Juha Laaksonen

MANAGING RADICAL BUSINESS INNOVATIONS

A STUDY OF INTERNAL CORPORATE VENTURING AT SONERA CORPORATION

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DI Juha Laaksonen in memoriam

Organisaatiot ja johtaminen aineen tutkija ja jatko-opiskelija DI Juha Laaksonen menehtyi vaikeaan sairauteen 16.8.2007. Hän oli syntynyt Oulussa 12.1.1966.

Aktiivisen strategia-alueen tutkimustyön Juha aloitti 1990-luvun puolivälin jälkeen. Aiheekseen hän valitsi matkaviestintään ja Soneran historiaan kytkeytyvien palvelu- ja liiketoimintainnovaatioiden syntyprosessien tutkimisen. Lukuvuoden 1999-2000 Juha oli vierailevana tutkijana SCANCOR´ssa, Stanfordin yliopistossa, jossa hän paneutui mm. yhtymän sisäisten autonomisten strategiaprosessien oppihistoriaan ja solmi monipuolisia kontakteja alan johtaviin tutkijoihin.

Juha sai painatusluvan väitöskirjaksi aikomalleen käsikirjoitukselle helmikuussa 2007. Tutkimuksen otsikko on Managing Radical Business Innovations. A Study of Internal Corporate Venturing at Sonera Corporation. Samaan aikaan hänen terveydentilansa alkoi heiketä nopeasti.

Juhalla oli keskeinen asema työyhteisömme arjessa. Kaikki kokivat hänet läheisenä ystävänä. Juha oli sosiaalinen, huumorintajuinen ja teki aloitteita monenlaisiin yhteisöllisiin kokeiluihin.

Läheisen työtoverimme muistoksi julkaisemme Juha Laaksosen väittelyluvan saaneen tutkimuksen.

Helsingissä 30.11.2007

Eva Heiskanen, Juha Laurila, Kari Lilja, Raimo Lovio, Risto Tainio, Teemu Väänänen

DI Juha Laaksosen VÄITÖSTILAISUUDEN VASTAVÄITTÄJÄN, ARVOSANALAUTAKUNNAN JA KUSTOKSEN MÄÄRÄÄMINEN

Helsingin kauppakorkeakoulun opetus- ja tutkimusneuvosto on 2.2.2007 pitämässään kokouksessa myöntänyt väittelyluvan DI **Juha Laaksosen** organisaatiot ja johtaminen – alalta väitöskirjaksi aikomalle tutkimukselle "*Managing Radical Business Innovations. A Study of Internal Corporate Venturing at Sonera Corporation*". Vastaväittäjäksi määrättiin professori Juha-Antti Lamberg (Teknillinen korkeakoulu).

Arvosanalautakunnan jäseniksi määrättiin professori, FT Juha-Antti Lamberg (Teknillinen korkeakoulu), professori FT, DI Olli Martikainen (Oulun yliopisto), professori Raimo Lovio (HSE, pj.) sekä tilaisuuden kustokseksi professori Risto Tainio.

ABSTRACT

This is a study of the managerial activities that produced two radical business innovations in a major Finnish telecommunications company called Sonera. The data clearly indicated the central impact of managers on these innovations, which involved the launch of new technologies in an emerging customer market. The two innovations were selected as research objects after a careful examination of innovations in the telecommunications industry in general and Sonera Corporation in particular. It was also recognized that during the history of the company, the management of Sonera had communicated four major changes in the company's core business. The second and third of these changes were vitally based on the studied innovations, ARP and Zed. After these first observations, a more detailed research question emerged, i.e., to clarify and conceptualize how the managers at Sonera contributed to the emergence of these two innovations. This exploratory study was based on longitudinal field data from Sonera Corporation. The main data collection methods were participant observation, interviews, and respondent validations.

This study suggests that certain managerial activities, which can be labelled as buffering and bridging, have a strong explanatory power for the development of innovations. Most importantly, the study indicates that the focal managers' experience and motivation, together with the specific situational circumstances, influenced the way in which managerial activities enabled the progress of these innovations through the processes identified already in the widely known Bower-Burgelman process model. Managers facilitated the development through simultaneous buffering and bridging activities, which had an important role in the cyclical development of the innovations and in the emergence of their distinctive features.

