5

High Speed Enablers to NB PD

This chapter presents an additional dimension of network based high speed product development as a result of a case study primarily on secondary business cases carried out under a previously defined analysis framework described in the article "Network product Development – Analysis Framework for Case Studies" (Bohn & Lindgren, 2000). The specific aim of the chapter is to determine the main enablers to high speed in network based high speed product development.

The chapter seeks to list these enablers and discuss their importance to high speed.

5.1 Introduction

Wheelwright & Clark (1999) emphasize three critical incentives for the product innovation process. The incentives were mentioned in connection with an account of the globalisation of the environment of the businessess:

- Intense international competition through an increase in the number of competitors competing at a certain performance level
- Fragmented market demand as customers and end-users demand high performance and reliability
- Alternative and speedily changing technologies as a result of increased knowledge of and access to new technology

My secondary case analysis confirmed that during the recent years up to 2003 businesses had centred their attention on the time dimension – high speed product development.

The focus on the time dimension during these recent years – high speed product development or the difference between success and failure in product development had in several surveys (Cooper, 1993) shown that it was primarily a question of the business being able at high speed to develop products

for the market – time to market. Furthermore, it was essential that the new products enable the business to obtain advantages by implementing the products on the market before the competitors – the so-called "first mover advantage".

The questions was however

- what enablers explain the high speed at which new products were developed in specific businesses
- what was an high speed enabler. Such enablers are the focus of this chapter.

By way of introduction, an analysis of 74 case businesses had been used to identify the above-mentioned high speed enablers. The 74 businesses had proved their ability to increase the speed at which a product had been developed from idea to final product and market introduction. By means of the framework model of my research; see Figure 5.1.

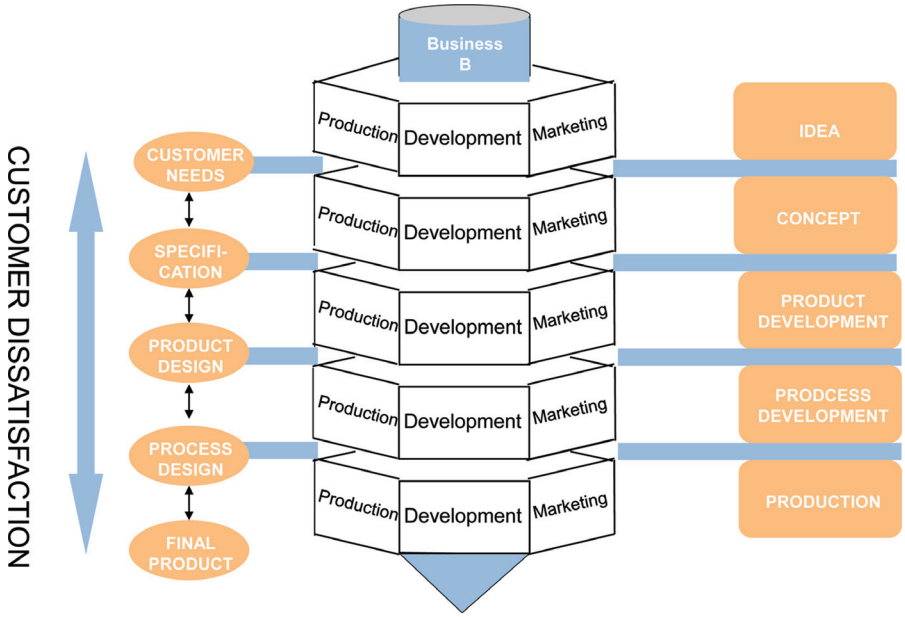

Figure 5.1 Analysis model for network product development.

In this chapter I wish to present, identify and define the enablers employed by the case businesses in order to increase speed and diminish product development time.

5.2 What Is a High Speed Enabler?

5.2.1 Theoretical Approach

> *"A high speed enabler is a catalyst put to the product development process that increase the speed and diminish the time at which a product development process can be completed".*

The hypothesis of my research project was that high speed enablers used to speed up the product development process each have their own characteristics and central part to play in increasing the speed of the product development process.

5.2.2 Practical Approach

As a result of the research ten main enablers of highs speed product development were identified.

