

Improving Efficiency in Product & Process Development A Case Study on a Consumer Products Creation Process

by

Xiaoqin Dong

M.B.A, the University of New Hampshire, 2003
B.S. Mechanical Engineering & Economics of Technology
Shanghai Jiao Tong University, 1993

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in Partial Fulfillment of the Requirements for the Degree of

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Engineering Systems Division
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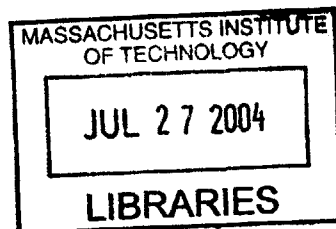
.....
Chris Caplice, Thesis Advisor
Executive Director, Master of Engineering in Logistics Program

Certified by

.....
Donald B. Rosenfield, Thesis Advisor
Sr. Lecturer, Sloan School of Management

Accepted by

.....
Yossi Sheffi
Professor, Engineering Systems Division
Professor, Civil and Environmental Engineering Department
Director, MIT Center for Transportation and Logistics



BARKER

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ABSTRACT

This research examines how an athletic footwear company should establish its new product development and launch process to eliminate wastes in the processes and improve the time to market. Currently, it typically takes an athletic footwear company twelve months to introduce new product samples. Retailers place orders after they see samples, however they will not receive and sell the shoes in their retail stores until six months later. The total process from an idea generated to the time when the final products launch takes eighteen months. While this system is set up due to historical reasons, forward looking management teams in the industry see a lot of inefficiencies in it, especially when athletic footwear becomes more and more fashion driven. Why should retailers stick to this advance buying pattern where they take big risks predicting the market six months ahead of time? What if this advance buying pattern is eliminated for whatever reasons? How companies can improve their new products launch process to make them prepared for the possible new challenges in the future?

This research studies the new product development process in a large athletic footwear company (Hereinafter US-Footwear). Recommendations include adopting a systematic new products development framework to shorten the time to market. Specifically, this systematic roadmap will force companies to redefine milestones and key activities; this approach will also form a “funnel” screening and informed decision making mechanism. Consequently, companies would be able to eliminate non-value added activities and focus their valuable resources only on the most winning products. It will thus provide companies huge potential to shorten the time to market by doing fewer activities, fewer products and by greatly reducing iterative design changes. Lastly, the author believes that fashion business in general could benefit by adopting the similar approach.

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Chapter 1. Introduction

Due to historical reasons, the athletic footwear industry has adopted a type of “future business” model in its new products launch process. Typically, an athletic footwear company introduces new products each quarter; taking upwards of twelve months to design and produce samples for that season. Samples are then presented to big retailers and retailers place orders. However, they will not receive and sell the shoes in their retail stores until six months later. This is the so called “future business” model. The majority of the US athletic footwear is distributed in this way.

The entire process from ideas generated to the time when final products launch takes eighteen months, including twelve months of designing and six months of production. While this system is set up due to historical reasons, when Nike successfully convinced specialty retail stores to enter into the future business in the 1970’s, many forward thinking management teams in the industry see a lot of inefficiencies in it, especially now that athletic footwear has become more and more fashion driven. Why should retailers stick to this advance buying pattern? What if retailers could reach agreement with the market leader Nike to eliminate the advance buying? How can companies improve their new product launch process to prepare them for the possible new challenges in the future?

The primary objective of this research is to investigate how athletic footwear companies manage their new product development process to improve the time to market. In doing so, an investigation of new product development process at a large athletic footwear company will be provided. To protect confidentiality, this firm will be referred to as US-Footwear in this thesis. Process mapping techniques are employed in the analysis of the current situation and future state. A systematic approach- Stage & Gate™ (Cooper 2001) modeling process is introduced and applied in the case. Implementation issues and next steps are also discussed.

This thesis is divided into six chapters. Chapter 2 presents the case, consisting of an introduction to the company, a quick glance at the industry, the current new product development process, the motivation and hypothesis. Chapter 3 discusses the methodology and key findings.

Chapter 4 presents the review of the best practices. Chapter 5 presents the Stage-Gate model analysis in the firm studied. Chapter 6 presents the recommendations. Lastly, Chapter 7 discusses the implementation issues and next steps.

Chapter 2. Case: US-Footwear, Inc.

2.1. Background of Company

2.1.1. US-Footwear Inc.

This thesis investigates new products development process at one large athletic footwear company. US-Footwear is a global company that designs and markets sports and fitness products, including footwear, apparel and accessories. The Company also designs and markets casual footwear, apparel and accessories for non-athletic use.

About 40% of the US-Footwear's footwear products are distributed through athletic specialty retailers such as FootLocker, Footaction, and Finish Line, etc; 25% to 30% of the products are distributed through big department stores such as Sears, J.C. Penny, etc; another 20% of the products are distributed through sporting goods store; the rest of 10% to 15% are distributed via roughly two thousand independent stores¹. US-Footwear operates more than two hundred factory outlets in the United States that sell a variety of their footwear, apparel and accessories. They also operate a couple of "concept stores" where showcase a wide selection of their latest and classic products. The concept store is a marketing tool through which companies communicate a concept with the public. The concept could be, for example, a lifestyle the products are designed for. For their athletic footwear business, US-Footwear has never owned any shoe manufacturing facilities from the beginning. However, they have roughly a dozen of dedicated, yet independent, factories in the Far East.

US-Footwear designs, markets and sells products under a number of brands. The author studied the new product creation process at its flagship brand division, hereinafter "Athletic" Brand. "Athletic" brand footwear business is operated under five product marketing business units: Classic, Performance, Fitness, Kids, and Fashion. (See Figure 1) Classics are referred to those shoes that have been selling in the market for more than 10 years. When looking at shoes from category point of view, these five business units design and market shoes in thirteen categories: Basketball, Tennis, Walking, Golf, Kids, Running, Off-road running, Soccer, Fitness, Women's

¹ Based on interviews with key people in US-Footwear sales organization.

training, Men's training, Classics, Track and field. Each business unit may cover one or more of the categories; one category may be designed and marketed in one or more business units.

Figure 1: Athletic Brand Business Units

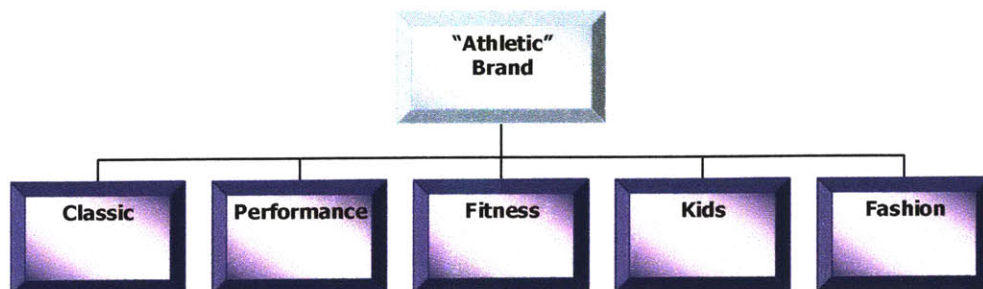
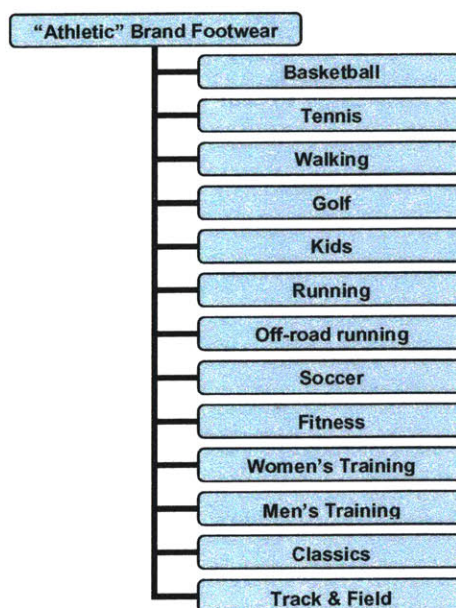


Figure 2: "Athletic" Brand Footwear Categories



2.1.2. Industry Characteristics, Market and Competition

The athletic industry in the US is mature and competitive. According to one study performed by NPD, a top ten international marketing information company headquartered in Port Washington, New York, US athletic footwear industry is an eight to nine billion business industry.

Athletic footwear industry competes both on technology and fashion trends. It has to deal with competitive technological advances in products; (such as Nike Air Technology and Reebok Pump Technology); the changing fashion trends, with new designs that will appeal to the more sophisticated and demanding consumer. The NPD study found that more than one-half of athletic footwear purchases were for the purpose of casual use only. This leaves the athletic industry vulnerable to fashion whims of the consumer and 'hot' fashion brands, such as Tommy Hilfiger, Polo, etc.

Athletic footwear industry also has to deal with relatively long lead time to market and relatively short product life cycle. The industry average time to market is about eighteen to twenty months and the best selling season is one or two months. After that products would be marked down and/or sold to second or third channel, such as factory outlets at a loss.

Due to historical reasons, athletic footwear industry adopts a type of "future business" model in new products launch. Typically, an athletic footwear company launches new products each quarter. It would take companies twelve months to design and produce samples for one specific season. Samples will then be presented to big retailers, such as Footlocker, Footaction and Finish Line, etc, and they place orders accordingly. However, retailers will not receive and sell the shoes in their retail stores until six months later.

Just as other manufacturers in retail business channel, US-Footwear is also concerned about retailers' "Open to Buy". According to the definition provided by retailingindustry.about.com, "Open-to-Buy" is the difference between planned purchases and stock already ordered; the dollar amount of merchandise that a buyer can order for a particular period. Normally retailers will purchase the best selling shoes first and use the balance "open to buy" to cover other smaller and less popular shoes.

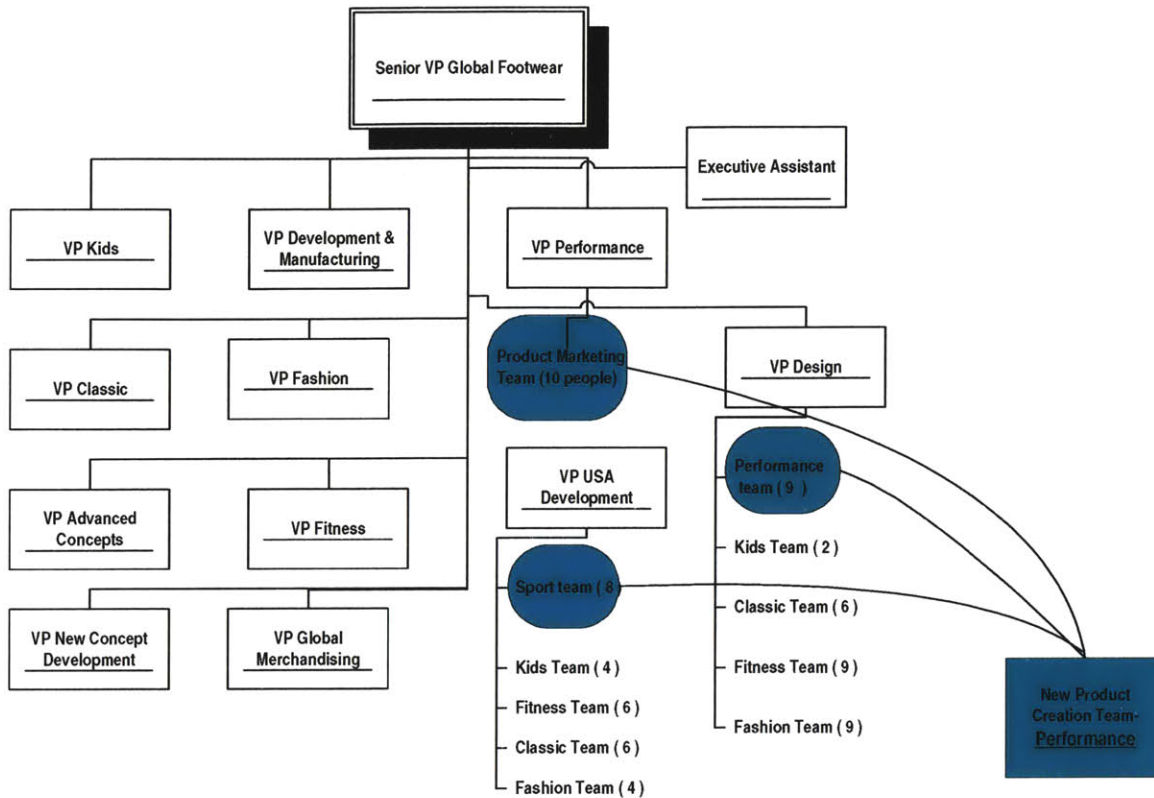
2.2.Current Practice and Motivation of the Research

2.2.1. Global Footwear Organization and New Product Creation Team

The Global Footwear Organization is responsible for new product creation. The organizational structure could be characterized as hierarchy and function based. The Vice President for each business unit, leading a product marketing team of about ten people, reported to the Senior Vice President Global Footwear. The Vice President Design, the Vice President USA Development, the Vice President Development and Manufacturing, the Vice President Advanced Concepts and the Vice President New Concept Development also reported to the same position. Within Design and USA Development department, there are five groups that mirror the five business units. Product marketing team of each business unit works with the corresponding group within Design and Development through new products creation process. While there is no official team leader for this matrix team and team members still report to their functional line manager, the Vice President of each business unit is actually the people leading the process and making decisions. Figure 3 shows an example how product marketing team of “Performance” works with “performance” group within Design and Development department.