In general, this study highlights the influence of simultaneous buffering and bridging activities at multiple managerial levels in the organization. In fact, when innovations are bootlegged, it is crucial for the organization to be open towards third parties in order to raise intrapreneurial capacity and absorb external technology and market knowledge. Hence, bridging is then the core managerial activity. Furthermore, it is important to provide sufficient room and space for the innovation initiators to define principles for managerial activities that enable bringing the innovations to fruition. Therefore, buffering is the core managerial activity at the time when the initiators define the innovation. Moreover, in the buffered technical core, the focal managers need to re-open the innovation development to third parties in order to create a group or community of people with sufficiently similar or congruent sources of motivation, experience, or intentions. This allows them then to mutually assist one another over the long term to develop the market and provide impetus for the innovation. Thus, striking a balance between buffering and bridging activities is the core managerial activity when the focal managers provide impetus for the innovation development. This study also indicates that one way to create a common general intention that includes sufficient joint attention to both bridging and buffering activities is by building intra-corporate communities across formal hierarchical levels.

Keywords: managing radical business innovations, internal corporate venturing, buffering and bridging, iterative cyclical process, Sonera Corporation

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1 INTRODUCTION

1.1 Purpose and relevance of the study

This is a study of two radical business innovations in a major Finnish telecommunications operator called Sonera[1]. The main purpose of the present study is to explore and specify the underlying, and often hidden, managerial activities that are associated with the development of radical business innovations in a multidivisional established company. I start this report by discussing why I chose to study the telecommunications industry in general, that industry in Finland, and especially Sonera Corporation.

The telecommunications industry was one of the fastest growing industries in the world in the 1990s. This makes it a generally interesting context to study innovations. Telecommunications technologies, especially the global system for mobile communications (GSM), were a European success story in the continental competition between USA, Japan, and Europe. Additionally, information technologies, data communications and mobile communications technologies and their convergence have been in the front line in opening new global opportunities for businesses, companies and nations. Hence, they have been the focus of interest for analysts of strategic renewal, technology transfer, and many other issues. In the 1990s, the telecommunications industry opened new opportunities for newcomers such as Nokia or Microsoft. Especially, Nokia's major international breakthrough has been sensational (Lovio 1993; Pulkkinen 1997). Sonera is interesting to study also partly because Sonera's Mobile Communications Business Unit assisted Nokia in its breakthrough. Additionally, in terms of revenue Sonera was the 22nd largest, but in terms of market capitalization it was the second-largest company after the Nokia Corporation in Finland in 2000 (TE 20/2000).

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[1] See Appendix 1 for the name history of the Sonera Corporation. Sonera has taken responsibility for the telegraph and telecommunications businesses of the former Posts and Telecommunications of Finland (PTT).

Finland and Sonera make an interesting case to study because both of them rapidly entered the front line in the competition among nations and companies in the telecommunications industry. The standard of living in Finland rose to the average level of the other West European industrialized nations during only a few decades between the early 1980s and the end of the 1990s. Finland transformed from a society dominated by agriculture and the forest industry into a forerunner in the information and telecommunications industries. During the 1990s, the country placed a special emphasis on the mobile communications and mobile Internet sectors. In order to reach the front line in those business areas, the Finnish government supported considerable R&D activities in the sector. Finland is also an interesting environment to study the telecommunications industry, especially the telecommunications operator (TELCO) market. The relatively small domestic market has been able to produce two strong TELCOs[2]. This structure has persisted until the present day. The development of market competition started in the end of the 19th century, leading first to a duopoly market and later to full competition in the 1990s[3]. The deregulation of the Finnish market started among the first ones in the world in the late 1970s. Competition increased gradually during the 1980s and 1990s. By the end of the 1990s, the Finnish TELCO market had developed into one of the most competitive markets in the world[4] (see appendix 2). The exceptional market structure enabled the rapid transfer and implementation of international technical innovations in the Finnish market[5]. There was no single incumbent in this market, unlike the situation in the rest of the world, excluding the USA. In addition, the Finnish TELCO market was definitely the most developed user market in the world in the early 1990s (see appendix 3)[6].

