steady in its innovation, “innovation at the pace of life.”\(^{34}\) While that means it’s wise in its decisions, it’s also not adapting to changes fast enough – I’ll expand on this in the Presence section. It’s hard to determine whether process itself lends to higher quality items, but Whirlpool does create high-end, technically innovative items. It is being squeezed of its margins in the process, so it may insinuate that the process and capabilities isn’t providing efficiency. Regardless, its final product proves to be innovative.

---


Where to Compete: Status quo. Its global inception was pretty status quo and now operates in North America, Latin America, EMEA (Europe, Middle East, and Africa), and Asia.\(^{35}\) It should focus on India, but it continues to rely too heavily in North America where margins continue to decrease.

**Customers (brand, customers)**

Brand: It’s sold under 19 different names, some of them being Whirlpool, Amana, KitchenAid, Maytag, and Roper. Its branding as a home manufacturing goods company is a lot about not just its product but about its values – about its history and heritage, its employees, community, and focus on excellence and passion. In emphasizing product leadership, Whirlpool claims that “their day-to-day connection with their consumers is through their appliances.”\(^{36}\)

Customer Experience: It reassures customers through its safety and loyal branding, which had not existed prior to Whirlpool in the home goods industry at the time.

**Financials (value capture and presence)**

Value Capture: Despite being a leader for about 50 years, it continues to fall in market share throughout the 2000s. It has favorable trade positions, brand name, global operating platform, experience executive team. It seems to lack strategy in expanding beyond just organic growth – it should try to diversify its product mix more, it should arrange capital, it should grow its Asian market, it should make strategic acquisitions. It’s making strides toward it presently. In 2014, it acquired Hefei Sanyo, allowing it to quadruple their platform in China by bringing increased distribution, new manufacturing and service centers, and just reaching more consumers in the market.\(^{37}\)

Presence: Its major customers include retailers Lowe’s, Home Depot, Sears, and Best Buy. It needs to motivate its distribution channels better.


Haier Rating

Product Mix – introduction of new product or services, alteration of product mix, especially when tailored to fill emerging, unmet customer needs.

Value capture – redifinition or identification of new revenue streams.

Presence – creation of new distribution channels or innovation of points of presence, including the places where offerings can be bought or used by customers.

Where to Compete – deciding in which markets and for which customers to compete, customer segments.

Platform – a easy-to-use structure that allows seamless use of multiple products from basic to new additions.

Brand – presentation of product or service in a new way, creating brand image distinct from any competitor.

Customer Experience – discovering unmet customer needs or identification of underserved customers.

Internal Process and Capabilities – operating in a new way, new or redesigned processes to improve efficiency and effectiveness.

Whirlpool Rating

Product Mix – introduction of new product or services, alteration of product mix, especially when tailored to fill emerging, unmet customer needs.

Value capture – redifinition or identification of new revenue streams.

Presence – creation of new distribution channels or innovation of points of presence, including the places where offerings can be bought or used by customers.

Where to Compete – deciding in which markets and for which customers to compete, customer segments.

Platform – a easy-to-use structure that allows seamless use of multiple products from basic to new additions.

Brand – presentation of product or service in a new way, creating brand image distinct from any competitor.

Customer Experience – discovering unmet customer needs or identification of underserved customers.

Internal Process and Capabilities – operating in a new way, new or redesigned processes to improve efficiency and effectiveness.
D. Shortcomings

I would like to discuss the shortcomings I had identified in the research process and how I hope to improve for the future. Specifying the time frame and the industry was crucial for narrowing the scope of the project, and the reasoning behind my timeframe and landscape was sound. Investments toward innovation were being poured into the industrial landscape at the time, and Sun’s and Du’s study on the critical role of in-house R&D seems to reaffirm the “Zizhu Chuangxin” efforts. Organic and internal innovation in China may indeed be possible, and the best place to look for that may be in that specific time frame. That being said, narrowing the scope has made it difficult to answer the initial, much broader question posed: are there differentiating factors in innovation between the East and the West?

Another glaring flaw might be in that I went with the broad assumption of our innovation web being globally applicable. It may be that certain dimensions are much more U.S. oriented, allowing for unfair judgments of a company’s innovation quality.

For the purposes of this project, I had focused in on 3 sets of competing companies in diverse industries. Professor Robertson, Victor, and I had previously understood the importance of providing the same source or summary of the companies to properly do the numerical web ratings. As a result, the process for understanding and analyzing the company takes an incredibly long time. Additionally, because of its qualitative nature, it doesn’t allow for practical replication (which would be necessary in order to get a large data set and actually prove my hypothesis).