1. Use of information and communication
2. Customer satisfaction/customer focus
3. Optimization of PD processes
4. Network product development
5. Development of product development innovation
6. Human resource
7. Process optimization
8. From product to process
9. Product modelling
10. E-development

The main enablers could be described as catalysts which were included in and applied vertically and horizontally in the product development process. My hypothesis was that the enablers were in evidence in and applied in the businesses and in their product development processes with different intensity, frequency, and focus depending on:

- Business characteristics
- Product development situation
- Market characteristics (line of business, customers, competition)
- Network characteristics

Business characteristics were defined as specific and prevailing business characteristics such as size, business culture, interpersonal relationships, tradition, management philosophy, sales and marketing strategy, production strategy etc.

The product development situation could be defined as the task which the product development business face:

- incremental or radical product development
- idea or concept phase

The market characteristics were the conditions – trade and customer characteristics – defined as according to which the specific business had to act, i.e., type of industry, growth rate, legislation, customer segmentation, customer behaviour etc.

Competition characteristics were defined as the competitive conditions to which the specific business was subject. Such conditions include the number of competitors, the degree of rivalry, entry and exit barriers, threats from potential entrants or substitutes.

Network characteristics were defined as the network conditions to which the specific network was subject. Such conditions include the number of networks, the degree of network, the different types of networks etc.

Technology characteristics were defined as the technologies that were available, mainstream and coming up to the industry involved.

My hypothesis was that the above five characteristics influence to a considerable extent the kind of enablers employed in the businesses high speed product development. In the following each main phenomenon will be identified and explained in terms of content and sub-phenomena.

5.2.3 Information and Communication Utilization

Theoretical Approach

The high speed enabler which was first identified in the cases was the ability of the businesses to use the information and communication parameter and flow faster in the product development process to develop and create valuable information at an earlier point in the information creation.

Practical Approach

Firstly, the cases showed that the businesses had managed to streamline the information flow from customer to supplier and to sub-supplier. Primary information could be "reaped" directly with the customer and at an earlier point in time – real time consumption. Subsequently, the information was transported to the supplier and the sub-supplier often without any time delaying "filters". This meant faster access to information and consequently the possibility of swift use and swift analysis of market information. The advance

of the e-business area was also pushing such development (BESTCOM Project, 2002).

An example of such use of information had been described in the case on the computer business Gateway 2000 (Case No. 16). Gateway 2000 allowed their sub-suppliers direct access to their customers real-time consumption.

In this way, production and product development could be based on such "real-time" data which allowed product development to be based not only on forecasts but rather on real-time consumption.

Similar examples of this were the space systems employed by the retail trade such as space management, category management, store management and others (Case No. 27) which were all based on real-time consumption. Information was gathered directly at the cash registers and is transferred back to the sub-suppliers for further product development.

This was also true for the e-business business DELL described in Case 44. In principle DELL and their sub-suppliers were able to monitor real-time consumption from one hour to the next or even from one minute to the next.

The main phenomenon was based on the prerequisite that access to primary information is open to all links in the supply chain. Subsequently, the information flow is streamlined e.g., by means of the Internet, high speed network, e-development tools, and data mining to ensure that information can be passed on at higher speed and with higher quality to relevant key players in the product development process.

One of the distinctive features of the businesses which work with the above-described enabler was that all players in the product development process had committed themselves to and had accepted the open access to primary information. Furthermore, they seek continuously to improve and make more effective the communication tools, the communication flow, and the quality of the information. The businesses in the product development process were confident that the above scenario was beneficial to the product development process and to the speed of the product development process (Price, 1995 and Cooper, 1996). In this connection, the trust factor was important (Price, 1995).

The result was that the speed at which new products were developed and the speed at which the decision processes in product development could be carried through, could be increased as the information and consequently the conditions for making such decisions were available at an early point in the decision making. Thus, information and the access to information no longer constituted limitations or "bottle necks". On the contrary, the decisive factor was now the

speed at which creativity and the decisions of product development could be made.

5.2.4 The Customer Enabler

Theoretical Approach

Most businesses no doubt will claim that they aim for maximal customer satisfaction with due regard to the earnings of the business. At the same time many businesses will claim that an increase in the degree of customer satisfaction would delay the product development process and increase the costs of product development as the products and the development process were becoming more complicated.