The emergence of competition in the Finnish TELCO market in the 1980s partly encouraged, partly compelled the management of Sonera to start to emphasize resilient

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[2] This was due to the geographical position of Finland between Sweden and Russia as well as to history. This especially relates to the late 19th century when Finland received autonomy from the Russian Czar. About the same time, the national divided monopoly was born when the Finnish Senate gave the first permissions to the privately owned Finnish local telephone companies.
[3] Local fixed telephony business was still a monopoly in the early 2000s, as in the rest of the world. There were not economically reasonable technologies to substitute this access.
[4] In terms of market shares and regulation.
[5] For example, the telephone was patented in the USA in 1876 and the first telephone line was constructed in Finland in 1878.
[6] In terms of mobile and Internet penetration numbers.

resource allocation and strategic flexibility. These managerial activities were more reactive than proactive, when viewed from the perspective of the present time. In any case, these activities required external resourcing and detached the corporation from government control, thus paving the way towards privatization (see Turpeinen 1996). The calls for resource allocation and flexibility led to wide discussion about competition and its preconditions as well as to state ownership and governance principles both at the level of Finland and within Sonera. The invisible ownership created special challenges for the Sonera managers in decision and strategy making[7]. Sonera's success in the TELCO industry was noteworthy. This was indicated in what the Finnish Prime Minister said in 2002 to the Finnish Parliament:

> *"While estimating the state's ownership policy in Sonera, the balance from Sonera's share sales is six billion euros, value development is comparable to international competitors, there are 10 000 employees and there is an excellent competence in technology and leadership as well as a significant position, for example in Turkey and Russia, from a business development point of view".* (September 2002, freely translated from Finnish).

In 2002, Deutsche Bank assessed the success of state-owned telecommunications companies' privatization in different countries. In this assessment, Finland was regarded as the second best in Europe after Ireland. The Finnish government had taken an active role in the development, which was also the case in France. This was completely an opposite role to the one adopted by governments in Germany and the USA. Generally, this means that both Finland and Sonera have proceeded from a situation characterized by a lack of resources towards the front line of information and telecommunications societies and technologies. From a research point of view, these are enticing circumstances for a study of corporate development from a perspective that departs from 'perfect market' assumptions.

1.2 Context of the innovations studied

Over the period studied, the industry constellation of mobile service production in Finland was unique in the world. Vendors such as Ericsson, Nokia, Motorola, and Siemens manufactured mobile telecommunications networks and terminals. Mobile

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[7] Generally, Sonera was a forerunner in changing the ownership structure of the Finnish state-owned companies from public agencies into private companies.

telecommunications operators purchased equipment from vendors in order to produce services. Customers purchased access, e.g., to a mobile service either from a private or an operator-owned retailer. Legislation did not allow subsidization, i.e., the combination of a subscriber identity module (SIM) card with a mobile terminal. This was allowed in all the other TELCO markets in the world. Vendors manufactured SIM cards and mobile telephones. Vendors also had their own subcontractors. The Finnish Communications Regulatory Authority (FICORA) admitted and controlled radio frequencies. It also permitted type approvals for mobile terminals. Mobile telecommunications licenses were admitted and controlled by national regulators. In Finland, such an institution was the Ministry of Transport and Communications Finland (from here onwards referred to as MINTC). A separate independent unit within the Ministry took care of Sonera's ownership policy[8]. Strategic decisions were handled by the Council of State, the Finnish Parliament or within the Parliament's Ministerial Committee for Economical and Political Affairs. The Finnish Competition Office controlled the market competition. Figure 1.1 presents this industry constellation.
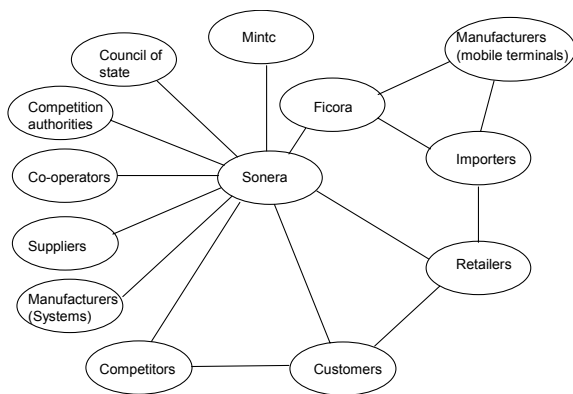
Figure 1.1 Industry constellation of mobile telecommunications in Finland