E. Conclusion

I had specifically chosen sets of companies that were #1 and #2 in the industry with the Chinese company leading in terms of financial success by a margin. I wanted to understand if that difference could be explained by some of these innovation dimensions. There was consistency in dimensions that stood out for U.S. companies versus Chinese companies – implying that they may be innovating in a specific way that lends these Chinese companies more financial success.

For Chinese companies, there was consistency in high ratings for: “Internal Capabilities and Processes,” “Where to Compete,” and “Customer Experience” for the more financially successful Chinese companies. Considering I’m looking mostly at manufacturing companies (OEMs), it’s pretty intuitive why internal capabilities and processes would consistently rank high. That being said, a lot of the U.S. based companies didn’t intuitively focus on this. For example, Dorel is only now bringing production process in-house in 2014. Hewlett Packard’s internal process has been believed to be not conducive to innovative thinking.38

---

Cheap labor, manufacturing facilities, and understanding of culture gives these Chinese companies an edge, but I would argue that these companies’ success goes beyond being a good “OEM” company. The glaring difference between the U.S. companies and the Chinese companies is that the U.S. tried to focus on all dimensions or too much on the external dimensions (such as branding and product mix). While Chinese companies tend to let branding happen organically and tend to use branding to emphasize product quality, U.S. companies tend to use branding to bring to focus other aspects of the company: its values, its corporate social responsibility, its history, its environmental sustainability.

Beyond Internal Capabilities and Processes, the more financially successful counterparts tend to excel in “Where to Compete” and “Customer Experience.” As for Where to Compete, it was about identifying new markets or customer segments in a strategic manner. The way I’ve defined Customer Experience innovation is the ability to predict unmet needs rather than the ability to provide customer service. I actually thought the two dimensions of Where to Compete and Customer Experience complemented each other, especially for the industrial product design landscape. Innovation came from focusing a lot on seamless design of the products.

Moving forward, I’d be curious to see whether these 3 dimensions continue to hold for superior Chinese companies and what kind of strategic implications and correlation there may be. Can China innovate? I certainly think so.

Work Cited


E. Keh, personal communication, April 9, 2015).


SWOT Analysis of HP. (2013, February 16).


Appendix A

Innovation Matrix

<table>
<thead>
<tr>
<th>Problem Definition</th>
<th>Domain Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Well Defined</td>
<td>Not Well Defined</td>
</tr>
<tr>
<td>Well Defined</td>
<td>Well Defined</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Breakthrough Innovation</strong></td>
<td><strong>Sustaining Innovation</strong></td>
</tr>
<tr>
<td>Skunk Works</td>
<td>R&amp;D Labs</td>
</tr>
<tr>
<td>Mavericks</td>
<td>Outsourcing</td>
</tr>
<tr>
<td>Open Innovation/Prizes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Basic Research</strong></td>
<td><strong>Disruptive Innovation</strong></td>
</tr>
<tr>
<td>Research Divisions</td>
<td>VC Model</td>
</tr>
<tr>
<td>Research Grants</td>
<td>Innovation Labs</td>
</tr>
<tr>
<td>Academic Affiliations</td>
<td>15% / 20% Rule</td>
</tr>
</tbody>
</table>

Innovation Quadrants

- Q1: Existing Offering - Incremental - Existing Users Trust
- Q2: New Offering - Evolutionizer - New Users Trust not Established
- Q3: New Offering - Evolutionizer - Revolutionary
- Q4: Next Offering - Synthesizer - Revolutionary
## Appendix B

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No attempts at innovation at all.</td>
</tr>
<tr>
<td>2</td>
<td>Maintenance of industry status quo, but no introduction of improvements or new techniques</td>
</tr>
<tr>
<td>3</td>
<td>Innovation attempts that unintentionally result in negative or undesirable impacts on product performance</td>
</tr>
<tr>
<td>4</td>
<td>Slight/moderate improvement to current innovation strategies resulting in increase in customer value, but incremental positive impact on overall product sales</td>
</tr>
<tr>
<td>5</td>
<td>Significant improvement to current innovation strategies resulting in meaningful increase of customer value and/or substantial positive impact on overall product sales</td>
</tr>
<tr>
<td>6</td>
<td>Significant improvement to and creative application of an innovation strategy that improves areas of product performance thought to already be maximized</td>
</tr>
<tr>
<td>7</td>
<td>Introduction of a novel (i.e. never-before-seen) innovation strategy that has substantial customer value and product sales</td>
</tr>
</tbody>
</table>