However, the above scenario indicated a traditional and outdated assumption in 2003. The next main phenomenon – increased customer satisfaction – Enriching the customer (Price, 1990, Cooper, 1992, and others) verified this argument. Products could be developed at a higher speed at similar or even lower costs and with better performance, provided that they were developed "right" the first time.

This involved letting the customer join the product development process. The main phenomenon includes several dimensions i.a.:

1. Products are developed to satisfy the immediate wishes of the customers.
2. Customers and suppliers develop the products in cooperation. This will reduce the number of misunderstandings and result in applied product development.
3. The customer is put in a position to make product development process decisions which may increase speed and performance and reduce costs.
4. The customer will have the possibility of "freezing" the product development at a very late point in the product development phase.

Practical Approach

The Levis case (Case No. 3) presented a new product development concept – personalized clothing. In this case Levis develop trousers in cooperation with the individual customer in the shop. This results in increased customer satisfaction as the product was fully adapted to suit the customer's needs. As a consequence, the speed of Levis' product development process had increased and performance had improved.

By means of an "electronic stocking" The Customer Foot Shoe Business (Case No. 4) had been able to make customer adapted shoes. As was the case

with Levis, The Customer Foot Shoe Business was able to develop exactly the shoe which the customer wanted while the customer was still in the shop. In the course of a few days the customer adapted shoe was sent directly from the shoe factory to the customer. The customer had taken part in the product development. The customer was allowed to make vital decision in the product development process and this information was sent directly to the supplier which helped ensure optimal performance within the briefest possible time.

Glunz and Jensen (Case No. 30) was developing advanced picture developing equipment particularly for the Japanese market. The Japanese customers were known to want the "best product". In terms of product development this often poses complicated problems as the customer may discover at a very late point of the product development phase that the product which was to be completed was not the "best".

Glunz and Jensen had solved this problem by enabling the customer to "freeze" the final version and performance of the product as late in the product development phase as at the time of product realization. In this way Glunz and Jensen evade a possible delay of the product in the final phases of the product development and at the same time succeed in bringing the product to market on time.

Case No. 37 and Case No. 38 confirmed that on their own initiative two major customers wanted to establish their own product development department at Lumonics and Lyngsø respectively. The motive for establishing their own product development departments was their wish to increase speed, improve performance, and reduce costs in two specific product development projects. Both customer and supplier had recognized that the product development process could be optimized by employing the above-described enabler.

Other businesses addressed the customer satisfaction phenomenon in another way. By developing customer products using the advantages and capacity of mass production the businesses were able to save time considerably. This phenomenon stems i.a., from the concept of mass customization of which businesses such as Lego strived to make the most.

5.2.5 Optimization of PD Models

Theoretical Approach

In a previously published article (Product Development 2000) criticism of the Stage gate models was put forward. My information retrieval and preceding

case analysis had shown that an increasing number of businesses tried to optimize existing product development models by moving away from traditional sequential product development models towards more simultaneously based product development models.

This also involved the theory and tools of flexible product development models and rapid prototyping as previously mentioned (Verganti, 2001).

Practical Approach

In particular Rossflex (Case No. 11), TC (Case No. 6), and TC2 (Case No. 8) had special focus on the processes of product development. The centre of attention was on the elimination of such processes which were not productive an on the optimization and speeding up of the remaining processes.

Toyota (Case No. 10) was another example of a business struggling to diminish the product development time of a new car model from 5–6 years to 2–3 years.

AKV (Case No. 39) deliberately seek to put pressure on their product development and product development department by forcing product development through the phases from idea, to concept, to prototype. AKV anticipate errors as a result of their approach but they believed that such errors and the pressure to overstep the bounds of their ability would eventually benefit their product development in terms of time, performance, and ultimately of costs.

Lumonics (Case No. 37) showed the way in which the business worked with three key product development tasks simultaneously. The case also showed that progress or new developments in one of these areas would result in decisive improvement in one or both of the other areas.

5.2.6 Network Enabler

Theoretical Approach

For many years the major part of product development had been based on internal product development. However, an increasing number of businesses realized that as a result of the demand for high speed product development they were no longer able to base their entire product development solely on internal product development. Consequently, they were called upon to consider network product development.