Sonera Corporation as a TELCO developed, purchased, operated, and sold fixed-, data-, and mobile-network based services. Services were provided for local, long-distance, mobile, and data customers using audio, text, and video such as telephone and short

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[8] This unit was transferred under the control of the Ministry of Trade and Industry in 2005.

message service (SMS)[9]. As an example of the different businesses within a TELCO, let us look at what an individual mobile telecommunications operator did in its business. It planned, built and maintained different kinds of mobile networks such as NMT900 (Nordic Mobile Telephone) and GSM. A mobile system consisted of basic and supporting technological platforms by which the operator produced services and offered them to subscribers. The basic platforms included mobile switching centers (MSCs), base station controllers (BSCs), base stations (BTSs), and different kinds of registers for customer control and service provision. Supporting platforms included operation and maintenance (O&M), intelligent network (IN), and billing and accounting, just to mention a few. Figure 1.2 presents the operator's 'toolkit'.
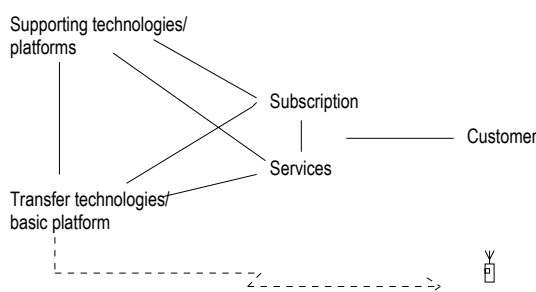
Figure 1.2 The 'toolkit' of the mobile telecommunications operator

The first innovation studied, ARP, unfolded in the 1960s, when the company later to be known as Sonera mainly consisted of the Telegraph and Radio Divisions of the Posts and Telegraphs of Finland of that time. Appendix 4 presents those organization charts. Appendix 5 presents the organization charts of Sonera and the business unit where the second innovation studied, Zed, unfolded.

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[9] GSM services were divided into teleservices and supplementary services. Teleservices were audio, data, short message, and fax. Supplementary services were functionally based on the teleservices and they were, e.g., call waiting, call transfer and call barring. The execution of service needed co-operation between the basic and supporting technologies. For example, a short message service center was needed to receive and send messages.

1.2.1 Innovativeness in the global telecommunications industry

Until quite recently, innovativeness in the global telecommunications industry has focused mainly on network capacity building and maintenance as well as on the provision of telephone services. The companies involved have directed the major share of their investments to purchasing different kinds of technological equipment. Starting in the 1990s, globalized markets, standardization, and the convergence of industries made it increasingly difficult to identify how innovations should be focused in the future. The challenges have further increased as central generic questions have emerged, concerning such issues as terminal and personal mobility, coordination and control of transmission, services and applications as well as their content (Palmberg and Martikainen 2005). The fragmentation of value chains has moved the managerial emphasis away from equipment towards human-made innovations and talent management.

The customer markets of the mobile telecommunications industry have developed from the Nordic Countries to the global level[10]. Licenses admitted for mobile telecommunications operators to operate the second-generation mobile systems (2G) increased market competition considerably. The initial public offerings (IPOs) of telecommunications operators brought capital market pressure on their management. Also, the technological development transferred from the Nordic Countries to the global level[11]. In addition, the industry convergence has transformed the development of content and skills from the dominance of hardware to the software of information communication[12].