This research focuses on the “in-line” products creation process, which constitutes the majority of the footwear business, complemented with “CFD” – customer footwear design. For the in-line business, every business unit conducts its new product design process each quarter independently while following almost the same calendar. However, all business units share the same resource of samples creation and mass production facilities in Asia. The planning calendar is maintained by the executive assistant to the senior Vice President Global Footwear, telling people in different functions when to finish what. (See Table 2 for the illustrative example of a calendar planner.)

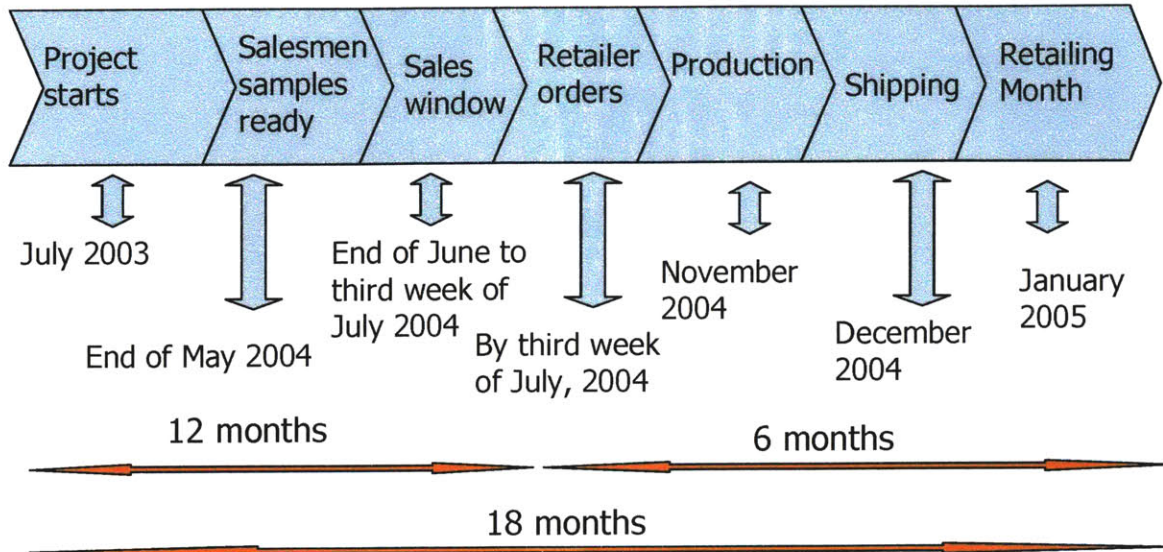
Figure 3: Global Footwear Organization – US-Footwear Corp.



2.2.2. Current timeline

It takes about eighteen months from the time an idea is generated to when the shoes show up on the retailer shelf. For example, a new pair of shoes showing up on retail stores in January 2005 will be shipped in December 2004. Production will occur in November 2004 in its Far East factories. Retailers will be placing orders during the “sales window” starting from end of June and ending by third week of July. “Sales window” is referred to the time period when salesmen visit retailers and present the new shoes samples to them. These sales samples won’t be ready until end of May. The new product creation project starts in July 2003. For the entire eighteen months, twelve months are for designing and producing the samples; six months are for orders and production. Figure 4 displays the timeline.

Figure 4: Q1 2005 New Product Creation Process Timeline



2.2.3. Current Process Flow

While the whole new product creation process is much more complicated involving activities such as model download into systems; three rounds of forecasting; two rounds of production plan allocation; molds and tooling opening, three rounds of factories ordering materials, and fit & wear testing, etc, it is much easier to understand the process by identifying several key milestones. When looking at the key milestones, the entire process can be divided into eight phases: *briefing*, *design process*, *prototype samples production*, *merchandising meeting*, *line confirmation meeting*, *sales meeting*, *key accounts meeting*, and *sales window*.

New product creation starts with the Product Marketing (PM) team briefing² the coming season. Then the briefing book will be handed to the designers. Currently almost all design work is finished in the US headquarters with a small portion of the jobs outsourced to independent designers. Designers will finish designing process and hand the tech pack to Far East Development center. Prototype-samples will then produced in the Far East development centers and shipped to the US headquarters. Prototype-samples will be reviewed during the merchandising meeting and revised tech-pack will be sent to Far East Development center. The revised samples

² See next paragraph for definition for “brief”, “tech-pack”, etc.

will be produced and reviewed during line confirmation meeting. Re-revised tech pack will be transferred to Far East Development center and line confirmation samples will be produced and then reviewed during sales meeting. After that key accounts will be invited to the US-Footwear headquarters to review the line confirmation samples. Finally sales window opens and sales people visit retailers presenting samples to them. Sales window lasts about three or four weeks, and retailers shall place orders by the time sales window closes. Figure 5 explains who are involved in these eight stages, key activities involved and the main outputs.

a) Definition:

Briefing Book: A briefing book is a brochure prepared by product marketing team describing to designers ideas about new products to be launched in the new season. A good briefing book should include information such as target consumers, target distribution channel, price, and context story, etc. A briefing book for each individual business unit usually consists of around 300 models. Once the briefing book is handed to designing team, they start the designing process.

Sketch: When designers get the briefing book, they will first sketch shoes by hand and review the sketches with product market people. A sketch normally takes one hour or so to finish.

Colorway: Once a sketch is confirmed, designers will create a two dimensional show graph through certain computer programs. Those graphs are with color scheme, referred to “Colorways”. Colorways will be reviewed with product marketing team. A colorway normally takes couple of hours to finish.

Tech Package: Once a colorway is confirmed, designers will create the tech package. A Tech Package or Tech Pack is the technical specification documents based on which the shoe is produced. Once the tech pack is transferred to Far East Development center, they start the prototype samples creation. A tech pack normally takes one week to finish; and two tech packs are needed for a pair of shoe, one for top and one for bottom.

Figure 5: Current New Product Creation Process Flow

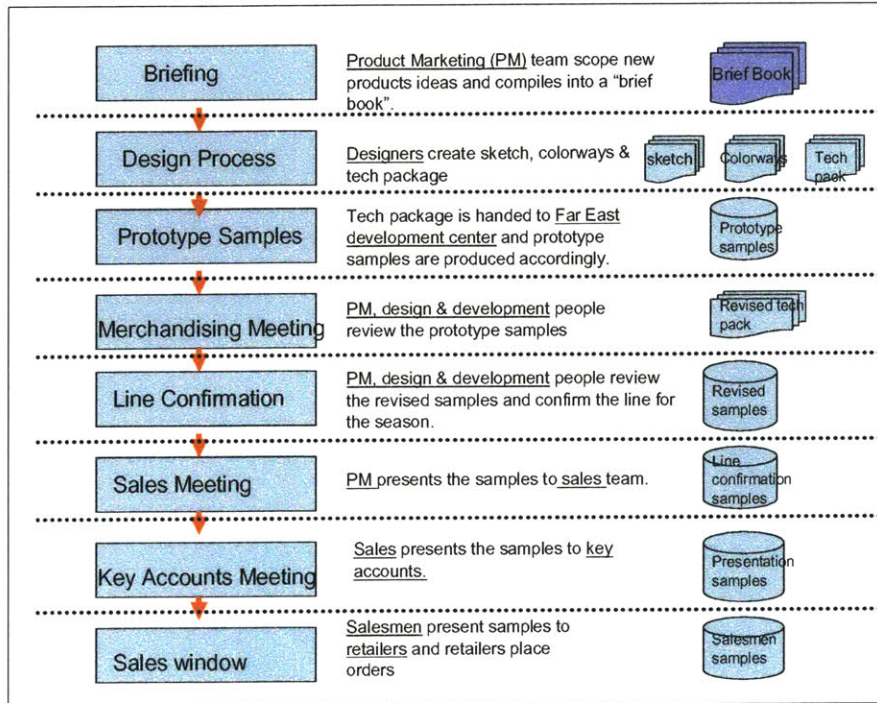


Table 1: Mapping New Products Creation Process – Current State

	Milestone	Time (wks)	Time elapsed (wks)	Who's involved	Main Activities	Results	Remarks
1	Briefing	2	2	Product Marketing (PM)	Briefed the new products to be created	Hand off a brief book to design	Normally a Business Line will brief more than 200 models
2	Design	8-12	10-14	Design	Sketch, Create Colorways & Tech-Pack	Hand off Tech-pack to Far East development to create prototype samples	There are normally three review meetings with PM and Development during the process
3	Prototype Sample arrived US headquarter	5+1	16-20	FE development center, factory, US development, design	* model allocation among factories *US development sample request form * US development FE travel and create the prototype together with FE development team * Travel feedback	Prototype samples were created and arrived US headquarter ready for review	4 week- prototype creation 1 wk- shipping 1 wk- travel feedback and get ready for merchandising event
4	Merchandising Event	2+1	19-23	PM, design, development	Review the prototype samples and decide the changes to be made	* Revised tech-pack had off to FE development * factory order additional materials	2 weeks- merchandising meeting 1 wk- tech pack revision the raw materials lead time is 3 wks
5	Line Confirmation Samples produced and arrived	1+3+1	24-28	Far East development center, factory	* FE produce revised samples according to the revised tech-pack	Revised samples- line confirmation samples arrived US headquarter	1 wk- samples creation 3 wk- raw materials lead time 1 wk- sample shipping to the US
6	Line Confirmation Meeting	3+1+4+1+1	34-38	PM, design, development, FE development, factory	* Review line confirmation samples and decided changes/revisions * drop some models * design revise the tech-pack * factory ordered materials and created presentation samples		3 wks- line confirmation meeting 1 wk- revise tech – pack 4 wks- factory received revised tech-pack, ordered new materials and materials arrived 1 wk – create presentation samples 1 wk- shipping presentation samples
7	Sales meeting	1	35-39	PM, sales	Present the samples to sales	Revise the samples and cancel some products	
8	Key accounts meeting	3	38-42	PM, global key accounts	Present the samples to global key accounts	Revise the samples and cancel some products	
9	Sales window	4	42-46	Sales, retailers	Sales force present samples to retailers	Retailers place orders	

2.2.4. Current guideline – Calendar Planner

Currently US-Footwear uses a calendar planner, prepared by the executive assistant of the senior vice president global footwear, to guide the new product creation project. Key players look at the same calendar planner and decide when to finish what. Below Table 2 is an illustrative example of the calendar planner. For example, for Q1 '05 new product creation project, product marketers (PM) make sure they handed off the product briefing book to Design team on 4th August 2003; Designing process started on 5th August 03 and finished on 28th October, etc.