Network product development can typically be assigned to two main types:

1. The enterprise network – i.e. product development between equivalent businesses or businesses in the same line of business
2. Exterprise – partnership with non-traditional partners
3. A combination of enterprise and exterprise

Practical Approach

Canon/HP (Case No. 21) and UK Chemicals (Case No. 19) were good examples of enterprise network. Canon and HP who are traditionally competing on the printer market form a strategic product development relationship with the object of developing a colour laser printer. Subsequent to the development, the two businesses wish to market the product separately as two competing products. Canon had the motor and HP had the know-how on laser print. In this way both businesses were able to see the advantages of carrying out product development in an enterprise network.

UK Chemicals was a fusion of 11 chemical businesses which normally competed on the British market. However, they decided to form a strategic product development relationship with the object of developing and marketing products for the American market. Each business realised that when forming an enterprise network they would be able to take on and quickly meet large product development challenges in the American market. At the same time, they would be able to represent a wider selection of product development possibilities to the demanding American customers.

Apart from the fact that an increasing number of new networks were being established in order to satisfy the need for faster development, the nature of the network organisation was also changing. The networks were now organised on the basis virtual networks with dynamic relationships; this was illustrated by the UK Chemicals case (Case No. 19) and the Agile Web Network case (Case No. 20). The networks were organised as virtual networks or organisations (www.agileweb.com) which come up and became separated according to current needs. The actual product development task decided the extent and participation in the network intended to fulfil the task. The networks may also change in accordance with the time or the phase of the product development project. As a consequence, some players may participate in all phases whereas others may only take part in some of the phases.

5.2.7 Product Development Innovation

Theoretical Approach

The development of the PD innovation phenomenon focuses on the development process where product innovation is continuously developed e.g., directly with the customer either at the customer's address or at the supplier.

Practical Approach

The Rossflex case (Case No. 11), the Mayekawa case (Case No. 13), and the Lumonics case (Case No. 37) clearly show the way in which the product innovation process could change from being the business own product development or product development carried out exclusively with the customer and the supplier to being an integrated, joint product development cooperation between customer and supplier.

The two – or more – actors let their organisations merge in a joint attempt at and with the joint objective of developing product at the highest speed possible, with the best performance, and at the lowest cost possible.

5.2.8 Human Resource

Theoretical Approach

The main phenomenon which I toke the liberty to call "human resource" was the phenomenon which the major part of the businesses were presently addressing (18%). I believe that the reason could be found in the fact that this very phenomenon product valuable results in terms of speed, performance, and costs.

The main phenomenon contains several partial element such as:

- Empowering teams
- Flexible organisational structure
- Choice of optimal team size
- Clear rules governing the product development teams
- Control of distribution channels
- Raising of the level of team spirit

Practical Approach

Several cases (i.a., Case Nos. 34, 35, 36) show that it was indeed possible to increase the speed of product development by conferring power, defining

a more exact framework of product development, and by empowering the product development teams.

At the same time, it appears that the speed at which the product development could be carried out depends on the way in which the business has organised the product development as well as on the number of participants involved in the product development. The size of the team seemed to be decisive for the efficiency and speed of product development (Jepser Larsen, 2001).

Thus, the Lyngsø case (Case No. 38), the Scanio case (Case No. 41), and the AKV Langholt case (Case No. 39) showed that advantages of speed can be gained by organising product development into minor teams, within a known framework of product development, and with a "strong" product development manager – most often the general manager or the sales manager. The "strong" product development manager was characterised by his thorough knowledge of the framework of product development in terms of profitability, finance, technology and organization. Furthermore, the "strong" product development manager was able to and dare take risks and face uncertainty. Consequently, the product development team was allowed to work in a "safe" setting and the project manager was allowed to act as a catalyst for high speed as the process was not constantly being halted because of non-acceptance of proceeding. The product development manager may even force an increase of speed in the product development team as his leadership allows him to see which participants and which decisions etc. were decisive to the increased speed of the product development; see the Langholt case (Case No. 39) for further reference.

Another aspect of the main phenomenon described here is the ability of the business to arrange for a flexible product development organisation. The Rossflex case show (Case No. 11) how the business was capable of constructing a flexible product development organisation (Verganti, 2001).

Additionally, the Langholt case (Case No. 39) showed a flexible structure of the product development organisation. The results of such a structure became immediately evident in performance, speed, and costs.