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[10] The Nordic market formed about 80 percent of the global mobile telecommunication market in 1982 (Pulkkinen 1997).

[11] System and service development took place mainly in the international standardization bodies. The specifications defined mandatory requirements at the system interfaces. Based on these specifications, manufacturers then made equipment. Manufacturers also made products based on 'de facto' standards, which meant that they were not yet approved in standardization bodies.

[12] The convergence of industries meant the combination of telecommunications (fixed & mobile), consumer electronics (TV, radio & cable), and teleinformatics (PC, Internet). Convergence could be observed at many different analysis levels. At the product level, this concerned, e.g., signaling (TCP/IP) and technology platforms such as middleware, terminals, and operating systems. For example, a competition over terminal operating systems was waged between Nokia-driven Symbian and the Microsoft-driven Windows-based system since the late 1990s.

The manufacturers of mobile networks and terminals met the challenges mentioned above earlier than the operators. They controlled standardization by providing most of the standards. They also controlled operators by acting on global markets. Thus, they could globalize local knowledge[13]. The business of a TELCO was still politically embedded within the national level in which significant equipment investments increased entry barriers for international competitors. This national and political embeddedness encouraged national regulation and legislation. Through its administration and the different kinds of government bodies and state-owned companies, the state was also a significant customer for these TELCOs. In fact, nation states are still in the 2000s considerable owners of TELCOs throughout Europe.

1.2.2 Sonera as an innovative company

Sonera was internationally recognized as an innovative company since the mid-1990s, which is indicated by the international recognition for its technical innovations. For example, Sonera's Datanet ATM service received Datacommunication Magazine's 1994 'Hot Product Award'. At the end of the same year, the same award was granted to Sonera's multimedia pilot service (MediaNet), which was seen as one of the key products in the business in 1995. These were the first Hot Product Awards awarded to a Finnish company. The awards, which were recognized as indicators of technological trends, had usually been granted to telecommunications companies from the United States.

Second, the GSM Memorandum of Understanding (MoU) Association granted awards at the GSM World Congress for the most prominent GSM achievements of 1996. Sonera received a GSM World Award for the world's fastest customer growth in GSM mobile phone penetration[14]. Sonera was also awarded as the best mobile telecommunications operator in the world at the Communication Awards 2000 event. Additionally, Sonera was awarded for the best WAP services in the world at the WAP

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[13] The R&D budgets of the manufacturers were more than 10 % of revenue while the operators only used two or three percent for R&D.
[14] Annually held GSM World Congress was the largest forum of the global GSM sector. In the same event, Nokia of Finland received a GSM World Award for innovation, thanks to its pocket-size Nokia 900-communicator integrating GSM phone, fax, and Internet terminal.

Congress in Seville in November 2000. Additionally to the awarded services, Sonera actively launched new services in the Finnish market. On a global scale, Sonera established the first IP call over a corporate data network in 1996 and the first mobile Internet connection in 1999. Besides, Sonera provided the world's first TV service via Internet in 1997. It also provided the first nationwide mobile service functioning at dual frequency band as well as a digital signature for the mobile subscribers. Similarly, Sonera offered the first positioning service in the world for its customers in 2000. Thus, since the mid-1990s onwards, Sonera produced mostly technical innovations, but unquestionably in the front line in the world. As one executive of Sonera said:

> *"Sonera has been an internationally recognized technology champion". (2001)*

During its history, the management of Sonera has communicated the change of the company core business four times. Figure 1.3 illustrates these changes. Bluntly stated, one business at a time has been presented as the core of the corporation's strategy. This is not to say that only one business actually was in the core of strategy-making, but it can be said that the corporate management has communicated that business as the most important business at the time. The core business of Sonera has changed in the following order.