Table 2: Illustrative Example of Current New Products Creation Calendar Planner

Brief	Design Process	Tech Package Transfer	key feedback		Line close	Sale Sample Due				sales window open & close
			Protosamples Arrive USA	Merchandising Event	Line Confirm Meeting	S/S transfer deadline	Photo shoot sample	Pres.samples	bulk samples	
Q1 '05										
Briefs handed off 08/04/03	8/05/03- 10/28/03	10/30/2003	12/23/2003	1/9/2004- 1/12/2004	3/8/04- 3/12/04	3/18/2004	1 pr.4/28/ 04-due 4/30/04	4/38/04 due 5/05/04	5/13/04 due 5/21/04	6/28/04- 7/23/04

2.2.5. Current Process Review

It takes twelve months from an idea generated until the time when a sample shoe is showed to retailers. The middle deadlines are soft and are often missed, thus in reality, more than half of the work is done off calendar. As the final deadline- sales window is rigid, the project will usually turn into a rush program just to catch the final deadline. As a result, there is a lot tension and difficulties in the processes. Retailers in reality would place orders after sales window closes generating additional pressure to the system. Sales and key accounts are not involved in the process until very end. As no one is actually held accountability for the return of the project, there is little incentive to “kill” a project before it is too late. The up-front process can be characterized as numerous changes and revisions. Normally no project will be killed until the line confirmation meeting. Designing and development team strongly feel understaffed and overwhelmed, as workload outstrips resources.

2.2.6. Motivation and Hypothesis

This investigation is motivated by some concerns that the current “future business” model in athletic footwear industry might go away. In that case, how companies can make themselves prepared for the possible new challenges. The objectives of the study are to explore the potential areas to greatly reduce the time to market so as to respond to the market needs in a quick way. This paper hypothesizes that time to market can be greatly improved by doing fewer focused projects; by doing fewer only value added activities. This paper also hypothesizes that huge potential of time can be saved by doing things right in the first time through greatly reducing changes and revisions.

Chapter 3. Methodology and Key Findings

3.1. Methodology

Data for this study was gathered through interviews with US-Footwear Corp. Managers/directors/vice presidents/ senior vice presidents interviewed are from the following departments:

- ✓ Product marketing
- ✓ Design
- ✓ US development
- ✓ Supply chains
- ✓ Sales
- ✓ Merchandising
- ✓ US Outlet
- ✓ Advanced concept development
- ✓ Research and engineering
- ✓ Finance
- ✓ Account and customer Service
- ✓ Information systems

Each person was interviewed for roughly one hour. Depending on their time and willingness to participate, each interviewee described the current business processes in their departments /divisions relating to the new product creation. Each interviewee was also encouraged to make an assessment of the current processes and brainstorm the possibilities to improve. The author also reviewed an unfinished version of mapping the new product creation process developed internally by US-Footwear one and half years ago. That mapping hasn't been finished due to other priorities set by that time.

3.2. Key Findings

During the study, the author was impressed by the people working at US-Footwear Corp. They are very hard working, dedicated and smart. It is not surprising why US-Footwear has been ranked in the top three athletic footwear and apparel companies in the world for decades. The author also appreciated that the interviewees shared with her their insights of the current processes and helped to identify those potential areas that may deserve a further look. Following are the five potential areas mentioned by interviewees.

3.2.1. “Shotgun” Approach

Interviewees felt that USA-Footwear used a “Push” system in the new product creation process. Probably as it is hard to predict the fashion trend, it may be a good idea to try to create as many products as possible. By doing so, it is hoped that some customers at somewhere may like some of their products. Or in other words, they were “pushing” new products out of the door. While this “try everything” strategy might work under certain circumstances, it also results in the following consequences in the new product creation process.

a) Workloads Outstrip the Capacity

Design, development and research departments strongly felt that they do not have enough people to do the job. They are stuck to day to day work and do not have time for free thinking or cross functional communication. For example, one major reason the suggested a weekly meeting among design, development, product testing engineers and product performance engineers did not happen in reality is because people are “too busy to make it happen.”

b) Too Frequent Changes

Currently the product marketing team is the single decision maker and often finds it difficult to make a firmed decision, especially when they are designing the global line of products for sales in different regions and countries. They also find it is hard to say “no” to regional managers or country managers. This leads to the “Burger King” phenomenon which will be discussed later in this chapter. Consequently product marketing teams ask for design changes once they hear something from sales or key accounts. To make things complicated, in the current process, sales and key accounts are not involved in the process until very late in the sales meeting; many changes are actually after-fact-changes. Design, development and research people are painfully chasing a moving target everyday. As a result, their job priority was very short term, resulting not only tension in the system but also significantly added negative impacts to the psychological contract of the downstream product team. They sometime did not understand what they are doing; they are in a fear that all their hard work could possibly be discarded at any time.

c) Reinforced negative impacts to the current situation

When designers are overwhelmed, they do not have enough time to do the free thinking and come up with really good ideas and quality work. One designing director interviewed said

that he himself personally worked everyday till midnight most of the time last year and was very much burnt-out. To make things worse, under the deadline pressure, they usually do not have enough time to think comprehensively for every detail and sometime have to cut corners and copy each other sometime, no matter how reluctant they are to do so. They are not satisfied with their handed work sometime, regretfully saying “you know what- I can do better if given more time.” Mistakes are not uncommon under such circumstance, requiring rework and repeated iterations. When little time is left for Asia development center, they sometime make mistakes in prototype samples too. This conversely adds additional work for designing team to figure out why the prototype looked different from tech-pack. Design team complains that PMs treat them as “service” and their creative ideas are not very much appreciated. Unfortunately, this type of rework and iterations further ruins the possibility to win the respect from product marketing team. All these form a reinforcing burnt-out loop in design team, development team, research and Far East development center.

3.2.2. “Tunnel” instead of “Funnel”

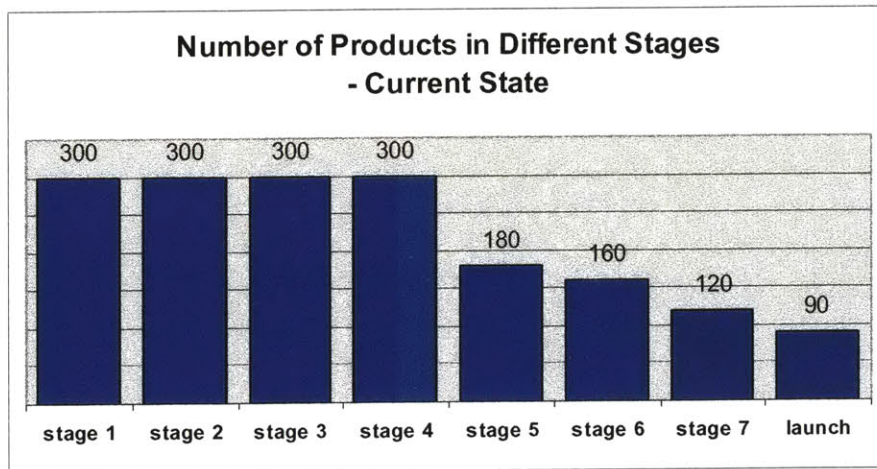
When looking at the process guideline, we do not see a clear screening selection mechanism in place forcing US-Footwear to focus their resources on selected products. The whole process could be characterized as changes and iterations. PMs tend to cast a huge net, asking for hundreds of models and multiple colorways, hoping that “just in case...” Product marketing teams change their minds frequently and ask for after-the-fact changes/revisions because they find it is so hard for them to make a firmed decision. Several product marketing vice presidents interviewed expressed their frustration in deciding who’s in and who’s out. Although they are the decision maker, unhappy regional managers or country managers can always go directly to their boss- senior vice president global footwear and ask for a product specially designed for their regions or countries.

A typical business unit at US-Footwear would brief and design more than two hundred models in the beginning and 70% of the projects will be dropped off later at different stages. To make things complicated, quite often the decision made is rather late. Figure 2 is a typical example showing number of products in different stages for each business unit. One thing to mention is that the salesmen samples actually are ordered before sales meeting and key accounts

meeting. This indicates that the feedback of the sales meeting and key accounts meeting are actually not fully integrated into the products creation process.

- ✓ Stage 1- Briefing
- ✓ Stage 2- Design
- ✓ Stage 3- Merchandising
- ✓ Stage 4- Line Confirmation
- ✓ Stage 5- Sales Meeting
- ✓ Stage 6- Key Accounts Meeting
- ✓ Stage 7- Sales Window

Figure 6: Number of Products in Different Stages- Current State



3.2.3. “Burger King” Approach

When asked why they make frequent changes, one vice president of a business line joked that they were actually pursuing a “Burger King” approach although they knew “McDonald” approach might be more efficient. At McDonald, the menu is standard; while at Burger King, they provide whatever customers want- cheese or no cheese, lettuce or tomato, etc. The interviewee said as they create the global line and it is hard not to provide country managers, key accounts, regional managers what they want. However, in the current system, these people were not involved until very late. Additionally, there was not a formal mechanism in the current system to absorb the feedback, consequently the feedback coming in an unsystematic way. As a result, the product marketing team made changes from time to time depending when they had the feedback.

3.2.4. Silo Based Communication

Most interviewees feel that US-Footwear is very vertically integrated company, and no one exactly know what people in other business units are doing. Or even they do, they do not care. As a result, there are lots of design duplications in different business units and considerable misunderstandings among PM, design and development. Besides, good practices and resources are not shared within the company either.

I. Duplications in Design

In US-Footwear no one is actually held accountability for the whole product family at the company level. One design director interviewed mentioned once there were 3 business units that were designing fashion running shoes for the same season with 4 models for each business unit. Personally he did not believe they would sell through all those twelve types of fashion running shoes.

II. Misunderstandings among PM, Design and Development

Designers interviewed described PMs as boxed, not creative enough to appreciate innovative ideas. Considering 70% of its products are sold under \$60, PMs felt designers just do not understand that US-Footwear is a commercial company rather than NASA, National Aeronautics and Space Administration where creativity dominating costs and commercialization. Additionally, one interviewee from research center was upset because PMs could not figure out what the end consumers' real expectation. If they could, research center should be able to perform the only needed tests instead of over-testing. One interviewee joked that "PM never know what they want; but they do know what they want tomorrow." "They change their minds like change socks". Of course, when you listen to PMs, you have totally different stories as already mentioned in the paper before.

3.2.5. Compensation & Rewarding Systems Were not Aligned With Performances

I. "Everybody is not doing everybody's job"

Although US-Footwear is a big company, it still appreciates entrepreneurial spirit- hero and breaking rules are often valued in the company. Probably they feel that in fashion business, which is defined as "emotional business" by some people, it might be a better idea to let individuals figure out what is going on. As a result, there is no clear and documented role/job description/responsibility for each position. While this type of entrepreneurial spirit works pretty

well in start-ups, it is not the same story for large companies. When there is lacking of a clear job description, people in different functions are likely to have different expectations even for one same position. When their expectations are not met, they felt upset. Here are some examples.

How Designers See Product Marketers?

Designers believe that PM should brief market vision/direction/insight, but often the time PMs are briefing shoes. Designers stated that PMs should actively predict the future market trend, but they are telling the stories what happened yesterday and are happening today. To make things worse, designers felt that PMs could not articulate what they want and could not make a firm decision when they should.

How Designers See Themselves?

Designers think they should have a free thinking environment to contribute innovative ideas based on the quality brief; but sometime they are doing marketing research themselves and trying so hard to convince PM what shoes might become a best seller. One Design director interviewed said they tore off Q3'03 PM brief, because it basically was the repetition of the last quarter. Things ended up they did the market research themselves and provided ideas to PM.

How Different Functions See US Development?

Designers interviewed generally felt that US development team is not helpful enough. They do not provide as much technical support as designers expect. Designers hope that development could act as strong back-ups to solve technical/construction problems; while in reality, development is more like a data entry and transporter. Specifically, when US development team hears some feedback from Asia development center, instead of trying to solve the trivial construction problems by themselves, they merely hand directly to designers to let them figure out how to change the design. Designers feel bad because they think their job is to take care of the cosmetics instead of construction. Plus they have to stop whatever things on hand and to do the changes/revisions.

Additionally, most designers believed that US development center did not have the capability to produce good looking prototype sample. That was the major reason why all prototype samples were created in Asia development center. Sometime, some designers even

by-passed US development center by sending the tech pack link to Asia development center directly and copying US development center at the same time. Although they are supposed to send tech pack firstly to US development center and then US development center transfer the tech pack to Asia development center.

One PM interviewed also questioned, “Why should we keep the development centers at two places?” “Why shouldn’t designers talk directly to Asia development center?”

Others had different perspectives for US development. One research and test director interviewed felt that US development team was the ear and eye of consumers, as they are closer to the market and know better about the products. If the whole product creation project is a big wheel, the interviewee thought US development is supposed to be the one in the hub who oversees the whole project and coordinates between PM, Design, Research and Far East development. The interviewee mentioned that most of US development team members do not have engineering background; this indicates that they are hired for project management instead of solving technical problems. The interviewee also believed that development is the appropriate people to act as the project managers as they know both product and research. Additionally, he did not think PMs are the appropriate candidate for project managers, as they are marketers and know little about how downstream work was fulfilled. Undoubtedly, PMs are actually the king in the process.