The third aspect of the present main phenomenon is the organisational structure and control of the distribution channels. The Zara case (Case No. 1) showed how the competitors viewed the practically inhuman product development speed at Zara. The competition report and analysis showed as far as they could see, Zara introducing a new collection each week which was impossible seen from the point of view of a traditional supplier of textiles. Thus, Zara exceeded according to their analysis all physical limits to product

development in the textile trade and gained major first-mover advantages in the business model ecosystem of textile/clothing.

As a result of the way in which Zara organised their product development, an outsider would believe that a new collection was being developed each week. The business had decided that a new collection had to be introduced in the shops each week. Thus, the product development team defined the limits to the future product development and could act accordingly.

The scenario described above may quickly result in bottlenecks had Zara not ensured that they have full control of the distribution and of the distribution channels. Consequently, because of their distribution strategy which was a combination of franchising and full ownership, the Zara chain was able to remove four weeks "old" products from the shops when the products had completed the four weeks life cycle defined by the business. At the same time, new collections were introduced to the shops every week, making other manufacturers believe that the product development speed was just one week.

The Zara case also showed that the team behind the product development and the team behind the distribution control were important players when speeding up the product development process. When the players had defined the business, financial, technical, and organizational framework which allowed the participants to take large risks and to work under uncertainties which supported the possibility to speed product development. The product development team had been motivated to work at high speed and within the predefined "risky and uncertain" product development framework. Hereby they could develop new products at higher speed (Leifers, 2002). The effects of the concept "empowering the teams" thus became evident. At the same time, it became clear how important HRM including high motivation of internal and external actors was when focusing on high speed product development.

5.2.9 Optimization

Theoretical Approach

For many years researchers have tried to define the product and its core benefits. Researchers have tried to define which partial elements are important to a product and which can be removed without the customer experiencing inferior performance of the product. A determination of perceived value is important to find the performance, cost, and time which product development should match.

In recent years, researchers have focused intensely on the increased practical value of process optimization. The hypothesis has been that focusing on the definition of the parts of the core of a product which the business may remove, the business may help increase the speed of product development. Additionally, such focus may even result in increased performance of the finished product seen from the point of view of the customer and in improved performance in terms of costs and resources seen from the point of view of the business. This phenomenon is described on the basis of an understanding of and focus on process optimization and adding value by subtracting time (Price, 1995).

Practical Approach

The TC case (Case No. 8) describes the way in which the business will be able to reduce the classic product development process from 66 weeks to only 3 weeks by focusing on the processes of product development. This is done by introducing a quick response system.

Also AKV Langholt (Case No. 39) focus on this phenomenon when dividing their product development into a product part and a process part. To the customer, the process part is often the most important part. How fast can the product development process be completed and what production process improvements may the customer experience as a result of the new product?

The ability to "freeze" a product at as late a point in the product development process as possible, is another aspect where the process and – specifically – the product development process are in focus (Hein & Myrup 1986). The Glunz and Jensen case (Case No. 30) shows how the business is able to accommodate their Japanese customers by making changes to the product at a very late point in the product development phase without producing vital consequence to the product development.

A third aspect is to make the process more flexible (Verganti 2002) (Microsoft – Case No. 50).

5.2.10 Changing Focus from Product to Process

Theoretical Approach

Several of the cases used for this thesis describe how the businesses change their focus from looking narrow-mindedly at the product to looking at the product as a process. As will appear form the cases, the business may look

at the current product or at the process in which the product is included at the customer's place. The businesses alter their perspective from considering the product development as having a beginning and an end. Instead, they think in terms of processes and they conceive of the product as a part of a process or maybe as a process which is continuously changing. Additionally, the businesses extend the product concept to include:

- Product families
- Product life cycle
- Project families

Practical Approach

Lyngsø (Case No. 38), Sony (Case No. 5), Mobilix (Case No. 40), GSI Lumonics (Case No. 37), and Nike (Case No. 14) show how the development of a product can be incorporated into product families and product life cycles already at the idea and concept phase. In this way, the strategy of the businesses, not least the marketing and production strategies, have already been incorporated and made ready when the product is introduced and settled on the market. The businesses have integrated their product in a "from the cradle to the grave" context. As a result, no need for alterations due to changes in the product family or in product life cycle needs will arise during the course of the product development Consequently, the product development process can take a faster course and the product which is already on the market can be developed faster. In this connection, the businesses focus partly on "new development" of a product, partly on a subsequent "variance creation" of a product.