1) From telegraph service to long distance telephone service
2) From long distance telephone to mobile telephone service
3) From mobile telephone service to value-added services
4) From value-added services back to mobile telephone service

The last of these changes in the core business of Sonera implied that the emphasis in its operations turned back to the mobile communications business that still provided telephone service at that time. Thus, it did not comprise a radical business innovation. The second and the third of these publicly communicated new corporate core businesses were vitally based on the studied radical business innovations, ARP and Zed. Reaching this position, however, took about 25 years in the case of ARP but only about two years in the case of Zed (Sonera AR 1997,2000,2001; Sonera road shows 1998,1999). We can also observe from the figure that these kinds of innovations have happened surprisingly seldom in the Sonera Corporation. However, they have had a major affect on the

corporation, hence being significant events and producing added value for the corporation and its different stakeholders.
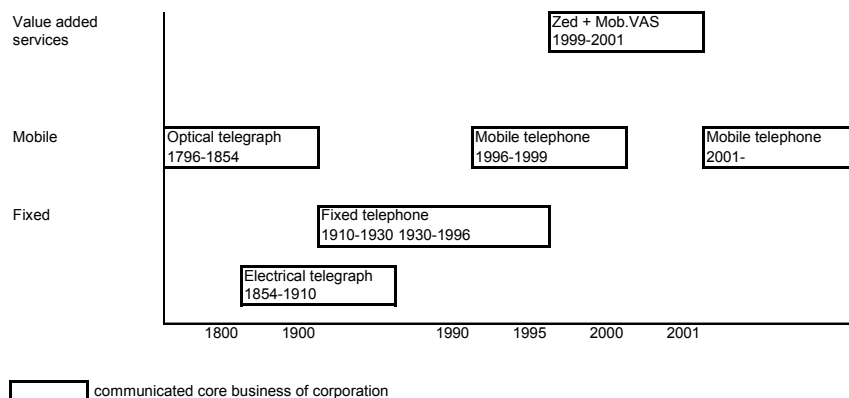
Figure 1.3 Changes in Sonera's core business as communicated by management

Figure 1.3 also describes the way work was organized in the company. Sonera Corporation has over its history produced services with different technologies and offered them through various channels to customers. These channels were fixed, mobile and data communications. The offering of services has moved from one channel to another, but employees have been attached to the service or business units organized around each channel. This organization structure was slightly revised in early 2000 and finally changed into a matrix form at the end of 2005. In summary, it is interesting that Sonera management has been able to define and communicate only two new core businesses since the 1950s in spite of its indisputable technological innovation history.

1.3 ARP and ZED – two interesting radical business innovations in the Sonera Corporation

The observations made above strongly suggest that it would be worthwhile for everyone who wants to learn about radical business innovation development to take a closer look at the ARP and Zed innovations of the Sonera Corporation. Next, I briefly describe these innovations as the particular objects of the present study[15]. The first of these radical business innovations, ARP, constituted a manual mobile telecommunications

system. The system was launched in the market in 1971. The system functioned at 150 MHz frequency band. Its system architecture was the following: 1) Mobile terminals (MTs) were installed in cars. An individual customer was thus able to make and receive calls. Terminal manufacturers included companies such as Televa, Salora, Nokia, ITT, and Siemens, 2) Base transmission stations (BTSs) contained radio receivers and transmitters usually positioned in elevated and visible places. MTs communicated with BTS, which were manufactured among others by AGA, Ericsson, and Nokia, 3) Telephone operators connected calls from the caller to receiver at the centers.

The second radical business innovation in focus in the present study was a mobile portal called Zed. It was launched in the market in October 1999. Sonera's annual report for the year 2000 described it as follows:

> "Sonera Zed offers a service package for wireless terminal devices, combining...mobile communications and Internet. Zed is a brand for a mobile portal providing mobile value added services to customers and corporations. Zed offers... new opportunities for real time information retrieval, mobile data, time management plus personalized services allowing consumers to make the best possible use of the Internet via their mobile phone".

1.4 Radical business innovations and an innovative company

By this far, we have shown that the Sonera Corporation and its two radical business innovations are interesting objects to study and they should be studied more explicitly. Let us next shortly discuss and describe the nature of radical business innovations (RBIs) in this study. After this, we shall describe, based also on previous literature, the kinds of managerial activities that take place in an innovative company.