## Appendix C

![Diagram](image)

**Key**
- ![Product](image)
- ![Customer](image)
- ![Strategy](image)
- ![Financial](image)

**Product Mix** — introduction of new product or services, alteration of product mix, especially when tailored to fill emerging, unmet customer needs

**Value capture** — Redefinition or identification of new revenue streams

**Presence** — creation of new distribution channels or innovation of points of presence, including the places where offerings can be bought or used by customers

**Where to Compete** — deciding in which markets and for which customers to compete; customer segments

**Internal Process and Capabilities** — operating in a new way; new or redefined approach to improve

**Platform** — a easy-to-use structure that allows seamless use of multiple products from basic to new additions

**Brand** — presentation of product or service in a new way; creating brand image distinct from any competitor

**Customer Experience** — Discovering unmet customer needs or identification of underserved customers
### Appendix D

#### SAP

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Average</td>
<td>2.86</td>
<td>2.00</td>
<td>2.57</td>
<td>2.14</td>
<td>2.43</td>
<td>2.29</td>
<td>2.86</td>
<td>2.14</td>
</tr>
<tr>
<td>Median</td>
<td>3.00</td>
<td>2.00</td>
<td>3.00</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td>AVG-MEDIAN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STDEV</td>
<td>0.69</td>
<td>0.58</td>
<td>0.98</td>
<td>0.90</td>
<td>0.98</td>
<td>1.11</td>
<td>1.21</td>
<td>1.07</td>
</tr>
</tbody>
</table>

#### Oracle

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Average</td>
<td>3.71</td>
<td>4.14</td>
<td>3.14</td>
<td>3.71</td>
<td>4.43</td>
<td>3.14</td>
<td>3.29</td>
<td>3.8</td>
</tr>
<tr>
<td>Median</td>
<td>4.00</td>
<td>4.00</td>
<td>3.00</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>AVG-MEDIAN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STDEV</td>
<td>0.76</td>
<td>0.69</td>
<td>0.90</td>
<td>1.11</td>
<td>0.53</td>
<td>1.07</td>
<td>1.38</td>
<td>1.2</td>
</tr>
<tr>
<td>Respondent</td>
<td>GoPro Innovation - Product Mix</td>
<td>GoPro Innovation - Platform</td>
<td>GoPro Innovation - Brand</td>
<td>GoPro Innovation - Customer Experience</td>
<td>GoPro Innovation - Internal Process and Capabilities</td>
<td>GoPro Innovation - Where to Compete</td>
<td>GoPro Innovation - Presence</td>
<td>GoPro Innovation - Value Capture</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------</td>
<td>-----------------------------</td>
<td>--------------------------</td>
<td>----------------------------------------</td>
<td>-------------------------------------------------</td>
<td>---------------------------------</td>
<td>-------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>4.57</td>
<td>3.29</td>
<td>4.57</td>
<td>4.00</td>
<td>3.43</td>
<td>4.29</td>
<td>4.29</td>
<td>3.5</td>
</tr>
<tr>
<td>Median</td>
<td>5.00</td>
<td>3.00</td>
<td>5.00</td>
<td>5.00</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>AVG-MEDIAN</td>
<td>0.43</td>
<td>0.29</td>
<td>0.43</td>
<td>1.00</td>
<td>0.57</td>
<td>0.29</td>
<td>0.29</td>
</tr>
<tr>
<td>STDEV</td>
<td>0.53</td>
<td>1.11</td>
<td>0.53</td>
<td>1.29</td>
<td>1.51</td>
<td>0.76</td>
<td>0.76</td>
<td>1.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>3.43</td>
<td>2.71</td>
<td>2.43</td>
<td>2.57</td>
<td>2.00</td>
<td>2.29</td>
<td>1.71</td>
<td>1.8</td>
</tr>
<tr>
<td>Median</td>
<td>3.00</td>
<td>3.00</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
<td>3.00</td>
<td>1.00</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>AVG-MEDIAN</td>
<td>0.43</td>
<td>0.29</td>
<td>0.43</td>
<td>0.57</td>
<td>0.00</td>
<td>0.71</td>
<td>0.71</td>
</tr>
<tr>
<td>STDEV</td>
<td>0.79</td>
<td>0.95</td>
<td>0.98</td>
<td>0.79</td>
<td>0.82</td>
<td>1.25</td>
<td>1.11</td>
<td>0.6</td>
</tr>
</tbody>
</table>