II. Performance Metrics are Silo Based Too

Although different department have it performance evaluation process, the performance indicators are function based rather than consistent among different functions and tied to the overall company objectives. For example, development is measured by the defects made; designers are measured by the innovative ideas; product marketers are measured by the revenue generated. However, return on investment (ROI) is not a key financial indicator in new products creation and it has not been translated into various metrics in different functions.

To make things complicated, directors are usually not involved in the performance evaluation for his/her subordinates; directors’ boss- vice presidents do. Consequently, directors find it so hard to motivate their teams, plus they probably know better their direct reports than anyone else. Additionally, PMs are not held account for costs. Although vice president for each

business lines is evaluated by the profit generated for the company, they are not effectively held account for the costs associated with new products creation. As all business lines share the same manufacturing facilities of producing prototype samples and mass production, the costs occurred there are not linked directly to each individual business unit. Therefore, individual business unit usually have no incentives to reuse molds and/or to save on tooling, which actually are quite significant costs.

Chapter 4. Review of the Best Practices in the Market

New product creation has been drawing considerable attention recently. A lot of research has been done regarding how to improve new product creation process and reduce the time to market. The author found that these researches approached the problem in four different angles. *The first part of researches* is focused on company strategy answering the questions of what the companies is actually competing for. Some researchers believed that companies competed for time; others thought that companies competed for core competencies. *The second part of researches* is focused on processes. Some researchers suggested that systematic approaches for new product creation would provide a useful roadmap for the companies; others advocated that tasks management tools would help companies manage their new product creation project better. *The third part of researches* is focus on product strategy and suggested use product portfolio management strategies and/or tactics such as concept testing to select the right products to develop. *The fourth part of researches* is focused on people and activities. They believe that one of the most important success factors in the new product creation is to select the right organizational structure and establish true cross-functional team who can work collaboratively on value-added activities. They emphasized on activities that benefit from the participation of all the core functions of the firm.

4.1. Focus on strategy

4.1.1. Time based competition

Time based competition is a strategy that many companies are using to differentiate their products from those offered by their competitors. This method suggested that firms can be more competitive by accelerating the time to market. It also stressed a holistic view of the whole process in order to achieve the overall time reduction.

Davis (1989) argues that “reducing the time from each product’s concept to its market delivery is intricately tied to a company’s success... the first company to market any new generation product inevitably will end up with the largest market share, the greatest overall profits, and the longest life cycle.” Vesey (1990) also believed that manufacturing firms of the 1990’s would either emphasize time to market or lose their competitiveness.

Smith and Reinertsen (1991) echoed Davis and Vesey's opinion and further emphasized that companies shifting from a cost to a time mindset. He pointed out several good reasons for using time as the focal point to build a competitive product creation process. The first was that time has become an area of great opportunity for improvement; technical advances together with ever stronger global competition have encouraged leading companies to search for ways of getting products to market much more rapidly. The second was that development speed was actually supplementing rather than replacing other development objectives such as design for quality or for low manufacturing cost, and time has become one more dimension to competitive advantage. He believed that still some of the benefits of fast product development were subtle and difficult to quantify but can nonetheless provided a great deal of competitive power; some companies used speed as a strategy to create a perception of excellence continually. In addition, Stalk (1998)'s research indicates that Japanese companies have used flexible manufacturing to attain time-based competitive advantages.

Several researchers, however, caution against blindly focusing on time to market. Clark and Fujimoto (1991) recommend that companies re-evaluate and streamline their new product development process, before trying to increase the number of products developed or accelerating the commercialization of innovations.

4.1.2. Core Competency

Prahalad and Hamel (1990) define core competence as "the collective learning in the organization, especially the capacity to coordinate diverse production skills and integrate streams of technology". They believe that companies should think of themselves as "portfolios of core competencies" rather than the commonly held view of corporation as "portfolio of business units". By thinking in terms of core competencies, companies can yield higher levels of commercial success, achieve market dominance and attain competitive advantages.

4.2. Focus on process

4.2.1. Funnel Screening

Hayes, Wheelwright and Clark (1988) emphasized that the funnel illustrated the framework firms ideally went through to identify many ideas, select the few most promising for development, and focus resources to get them into market. Wheelwright and Clark (1992)

further reiterated the importance of funnel screening as a useful leverage that differentiated problematic projects from outstanding projects. They summarized the central themes in ineffective and effective development projects as shown in Table 3.

Table 3: The Central Themes in Ineffective and Effective Development Projects

PROBLEMATIC PROJECTS		OUTSTANDIGN PROJECTS
Characteristics	Consequences	Selected Themes
Multiple, ambiguous objectives; different functional agendas	* Long planning stage; project become vehicle for achieving consensus; late conflicts	* Selected objectives and shared understanding of project's intent throughout organization; early conflict resolution at low levels
Focus on current customers and confusion about future target customers	* Moving targets; surprises and disappointments in market test; late redesign; mismatch between design and market	Actively anticipating future customers' needs' providing continuity in offerings
Narrow engineering focus on intrinsic elegance of solutions; little concern with time	* Slipping schedules; schedule compression in final phases	* Maintaining strong focus on time-to-market while solving problems creatively; system view of project concept
Reliance on engineering changes and manufacturing ramp-up to catch and solve problems; "we'll put a change order on it when we get to manufacturing;	* Poor, unrepresentative prototypes, many late changes; poor manufacturability; scramble in ramp-up; lower than planned yields	* Testing and validating product and process designs before hard tooling or commercial production; "design it right the first time"
Narrow specialists in functional "chimneys"	Engineering "pin-pong"; miscommunication and misdirected efforts; use of time to substitute for integration	Broad expertise in critical functions, team responsibility, and integration problem solving across functions
Unclear direction; no one in charge; accountability limited	Lack of a coherent, shared vision of project concept; buck passing; many false starts and dead ends	Strong leadership and widespread accountability

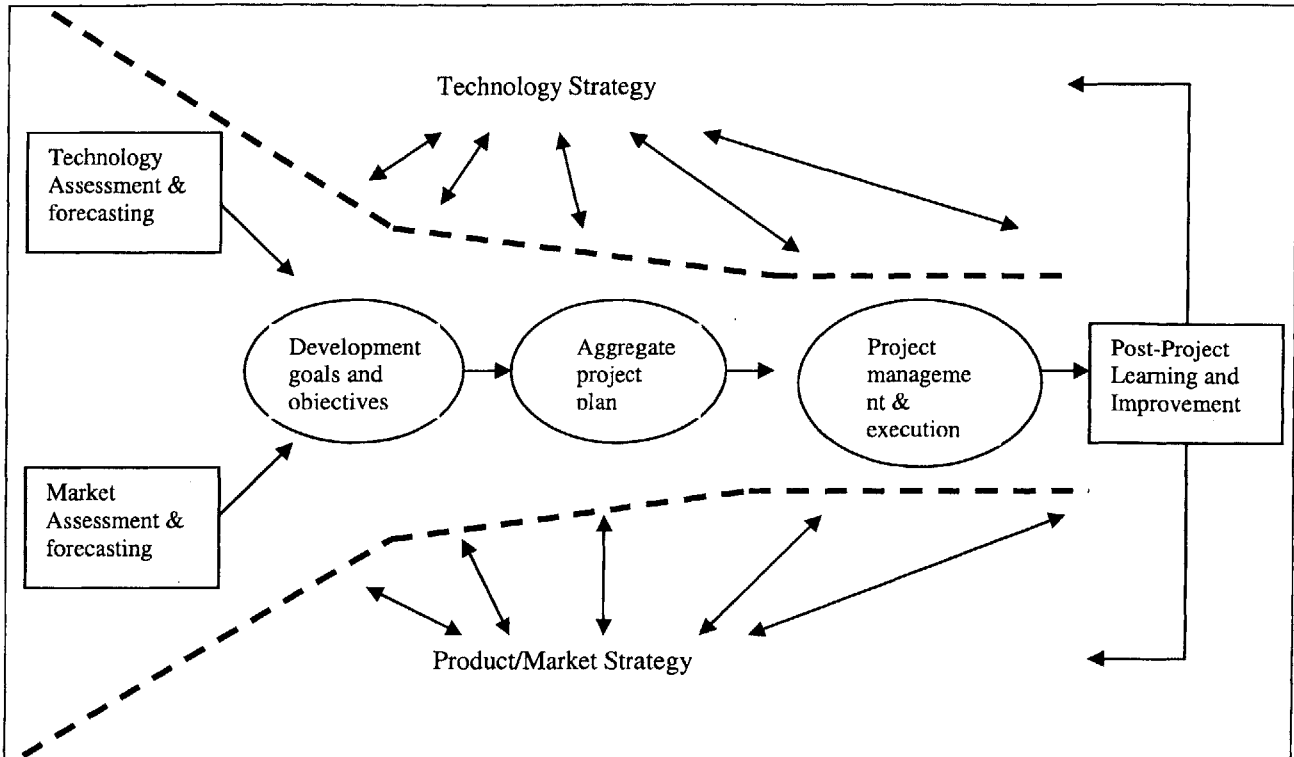
Wheelwright and Clark (1992) further pointed out the following pitfalls in new product and new process development from experience in a variety of firms and industries:

- ✓ The moving target
- ✓ Mismatches between functions
- ✓ Lack of product distinctiveness
- ✓ Unexpected technical problems
- ✓ Problem-solving delays
- ✓ Unresolved policy issues

They believed that a much more comprehensive framework for development strategy, as shown in Figure 7, provided a solution to leverage these problems. Using this proposed framework for development strategy, the technology and product / market strategies play a key role in focusing development efforts on those projects that collectively will accomplish a clear

set of development goals and objectives. In addition, individual projects were undertaken as part of a stream of projects that not only accomplish strategic goals and objectives, but lead to systematic learning and improvement. The dashed lines in figure 7 means fewer products.

Figure 7: Funnel Screening Framework

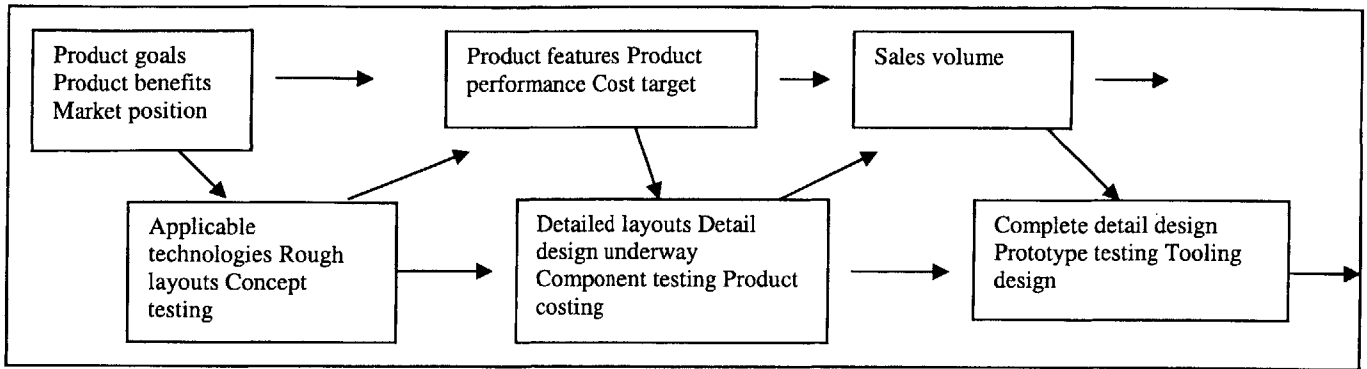


Source: Wheelwright & Clark (1992) "Revolutionizing Product Development"

4.2.2. Deal with fuzzy front end

Smith & Reinertsen (1991) found rich opportunities to save time at the beginning of the development cycle. Actions taken at the "fuzzy front end" give the greatest time savings for the least expense while these actions were frequently ignored because managers rarely focused on this stage of development. They suggested product planning and product design activities occurred concurrently rather than sequentially to deal with the fuzzy front end.