Already in the idea and concept phase of the new product, the product is integrated and made ready for solving the problem of creating variants on the market, when market needs and product life cycle demands it. The product architecture is prepare to high speed product development.

The Mobilix case (Case No. 40) clearly shows how such an integration on the mobile telephone market have been achieved in that Mobilix consider the global needs of the different markets as well as the needs of the individual segments on the partial markets. VW, LY, and Martin Lys (Cases Nos. 36, 38, and 45) show how integration can be included in the platform or module strategy of a business. GSI Lumonics (Case No. 37) incorporate a modular service concept in their product by developing the product in order for it to be serviced as quickly as possible. This will increase performance in the eyes of the customer. A well-thought-out product architecture is characteristic and decisive of such a method.

Furthermore, product development projects are no longer seen as isolated development projects but rather as development project families. Case No. 37 describes how a break-through in one of the three product development projects help advance product development in another development project. Such advantages are fully realized by the business which is why they focus on project families in order to increase product development speed.

5.2.11 Product Modularisation

Theoretical Approach

The major problem of known product modelling techniques is that it is time and money consuming process to develop several prototypes and thus carry out product modelling. In addition, it was often difficult or even impossible to visualise the result of the product modelling. Concurrently with improvements in e-development tools and especially in product configurators, product modelling has become easier.

Practical Approach

The Levis case (Case No. 3) illustrates one of the aspect of the product modelling phenomenon. Levis obtain high speed by product modelling in cooperation with their customer either in the shop or on the market. In this way, the products become individualized according to the needs of the customers. By way of product modelling the customer and the supplier are taken through all phases from idea to product completion and shipment in the course of 1 to 2 hours.

Subsequently, an individualized product is delivered at the customer 2–3 weeks later. Thus, the speed of product development is decided by the amount of resources or time used for product modelling rather than by the speed at which product development decisions are taken by the customer and the supplier – in this case probably especially by the customer.

The opposite aspect is illustrated by the Lyngsø case (Case No. 38) in which the decision-making process at the manufacturer's place is crucial to the speed. In the Lyngsø case several financing models are employed concurrently with the on-going product development process in order to increase the speed of decision making.

As previously mentioned, another dimension of product modelling is the businesses increased focus on product modelling as an integral part of a platform or a modularisation outlook. Sony, VW, Lumonics, Lyngsø,

Martin Lys and Gateway 2000 (Cases Nos. 5, 36, 37, 38, 45, and 16) illustrate how the speed of product modelling is growing continuously with the help of platforms and modularization strategies in the product development of the businesses. The products have been prepared for such a strategy through their excellent product architecture. The speed at which product development is carried out is increased considerably because product modelling prerequisites are particularly advantageous once the product architecture has been decided on.

A third example of the employment of product modelling to increase speed and performance of the development of new products can be found in the Nike case (Case No. 14). On the basis of the customer's use of the product Nike attempts to individualize the products – the so-called "sneakerizing" phenomenon. In this way, Nike develop new products on the basis of a firm product architecture.

Finally, Gateway 2000 (Case No. 16) presents a fourth example of the product modularisation enabler when using product modelling to simplify the product even though they are competing in a fragmented market. The case demonstrates how customers are "lead" through a product modelling process which to the customer must seem complex and individualised when in fact Gateway 2000 have developed a simplified product modularisation process which helps them to increase the speed of product development.

Apart from reducing the time of product development, the above examples of product modularisation all help to increase performance and reduce costs.

5.2.12 E-Development

Theoretical Approach

The last identified enabler to high speed in product development to be discussed in this chapter is called e-development or electronic development. This enabler has been in focus for a long time and by virtue of increased and improved technology sue, it is now possible to increase the speed at which new products are developed. The constant and speedy development of the Internet and related software tools (DISPU please see Chapter 12) contribute to making the idea and concept development more precise and faster.

The hypothesis is that E-development plays a significantly important role at the very early stages of product development where time or finances do not allow the development of a physical prototype. By means of E-development tools it is possible to create an exact copy of the final product and explain to the customer all facilities of the product. In this way, the product development process is furthered. The supplier and the customer are able to make decisions

as to the subsequent course of the product development at a very early stage and actually at any stage of the product development process. The previously encountered physical obstacles to prototype development are overcome.