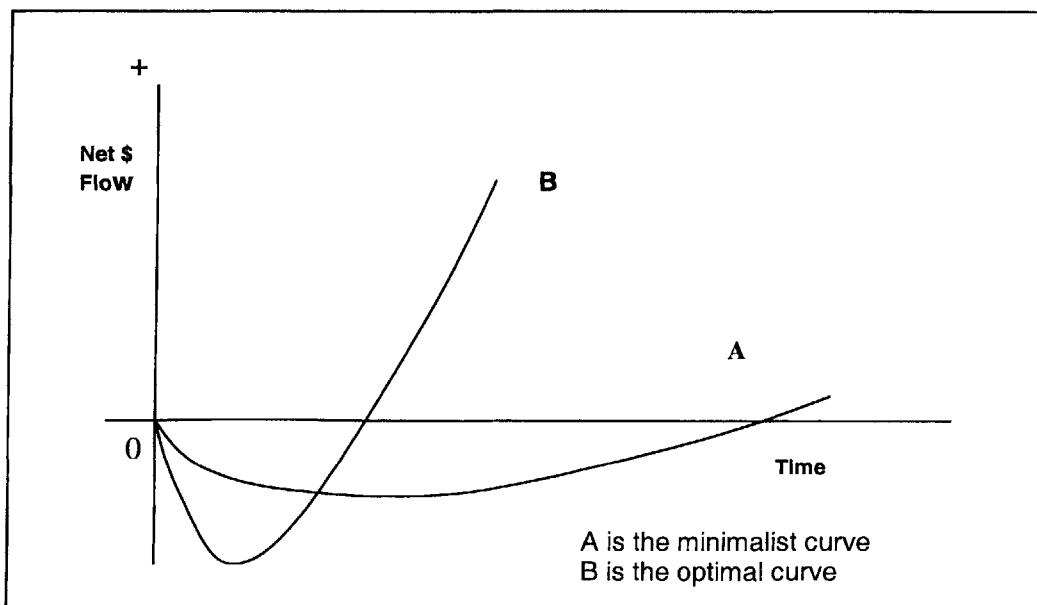
Figure 8: Concurrent Product Design Activities



Source: Smith & Reinertsen (1991) Developing Product in Half the Time

John Preston (1997) described two different common investment strategies. These two strategies are illustrated in Figure 9- Invest Early to Deal with Fuzzy Front End. Strategy A is to invest conservatively, in small amount over a long period of time. Strategy B is to do the majority of the investment heavily very early in the project. This yields more profits in shorter time. Preston (1997) thought cure A was problematic also because it created a wide window of opportunity for a competitor to come in more aggressively on the B curve and kill them. This investing heavily in the early stage coincides well with the comprehensive up-front planning. Comprehensive up-front planning requires certain amount of resources allocated early to guarantee the expected output of the up-front planning. Conversely comprehensive up-front planning will justify whether accelerating investment in a certain project is a good decision.

Figure 9: Invest Early to Deal with Fuzzy Front End



4.2.3. Systematic framework

Robert G. Cooper (2001) summarized fifteen success factors that made the difference between winning and losing. He pointed out that the challenge facing the companies was to design a blueprint or process for successful product innovation – a process by which new product projects could move quickly and effectively from the idea stage to a successful launch and beyond. He claimed that a multistage, disciplined and systematic new product process was the solution for many companies who faced the broken product innovation process. He emphasized that managing a new products program without a process in place is like putting a dozen players on a football field without huddled or preplanned plays and expecting them to score. He coined the Stage-Gate™ approach and believed that it would act as a blue-print and roadmap for managing the new product project, therefore improving its efficiency and effectiveness. Below is a typical model of Stage-Gate approach.

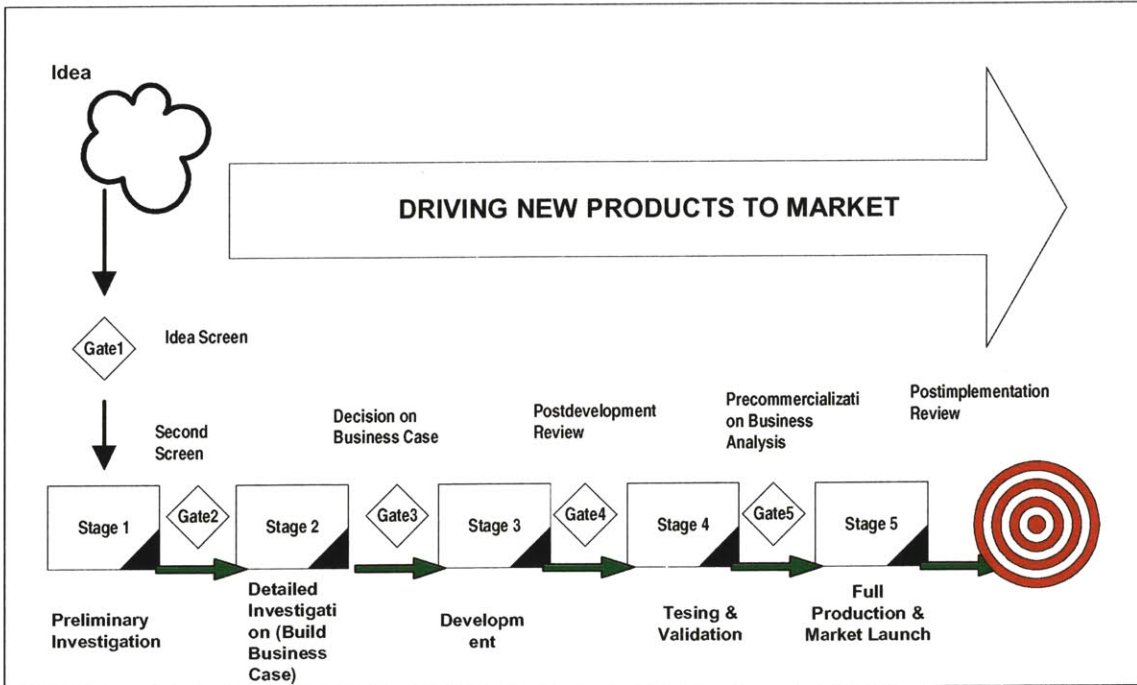
Table 4: Critical Success Factors in Product Innovation

Fifteen Critical Success Factors in Product Innovation

1. A unique superior product
2. A strong market orientation
3. Look to the world product- international orientation
4. More predevelopment work
5. Sharp and early product and project definition
6. Well-conceived, properly executed launch
7. Right organizational structure, design, and climate
8. Top management support
9. Leveraging core competencies is vital to success
10. Products aimed at attractive markets do better
11. Build tough go/kill decision points
12. New product success is controllable
13. The resources must be in place
14. Speed is everything
15. Multistage, discipline new product process fare companies much better

*Source: Robert G. Cooper (2001) *Winning at New Products**

Figure 10: A Typical Stage-Gate™ Model



Source: Robert G. Cooper (2001) *Winning at New Products*

4.3. Focus on Task Management Tools

Ulrich and Eppinger (1995) believed that it is important to understand the different tasks and their relationship in the products creation. Specifically, they label the tasks as *sequential, parallel, and coupled*. When task B was dependent on task A if an output of task A is required to complete task B, task A & B are sequential tasks. When task B and task A could deal with separately, task A and B are parallel tasks. When task A and B are mutually dependent, say to start B, A has to be initiated; however, to complete A is dependent on the output of B, then task A and B are coupled. Techniques as DSM (the Design Structure Matrix), Gantt chart and PERT (Program Evaluation and Review Technique) chart could help to identify what the type of relationship and how tasks are relate to each other.

4.3.1. The Design Structure Matrix (DSM)

A useful tool for representing and analyzing task dependencies is the design structure matrix (DSM). This method was originally developed by Steward (1981) for the analysis of parametric description of designs and has recently been used by Eppinger (1994) to analyze

development projects modeled at the task level. Figure 7 is an example of DSM. “A~N” represent different tasks and “x” indicates that another task needed in fulfilling the current task.

Figure 11: Illustrative Example of DSM

Task	A	B	C	D	E	F	G	H	I	K	L	M	N
Receive and accept specification A	A												
Concept generation/selection B	X	B											
Design beta cartridges C	X	X	C										
Produce beta cartridges D			X	D									
Develop testing program E	X	X	X		E								
Test beta cartridges F			X	X	X	F							
Design production cartridge G	X	X	X			X	G	X	X				
Design Mold H	X	X				X	X	H	X				
Design assembly tooling I							X	X	I				
Purchase assembly equipment J	X	X	X	X	X	X	X	X	X				
Fabricate molds K	X	X	X	X	X	X	X	X	X				
Debug molds L	X	X	X	X	X	X	X	X	X				
Certify cartridge M													
Initial production run N													

Source: Ulrich & Eppinger (1995) *Product Design and Development*

4.3.2. Gantt Charts & PERT Charts

A Gantt chart determines the timing of the tasks, but did not explicitly display the dependencies among tasks. Figure 12 is an example of Gantt chart. PERT (Program Evaluation and Review Technique) charts explicitly represented both dependencies and timing, in effect combining some of the information contained in the DSM and Gantt chart. Figure 13 is an example for ‘activity on nodes’ form of the PERT chart. The critical path, which takes longer time to finish, was designated by the thicker lines connecting tasks.

Figure 12: Illustrative Example of Gantt Chart

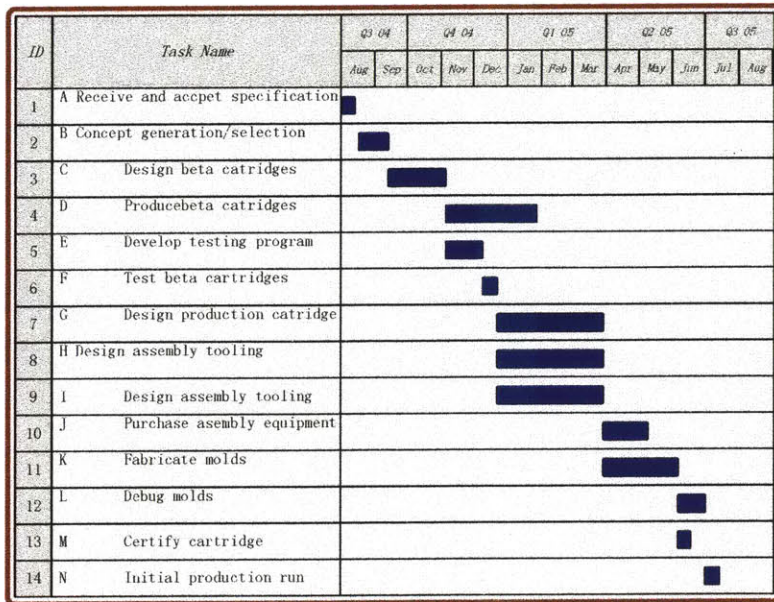
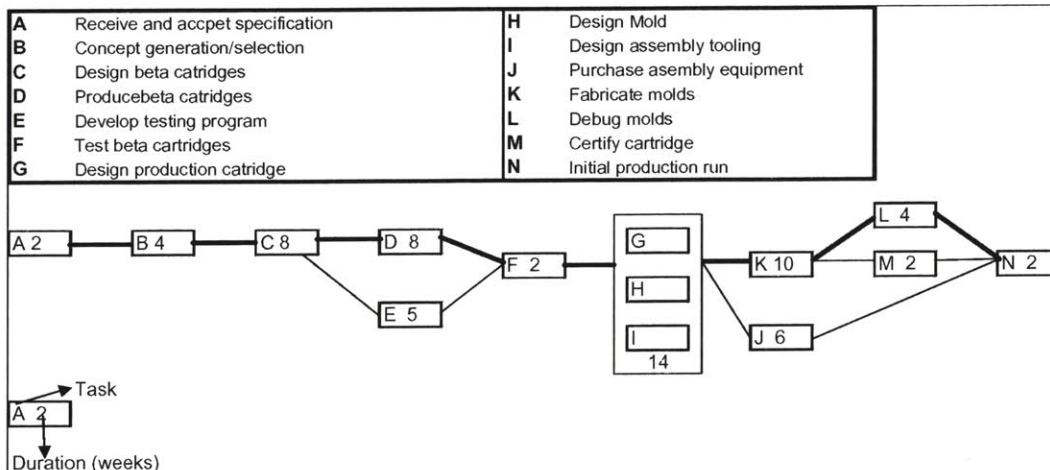


Figure 13: Illustrative Example of PERT Chart



Source: Ulrich & Eppinger (1995) *Product Design and Development*

4.4. Focus on Product Management

4.4.1. Product Family Evolution and Platform Performance Metrics

Many researchers believed that product family evolution and platform performance metrics provide insights of how efficiently a company develops new products and how effective the products are. According to Meyer and Lehnerd (1997), a product platform could be defined as a

“set of subsystems and interfaces that form a common structure from which a stream of derivative products can be efficiently developed and produced”. A platform extension is a product that particular subsystems within the original product platform are substantially changed and/or that new subsystems are added without disturbing the primary subsystems and interfaces in the existing platform. A derivative product is a series of follow-on products that improve the functionality and/or cost incrementally.

Many studies have shown the usefulness of the concept of product platform in industrial practices in relating to product/ market strategy, core capabilities, and renovating product line. (Wheelwright and Clark, 1992; Meyer and Utterback, 1993; Meyer and Lehnerd, 1997). A platform approach to product development helps to reduce the development cycle time when a company introduces successive products. By sharing a common structure and components, platforms significantly save development resources, too. The product platform approach also addresses the issue of product variety. Modifying subsystems in the platform can efficiently create wide product variety. A carefully designed platform can also serve as a leverage to prevent cannibalization of products that often inevitably occurs with the rapid product introduction. Examples of such platforms include the tape transport mechanism in the Sony Walkman, the Apple Macintosh operating system, and the instant film used in Polaroid cameras. (Ulrich & Eppinger 1995) However, in reality companies often find it not easy to differentiate platforms with extensions.

4.4.2. Concept Testing

Lehmann and Donald (1989) defined concept testing as the process of screening consumers reactions towards new product ideas. They showed concept testing was useful to:

- ✓ Develop a preliminary notion of the likely commercial success of the idea
- ✓ Determine who would be the most interested in the new products
- ✓ Gather information important to the direction of future product design
- ✓ Gain insight on the alternatives presented in bringing the product to market

Concept testing sequence consist the following type tests:

- ✓ Concept Screening
- ✓ Concept Generation
- ✓ Concept Evaluation /Position
- ✓ Concept Product Tests

Concept screening presents a respondent with up to fifty short neutral concept statements. They are rated by such questions as intention to purchase, interest, liking, uniqueness or

believability. Sample sizes range varies from dozens to hundreds, depending on how many concepts are involved. Concept generation is to produce a clear and concise statement that tells all about the concept. This is often done through the use of focus groups or several personal interviews. The focus group or interviewees would be given a preliminary concept statement and asked to respond to it. Concept evaluation/ position represent the first attempt at measuring the consumer's response to the concept statement quantitatively. Concept product testing typically involves the use of a prototype sample. This stage also involves the use of conjoint analysis and test markets.

4.4.3. Portfolio Management

According to Cooper, Edgett and Kleinschmidt (2001), portfolio management is the optimal investment mix of new products creation between risks versus return, maintenance versus growth, and short-term versus long-term. They pointed out that portfolio management for new product was a dynamic decision process wherein the list of active new products and Research and Development projects is constantly revised. They believed that when lacking portfolio management, the company was reluctant to kill projects, therefore there would be too many projects and resources were thinly spread. Eventually this would increase time to market and result in higher failure rates.

Liyanage, Greenfield and Don (1999) referred to more than 200 quantitative and qualitative methods for selecting Research and Development projects. The following are some of the models.

4.4.3.1. Financial or Economics Models

These models treated project evaluation much like conventional investment decision. Traditional computation approaches such as payback period, break-even analysis, return on investment and discounted cash flow & net present value, and internal rate of return (IRR) methods are used.

4.4.3.2. Scoring Models and Checklists

Scoring models and checklists required a well-informed management group to assess the project on a variety of characteristics. Such methods rely more on subjective assessment of strategic variables, such as fit with corporate objectives, competitive advantage, and market attractiveness.

4.4.3.3. Probabilistic Financial Models

Probabilistic financial models are developed from financial and economic models so as to better handle the element of risk and uncertainty evident in most development projects. The two major approaches are Monte Carlo simulation and Decision Tree Analysis. Monte Carlo simulation creates multiple scenarios representing the possible financial outcomes of a project. From these many scenarios, a distribution of financial outcomes is generated. Two commercially available Monte Carlo software models are At Risk and Crystal Ball. In Decision Tree Analysis, the project is reduced to a series of decision, activities, and outcomes in a tree-and-branch format. Probabilities of each branch or outcome occurring at each decision point or activity are noted on the branches, as well as the financial consequences of each outcome. The expected value is simply the probabilities of the outcomes times their financial consequences.

4.4.3.4. Behavioral Approaches

The techniques are designed to bring managers to a consensus and include a variety of methods such as:

Modified Delphi method: This is a facilitated behavioral process wherein a group of decision makers engage in open discussion, followed by individual decision making.

The Q-short method: Each participant was given a deck of cards, each card describing a project. Following a discussion on all the projects, each member then sorts and resorts the deck into five categories, from a “high” group to a “low” group, evaluating each project according to a pre-specified criterion.

4.5. Focus on People and Activities

4.5.1. Organizational Structure

Wheelwright & Clark (1992) identifies four dominant structures around which project activities can be organized. Ulrich & Eppinger (1995) further emphasized that successful firms must organize their new products creation staff effectively and reiterated the four types of structure. The four basic types of development team structure are:

4.5.1.1. Functional Team Structure

This is the traditional type of organization found in large, more mature firms. People are grouped together mainly by discipline, each working under the direction of a specialized sub-function manager and a senior functional manager.

4.5.1.2. Lightweight Team Structure

Like the functional structure, those assigned to the team reside physically in their functional areas, but each functional organization designates a liaison person to “represent” it on a project coordination committee. The project manager in this approach is a “lightweight” in two important respects. First, he or she is generally a middle- or junior-level person who, although having considerable expertise, usually has little status or influence in the organization. Second, although they are responsible for informing and coordinating the activities of the functional organizations, the key resources remain under control of their respective functional managers.

4.5.1.3. Heavyweight Team Structure

The heavyweight project manager has direct access to and responsibility for the work of all those involved in the project. Such project leaders are “heavyweights” in two respects. First, they are senior managers within the organization. Second, heavyweight project leaders have primary influence over the people over the people working on the development efforts and supervise their work directly through key functional people on the core teams.

4.5.1.4. Tiger Team

Under this structure, individuals from the different functional areas are formally assigned, dedicated, and co-located to the project team. The project leader is a heavyweight in the organization and is given fully control over the resources contributed by the different functional groups.

The most appropriate choice of organizational structure depends on which organizational performance factors are most critical to success. Functional organizations tend to breed specialization and deep expertise in the functional areas. Tiger team tends to enable rapid and effective coordination among diverse functions. Matrix organizations (lightweight and heavyweight), being hybrid, have the potential to exhibit some of each of these characteristics. Different companies need to consider their specific situation before choosing the appropriate type of organization. Ulrich & Eppinger (1995) suggested companies look into the following questions to guide their choice decision making.

- ✓ How important is cross-functional integration?
- ✓ How critical is cutting-edge functional expertise to business success?
- ✓ Can individuals from each function be fully utilized for most of the duration of a project?
- ✓ How important is product development speed?

4.5.2. Cross-functional Team Building and Problem Solving

A cross-functional team refers to the involvement of members from different functions or disciplines who work together toward common and individual goals. Many researchers believed that companies increasingly turned to cross-functional teams as an element in achieving faster times to market. Research in this area fell into three broad categories: those that talked about the importance of cross-functional teams, those that discussed challenges faced by organizations implementing teams, and those that discussed the limits of using teams.

4.5.2.1. The importance of Cross-functional Teams

Many studies of companies such as HP, 3M, AT&T, Merck, Hoffman-LaRoche, Northern Telecom, Canon, Xerox, and Honda show that cross-functional teams work well for new product development. (Albert, Barry & Albert 1991; Bredine 1991; Merrills 1989; Nevens, Summe & Uttal 1990; Posnick 1987; Quinn 1985) In addition, some empirical work (Ancona & Caldwell, 1990; Magjuka & Baldwin 1991) reflects that new product teams use their ability to draw from broad perspectives, work in parallel, and better communicate and coordinate with other parts of the organization to react quickly to project needs.

More specially, researchers have discussed cross-functional teams as way to: reduce time to market (Bower & Hout 1988; Cordero 1991; Lorenz 1990; Vesey 1991), develop better products (Clark & Fujimoto 1990; Nonaka 1991), reduce production costs (Vesey 1991; Whitney 1988) and increase the probability that the product will succeed. (Bredine 1991)

4.5.2.2. Limits of the Use of Cross-functional Teams

In examining successful projects – Honda City, NEC PC8000, Canon AE-1, and projects at 3M and Xerox- Takeuchi and Nonaka (1986) suggested that the use of cross functional teams had its limits. First, the use of teams took a great deal of efforts to implement correctly. Secondly, teams may not be most suitable to create breakthrough technologies that require revolutionary innovation. Thirdly, innovations driven by an individual who makes the invention and details a set of specifications for others to follow are not suited to the team approach.

4.5.2.3. Challenges Faced in Implementing Cross-functional Teams

Despite the limitations of cross-functional teams, the theory, anecdotes, and empirical research that lauds the use of teams remains compelling. Ancona and Caldwell (1990) suggested

that actually companies can use organizational norms to foster team performance. In doing so, companies who want to successfully implement cross-functional teams need to: determine team characteristics; communicate a clear operating vision; foster communication and a cooperative environment; balance control with empowerment; provide appropriate feedback and rewards; develop team management and facilitation skills; make sure the team has the necessary resources; and provide mechanisms to integrate the team's knowledge into the firm.

4.5.3. Post Project learning

Wheelwright & Clark (1992) claimed that the goals of post-project learning were to ensure that the lessons available from each project are identified, shared, and applied throughout the organization. In doing so, it closes the loop on continuous improvement by strengthening the foundation for the next iteration of the development strategy. To make continuous improvement a reality, the post-project phase of the development strategy needs to address the how, who, what, and where of such learning. A typical how is the project audit who seeks to identify the lessons learned and determine how best to apply them. The *who* consists of the entire organization. The *what* involves investing- in training, new tools, and new skills. The where is largely in the development projects themselves, targeting some to demonstrate new tools, others to train new people, but all to improve incrementally the organization's collective capabilities.

Chapter 5. Recommendations

US-Footwear is doing well in terms of today's industry game rules. However, if they think forward and get themselves prepared for the possible new market environment where game rules has been changed, they may need to be more efficient and more responsive. This shall require them to rethink about the ways they are creating new products. Innovation changes should be needed if they want to greatly reduce the time to market and stay a sustainable competitive position in the market. The author recommended that they might want to consider the following three areas to start the journey.

5.1. A Systematic Approach will Provide A Useful Roadmap

Although US-Footwear has a calendar planner to guide the process, that planner does not have mechanism to foster communication, to structure decision making and to hold accountability. It is not surprising in reality; only less than half of the projects actually follow the calendar. This explains why the middle objectives are often missed and the projects are often turned into rush programs eventually. This also explained why there is so much tension in the system and why design and development are overwhelmed. A systematic framework control mechanism, on the opposite, will force a timely and informed decision making. More specifically, a mechanism providing an open platform will absorb as many good ideas as possible from various resources in the earliest stage of project. This will help with project scoping. Besides, if product marketers are held account for the return of the project, they would have more incentives to kill the projects before it is too late.

5.2. Product Management strategies are Useful in Selecting Right Products

The author also found that US-Footwear does not have clear product management strategies to oversee the whole product family from company level and to differentiate products in design and test. As a result, each quarter, almost every business unit briefs and designs new products from scratch; there is no briefing template to refer to. Additionally, because every business unit works separately in designing, there are a lot of duplications in design which cause huge wastes of resources. As there is not a clear product strategy which can be translated into detailed product expectation, basically each product is designed and tested equally using the highest standards regardless of their final distribution channel. For example, basketball team

shoes worn by athletes need the highest standards of design and wear testing; but basketball non team shoes worn by individuals may be a different story. The kind of “over engineering” and “over testing” is waste of both money and time. This also partly explains why design, development and research center strongly feel understaffed.