Practical Approach

Glunz and Jensen (Case No. 30) use e-development tools for their internal product development carried out in cooperation with sub-suppliers. Likewise, Levis, The Shoe Maker Business, ODI, and Idémøbler (Cases Nos. 3, 4, 46, and 23) use E-development tools externally and in cooperation with the customers.

The Danish business Kellpo (Case No. 74) has developed their business in such a way that they only develop new products via advanced e-development software tools. This means that Kellpo cannot business economically develop new products with customers who are unable to develop together with Kellpo on e-development software platforms. Therefore, Kellpo has to reject customers who are only capable of developing products physically and not digitally.

On the basis of the cases included in this thesis it appears that suppliers' and sub-suppliers' ability to handle the tools will be the decisive factor when suppliers and sub-suppliers are chosen. Thus businesses begin to reject sub-suppliers and suppliers when such suppliers do not master the new tools. Additionally, some businesses are rejected because they do not master e-development.

5.2.13 High Speed Enablers in Future

Analysing these enablers to high speed product development gives the following hypothetical picture of future high speed product development as shown in Table 5.1.

Table 5.1 Enablers to HS PD

Enablers to High Speed Product Development	Today	In the Future
Information and communication	Physical and to some extent digital information and communication	Mix of all existing information and communication tools mixed with new and high speed communication tools

(*Continued*)

Table 5.1 Continued

Enablers to High Speed Product Development	Today	In the Future
Customer satisfaction/customer focus	Customer to some extent involved in product development process	Customer involved in all phases of the product development process
Optimization of PD processes		
Network product development	Few and narrow networks in PD	Network and all types of network in all product development projects
Development of product development innovation	Innovation ad hoc	Innovation continuously
Human resource	HRM not particularly involved. HRM not very important	HRM involved in all phases of the product development project – HRM very important in PD
Process optimization		
From product to process	Some businesses see the product as a process	All businesses see the product as a process
Product modularisation	Businesses try to use product modularisation but not with great success	All businesses use product modularisation
E-development	Some businesses use E-development	All businesses use e-development

5.3 Analysis Framework of PD

On the basis of 74 secondary case examinations the frequency with which each enabler appears in the secondary case examinations has been examined.

It is worth noticing that the main enablers appear with diverse frequency and that particularly the HRM enabler and the product modularisation enabler were the main phenomena which receive the most attention in the businesses or which are most frequently employed when exercising high speed product development.

On the basis of the above a need arises for a closer examination of the way in which product development processes and models are made adaptable to allow for the hypotheses and trends which we believe to be able to identify in the future network based high speed product development situations. Central aspects as to be included are shown in Table 5.2:

Table 5.2 Use of high speed enablers in secondary case businesses

Use of High Speed Enablers in Secondary Case Businesses	Total in %
ICT Communication Enabler	2
Customer Enabler	9
PD Model Enabler	11
Network Enabler	11
Innovation Enabler	6
HRM Enabler	27
Process Enabler	2
Product to Process Enabler	2
Modularisation Enabler	24
E-Development Enabler	8
Total	100

- How can the 10 enablers be integrated into the product development process?
- How do we achieve high speed in the internal and external networks to the product development to provoking first mover advantage?
- How do we ensure that high speed is integrated in all functional areas?

Thus, our future analyses and research must expose high speed product development processes in Danish productive enterprises. We define the process as a series of partial processes/activities in which internal connections are determined, in which the use of each separate enabler is determined, and in which their contribution in achieving the common goal – costs, performance and high speed – are defined. We believe, that the main focus in the initial phase should be on the following enablers:

- Customer satisfaction/customer focus
- Optimization of PD processes
- Product modelling

5.4 Summary

The literature and case studies of high speed enablers have shown that there are at least 10 enablers which may influence the speed of product development considerably. Consequently, in connection with ensuing empirical studies of current network based product development, it is necessary to extend

the analytic foundation and selection of models which intercept, describe, and provide a better understanding of the enablers to high speed network based product development. Such an extension will be made in Chapter 8 of this thesis.

Before this elaboration a discussion of the success criteria to network based high speed product development is important to find measurements of NB HS NPD.