5.3. Cultural and Organizational Issues

The entrepreneurial spirit culture reflects in the organizational structure is that US-Footwear is very vertically integrated company. Limited cross functional communication and collaborative decision making happens in work. Design, development and research center feel that they are treated as “service”. Because there is lacking of truly two-way communication, it is very rare that a job could be done right at the first time; iterations and changes are common in the process. Even sales people are not involved in the process until very late in the sales meeting. One senior sales people interviewed put this way: they (US-Footwear) ask someone to design shoes and ask another one to sell whatever designed.

Chapter 6. Stage-Gate™ Model at the US-Footwear

Robert Cooper (2001) developed the Stage-Gate process based on extensive market and industry research. Although Hayes, Wheelwright and Clark (1988) emphasized the importance of the funnel screening, they did not actually advise how to structure the funnel screening mechanism in real life. Cooper (2001), on the opposite, made it possible by suggesting a “gate” filtering process fulfilled before the project moving on to the next stage. This effectively forms a funnel screening process.

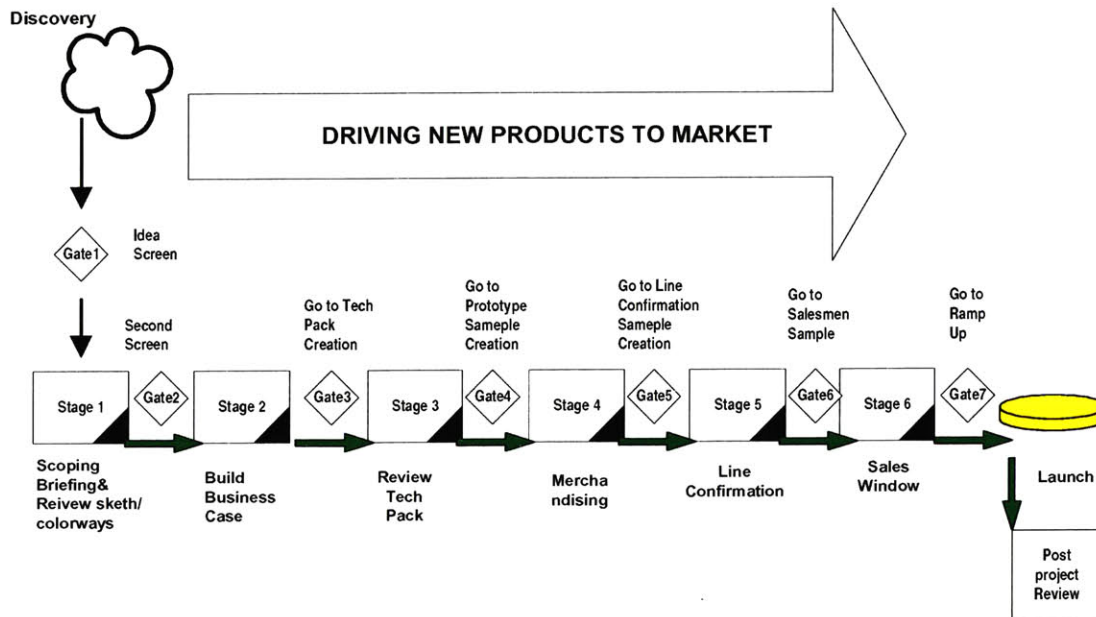
A well defined Stage-Gate model will fit well with US-Footwear’s current situation, because it will make two things happen - informed decision making and accountability. By doing so, it will also greatly take away hassles currently existing in the system. Specifically, the go/kill decision check-points will require multidisciplinary team working in the early stages, which will effectively foster the soil for better cross functional communication. The tough go/kill decision check-points will force the firm to make informed and firm decisions in a timely manner and avoid after-fact changes. Stage-Gate process will virtually help with structuring a funnel screening process, which allows designers and development people to focus their limited resources on targeted products. Ideally, this will also increase the winning odds of new products.

To sum up, US-Footwear should consider adopting a Stage-Gate model firstly to start the long journey of reengineering their new products creation process; because it will effectively help US-Footwear to be more efficient and it will also provide huge potential to reduce the time to market. After that, the company may want to embed appropriate product management strategies during the process to further increase the winning odds of new products in the market. Figure 14 is a first cut Stage-Gate Model at US-Footwear.

6.1. Stage-Gate Model

The main purpose of the Stage-Gate model is to provide a more open platform in the beginning in an attempt to absorb as many ideas as possible. The company certainly does not want to miss any good ideas. As there is little cost associated with the number of products in the very beginning, too many ideas are not a problem. As the project goes on, the costs associated become more and more large, the Stage-Gate model provides mechanism to kill those unpromising products before they consume too much resources.

Figure 14: Stage-Gate Model at US-Footwear



The author reorganized the processes into six milestones/stages.

a) *Discovery ~ Gate 1 (Idea screen)*

The purpose of this phase is to provide a very open platform to absorb the new ideas and then make a first screen. During this phase, interesting products would be sketched quickly by designers for preliminary screening purpose. This phase does not officially discussed in the current stage but the author believed it is very important to widen the funnel mouth so as to attract as many good ideas as possible and not to miss any good ideas.

b) *Stage 1 (Scoping) ~ Gate 2 (Second Screen)*

The purpose of this phase is to define products to be designed and provide context stories for discussion. Designers would produce the colorways for discussion. This phase does not officially exist in the current stage either but the author feels it is critical to do more comprehensive analysis in the up-front to get better understanding of products and markets. This phase is a kind of workshop. After the second screening, the selected products will go to business case building process.

c) Stage 2 (Build Business Case) ~ Gate 3 (Go to Tech Pack Creation)

The purpose of this phase is to build the business case for each product to be designed: consumer segments, targeted channel, selling price, cost, context story, a preliminary forecast of the demand, etc. After the gate filtering process, the selected products will go to tech pack creation process.

d) Stage 3 (Review Tech Pack) ~ Gate 4 (Go to Prototype Samples Creation)

This is a process of review the tech package between designers and development people considering the materials availability, manufacturability, rough margin analysis, etc. After the gate filter process, the selected products will go to prototype samples creation process.

e) Stage 4 (Merchandising) ~ Gate 5 (Go to Line Confirmation Samples Creation)

This is the first time the real 3-D samples of the products are displayed. The purpose of this phase is to review the prototype samples and confirm the merchandising factors for each specific product. After the gate filter process, the selected products will go to line confirmation samples creation process. The prototypes of the selected products will go to fit & wear testing, as well as footwear forecasting group.

f) Stage 5 (Line Confirmation) ~ Gate 6 (Go to Salesmen Samples Creation)

This is the event to confirm the new products line. The purpose of this phase is to review line confirmation samples and investigate each product from a holistic view, taking into account the cosmetic looks, demand analysis, materials availability, manufacturability, margin analysis, channel analysis, consumers' mentality analysis, testing results, etc. After the gate filtering process, the selected products will go to sales sample creation process. This is the final chance for the firm to do the reality check before deciding what to present to retailers.

g) Stage 6 (Sales Window) ~ Gate 7 (Go to ramp up)

This is the event that sales present the samples to retailers. Retailers may place orders for those products they like. After this phase, the favored products will go to production ramp up.

6.2. Mapping New Products Creation Process – Future State

Table 5 shows the proposed future state of new products creation process, explaining what the six stages are; who are involved in each stage; what the main activities are in each stage; what outputs are for each stage; and how many products are in the process before the gate and after the gate, etc.

Table 5: Mapping New Products Creation Process – Future State

	Stage	Time (wks)	Time elapsed (wks)	Who's involved	Main Activities	Results	Remarks (Before/After Gate)
	Discovery	4	4	Everyone in the company.	Brainstorm ideas, Designer hand sketch shoes	Selected products go to create colorways for workshop purpose	400/300
1	Scoping	1	5	PM, Designing, sales, marketing, development	Review colorways and decide which one to build business case upon.	Selected products go to build business cases.	300/200
2	Build Business Case	1	6	PM	PM define products in a clear and detailed way.	Selected products go to create tech packages.	200/150
3	Review Tech-Package	6+0.5+1	13.5	Design, development, FE development	Investigate the materials availability, cost, construction methods, etc.	* Hand off the tech-pack to FE development * factory order materials	150/100 6 wks- produce tech pack 0.5 wk- review 1 wk – possible changes to tech pack
4	Merchandising	1.5+1+2+0.5	18.5	PM, design, marketing, sales, key accounts, development	Review the prototype samples and investigate products from merchandising point of view	* Selected products go to line confirmation samples creation process * Factory produce line confirmation samples	100/80 1.5 wk- prototype creation 1 wk- samples shipping 2 weeks- merchandising meeting 0.5 wk- changes to selected tech-pack if necessary Note: no major materials changes, factories no need to order additional materials
5	Line Confirmation	1+1+3+0.5	24	PM, sales, marketing, key accounts, design, development, FE development center, factory	* Review the line confirmation samples and decide which products go to salesmen samples	Selected products go to salesmen samples creation process	80/70 1 wk- line confirmation samples creation 1 wk –sample shipping to the US 3 wks- line confirmation meeting 0.5 wks- possible changes to tech pack
6	Sales window	1+1+4	30	Sales, retailers	Sales force present samples to retailers	Retailers place orders	70/60 1 wk- factory produce salesmen samples 1 wk- sample shipping 4 wks- sales window open & close

One of the distinguished features of the Stage-Gate process is the Gate filtering process. Informed decision would be made during the gate filtering process to decide whether a certain product should go to the next stage processing. By doing so, a funnel screening structure is effectively formed. Figure 11 shows how many products would be in different stages in the future. Figure 12 compares the timeline between the current state and proposed future state.

Figure 15: Number of Products in Different Stages – Future State

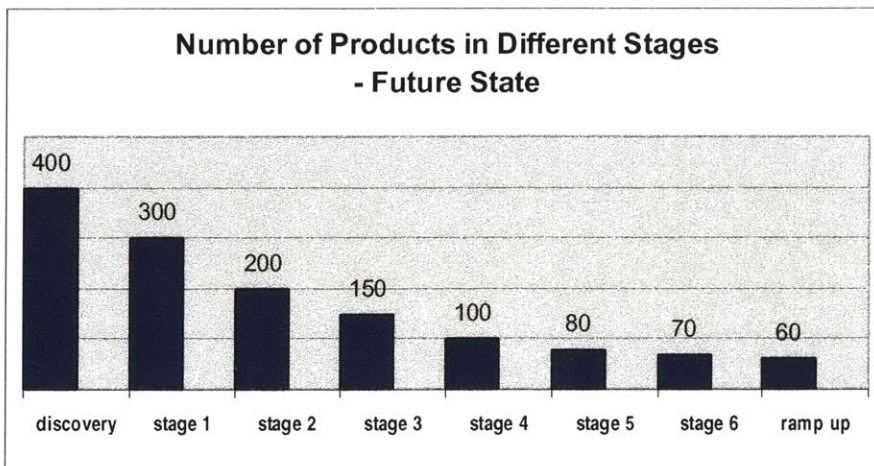
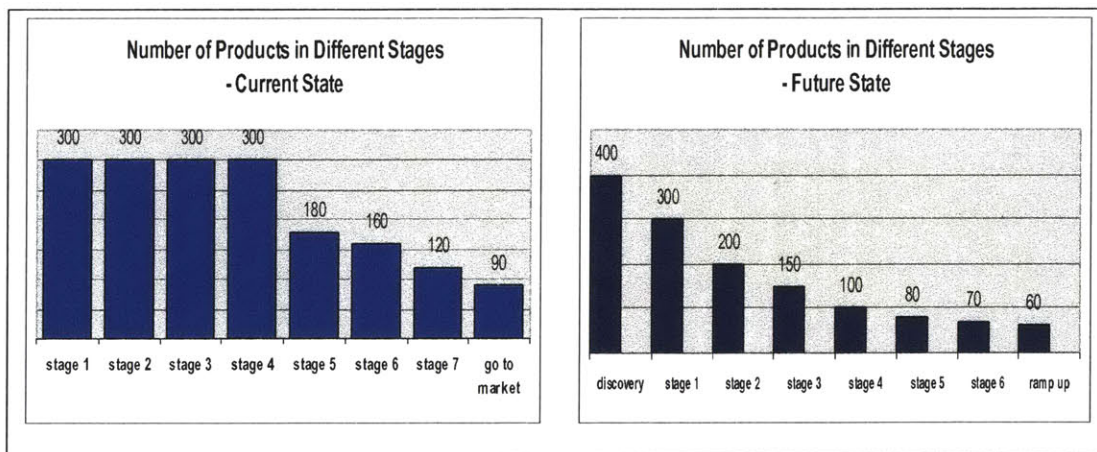


Figure 16: Comparison of Current State ~ Future State - # of Products in Different Stages



6.3. Improved Time to Market

Huge benefits could be foreseen both from quantitative and qualitative point of view by adopting the Stage-Gate model.

6.3.1. Cycle Time Reduction

Cycle time reduction sources consist of but not limited to the following:

- **Some Activities Are Eliminated**

By reshuffling the milestones in the project, some lengthy activities would be eliminated.

For example, sales meeting and key accounts meeting will be embedded in the different stages from the very beginning.

- **Fewer Products in a Certain Stage**

Fewer projects in the time consuming stages such as design, samples creation, will result in less time needed for that stage.

- **No After-Fact-Changes**

Go/kill decision will basically eliminate after-facts-decisions, so that repeated changes/revisions will be greatly reduced.

- **Factories Do Not Need to Order Materials Repeatedly**

Factories do not need to order materials in an iterative basis anymore in the proposed future state. Currently, multiple rounds of materials ordering are needed for factories because of the constant and dramatic changes in design. That each time factories order additional materials means adding three to four weeks into the whole process. Currently factories at least order three time for raw materials. The first order occurs for the prototype samples; the second order occurs for the line confirmation samples; the last order is for the sales samples. In the future, factories basically order materials one time in the beginning after the firm has decided which products to go for prototype samples.

Figure 17 and Figure 18 illustrate the timeline in new products creation process - current and proposed future state. This paper assumes that designing efforts and samples creation efforts are proportional to the number of products in that specific stage. This paper also assumes that factories only need to order materials once.

Based on the current practices, the time from an idea generated to the time when the sales window closes is about 46 weeks- or roughly eleven and half months. We note that it takes two weeks in briefing. Based on proposed future state, the overall time elapsed will be reduced to 30

weeks- or roughly seven and half months. A time saving of four months should be achieved even additional “discovery” and “scoping” stages are added in the up-front.

Figure 17: New Products Creation Timeline – Current State

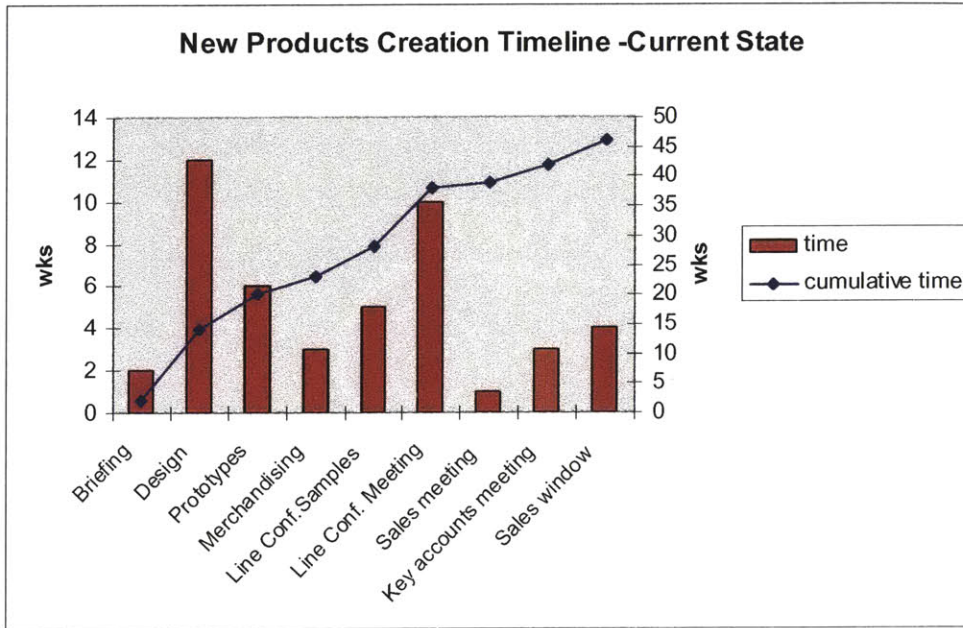
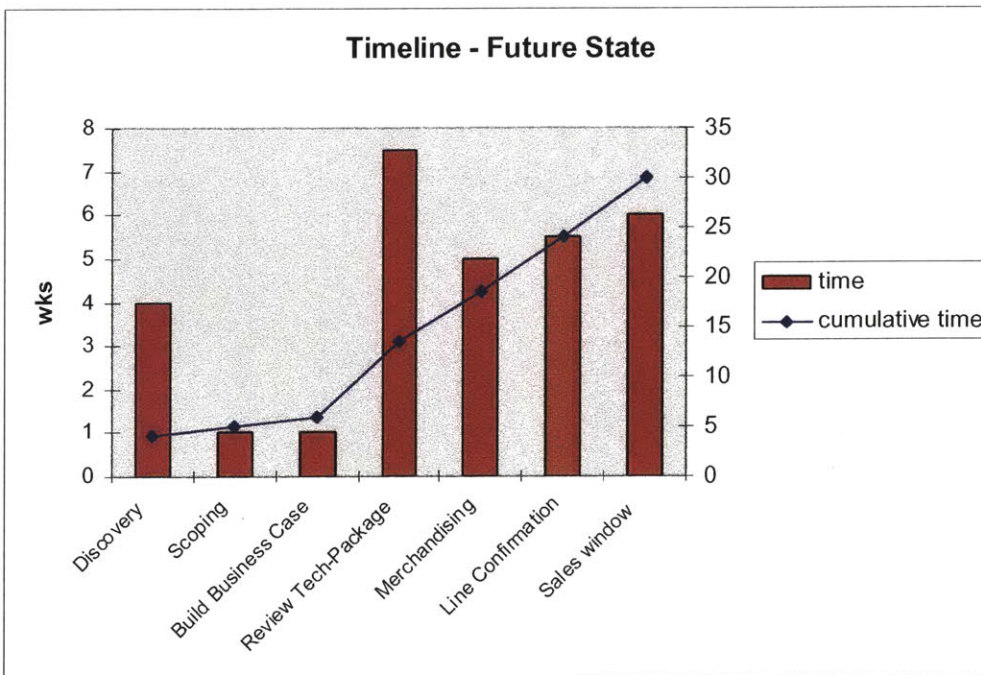


Figure 18: New Products Creation Timeline – Future State



6.3.2. Qualitative Benefits

The author believes that by forcing an informed decision making at each gate, US-Footwear could basically strike tension and hassles out of the system. Design, development & test can focus their resources & attention to the selected products. Thus designers would have more free thinking time and would improve the quality of the design. Most importantly, people from different disciplines would be motivated and communicated collaboratively; this is especially important to motivate design, development and testing people.

Chapter 7. Issues and Next Steps

The author feels that it is not an easy task to convince the executive team of the company and key stakeholders to pursue a reengineering program like this. A systematic approach will require fundamental changes in the company culture and the way it's doing business, which is always painful. This is especially true when the company is still profitable and successful. Even after the executive team agrees to do so, it is critical to seek their full and strong commitment during the project implementation, mainly because implementing Stage-Gate process itself may be not as straightforward as it looks.

Additionally, instead of implementing the model in all business units simultaneously, the author suggests that the company may want to do a pilot project in a selected business unit. In doing so, the firm would get themselves comfortable with the new process before they move on to other business units. This is especially important from the learning curve point of view. Besides, this also avoids the risk of possible disruptions in the market offering when a sudden change happens in the entire new product creation process.

7.1. Stage-Gate Model Implementation Problems

Many questions should be answered, here are the main examples:

- ✓ How difficult is it to reorganize the key activities in the processes?
- ✓ Who will be in the product committee?
- ✓ Who will be involved in the cross-functional team at different stage?
- ✓ Who are the voters making go/kill decision?
- ✓ How to set up a generic template –a clear and quantified go/kill criteria and metrics for all business unit purpose?
- ✓ How to configure the generic template to the unique needs of each business unit considering the different products they design?
- ✓ Who will lead the cross-functional team communication in each stage?

Actually we probably need to answer most of the questions in each stage for every business unit in details in order to implement the model in real life. Consequently, the implementation of the model for each stage in every business unit can turn into a mini-project. It can imagine that the whole project is a huge project requiring lots of resources and efforts. It is also a time consuming project.

The author also feels that the model may be needed to implement in two different levels in order to fully take advantages of its benefits- the business unit level and the company level. This paper has discussed the model in the business model in the previous chapter. However, as this paper mentioned earlier, there is not a systematic mechanism in the current system for the executive team to manage the entire product family as a whole; therefore implementing the model at the company level will provide a good opportunity to realize this purpose. This will eventually eliminate the design duplications existing in the current system. It is also noted that to implement the model in the company level requires less detail and the go/kill criteria may be a little bit different from that applied in the business unit level.

7.2. The Company Culture

During the study, the author found that the company strongly believes that as they are in “emotional business”, the best way to deal with it is to design as many products as possible and let the right people-product marketers, for example, to figure out what to do. “Discipline”, “Planning”, “Data Analysis”, and “Structure” are words that perhaps not fully appreciated, as the company thinks their issue is an art rather than a management. Additionally, product-marketers are currently in the dominate position at the company, other functions such as design, development, test are supposed to provide services so as to satisfy product marketers’ needs. However, a systematic approach like Stage-Gate claims that cross functional team, not any single person or department should hold account for any stages in the process. This is obviously very counter to the current practice. The author believes it would take long time to establish a true collaborative cross functional team at the company. Operations innovations like this require strong commitments from the top management and the alignment of rewarding/compensation systems with true performance.

7.3. Time to Market and Fashion Business in General

The author believes that dramatic improvements in time to market should only come from operations innovations rather than from incremental changes to the current processes. While it is painful for a still successful company to pursue operations innovation programs like the Stage-Gate, it will benefit the firm from the long term. Companies that take initiatives in continuous learning and improvement have been shown to realize competitive position in the market.

The author also believes this study results could be applied to fashion business in general. Fashion business enjoys almost the same feature as the athletic footwear business- relatively long lead time and very short product life cycle. To make things worse, retailers normally do not place orders in such an early manner as six months. Average manufacturers take great risks to predict the market trend one year ahead of time. The Stage-Gate model provides useful roadmap for companies to plan closer to market, as the model integrates both art and science in the process, ensuring that the products in design are the most likely winning products. This fits nicely with the fashion business profile. The reason why it is an art is because in the process, those who have the guts of the market trend are invited very early in the up-front to provide their insights and feedback, ensuring that no good ideas are missed out. The reason why it is a science is because in the process, informed go/kill decision are made based on the financial analysis, profitability analysis, the manufacturability, the test results, etc. Although there is an open platform to absorb as many good ideas as possible, the company fully understands that discipline- the decision making in a timely and confirmed manner, is extremely important so as to succeed in the market.

Currently there are other approaches in the market to solve this fashion business dilemma and Zara's quick response model is a good example. Zara realized that they are in fashion business which is hard to predict ahead of time, instead of taking great efforts selecting the right products to design, they established a quick response supply chain infrastructure to capture the trend in the market in an efficient way. Their quick response model helps them to produce and ship products to its retail stores in five days from the time they identify a trend in the market to the time when their versions of the product show up in their retail stores. Zara admitted that they omit the complicated designing process. What they did was to commercialize products in a cost effective and time saving manner. While other companies complained that Zara stole their valuable design, Zara declared that they were providing fashion to those who need them in an affordable way, which was beneficiary for end consumers.

The author feels that it is extremely hard for other companies to copy Zara's quick response model. For example, Zara is very vertically integrated in operations, because they understood that collaboration with suppliers and retailer are costly and time consuming. They decided to control the entire supply chain in their own hand. They have equity in raw materials suppliers

and they own factories which are close to their offices. They also distribute products in their own retail stores. Most importantly, they set up sophisticated information system to translate point of sales data into market information almost in a real time fashion. The author believes that Stage-Gate model is a better and realistic way for companies to adopt and quickly reap opportunities. For one reason, it does not require expensive capital investment. Besides, it focuses internally firstly to fulfill the improvements. Companies can extend the model to suppliers later on, but it is not necessary in the very beginning.

To sum up, the author believes that fashion business as a whole could greatly mitigate the risks of planning off the real market needs by adopting a tool like the Stage-Gate model. This model does not require any capital investment and does not necessarily require the company to collaborate with its suppliers and customers in the very beginning in order to reap the benefits.

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