1.4.1 The nature of radical business innovations in an established company

Previous literature typically suggests that innovations in companies lead to new processes, products, or systems. It also suggests that innovations can be separated analytically from the processes and strategies that produce them. In fact, innovations are conceptualized at the different levels of analysis. These include components,

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[15] They are more explicitly defined in Chapter 3.

technologies, processes, products, systems, companies, industries, and even nations. Regardless of the level of analysis, innovation is considered to challenge or cause divergence for the current state of the art in the business in question. Additionally, innovation is relational and thus context-dependent in nature. Fundamentally, an innovation is considered more radical when it is studied from further off. For example, technological innovation seems more radical at the industry level than when studied at the functional level of the technology department. Moreover, the radicality of an innovation is easier to observe when an innovation is studied during a short time period. The longer the time period, the harder the radicality is to recognize.

Previous literature has also emphasized that industries, sectors, and companies differ in their possibilities, abilities, and capacities to affect innovations. Nevertheless, the development of a RBI is a most demanding process for an established company (Burgelman and Sayles 1986). This is especially because company actors' technical experience accumulates into competences and resources producing large-scale advantages for the present technology in prevailing markets and prevailing businesses. When this stage has been reached, minor modifications to the company's skills, resources, and knowledge are not enough to move the company into to new businesses or industries. Major efforts are required to launch new technologies and marketing efforts for new services in new markets. Hence, in the long run an established company is likely to be inertial, as exploitation drives out exploration (March 1997). Thus, an established company is especially likely to produce incremental innovations.

Additionally, as Van de Ven (1986, 604) says, an invention or a creative idea does not become an innovation until it is implemented or institutionalized. He continues that indeed by most standards, the success of an innovation is largely defined in terms of the degree to which it gains a good currency. That is, it becomes implemented reality and is incorporated into the taken-for-granted assumptions and thought structures of organizational practice[16]. Thus, it is not enough to study invention or product development only before market launch or innovation development only after market launch (Burgelman 1983; Rogers 1983; Van de Ven 1986). In addition, RBI

development is more encompassing than developing a single product. This is because it constitutes the development of a product group instead of only one product. Additionally, it is almost impossible to develop an innovation by concentrating merely on definition or action. Concepts are communicated in plans or documents and they do not become implemented reality unless they are brought into action or the market. For example, action in the customer market produces unintended consequences, which in turn affect the concepts and planning. Therefore, an interplay between definition and action is needed.

In this study, Sonera's ARP and Zed were radical innovations (RBIs) in the sense that they were novel for both the company itself and for the industrial field in question. In addition, these RBIs were implemented and gained good currency as well as formed vital bases for the communicated new core businesses of the corporation. This occurred even though the innovations emerged from business areas that used to be marginal in relation to the prevailing corporate strategy and businesses. Hence, they are termed RBIs in this study because the individual new products, services, systems, or initiatives for such, meet all of these demands simultaneously. The two radical business innovations are described in more detail in Chapter 3.

Likewise, it is important to note that Sonera did not have significant amounts of market, technology, or business competencies related to these radical innovations when it started to pursue them. The innovations required new organizational practices in relation to Sonera's existing routines.

1.4.2 Activities of an innovative company

The previous literature acknowledges that the basic challenge for a company is to survive over the long term. Survival depends on organizational actors, the environment, or a combination of these (Burgelman 1980; Van de Ven, Polley, Garud, and Venkataraman 1999). The ability to grow or to change is typically considered essential for the survival of a company.

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[16] Most of the innovation literature recognizes that the terms invention and innovation should be separated. This study supports this separation while recognizing that both are needed in the development of radical business innovations.

Principally, companies search for the ability to grow through innovations (Biggadike 1979; Block and MacMillan 1993; Hamel 2000). For example, in Van de Ven et al. (1999), the Senior Vice President for R&D at 3M Corporation argues that the best way to increase corporate earnings is through top-line growth of revenue, and the route to this top-line growth is through innovations. Hamel (2000) recognizes that acquisitions may fuel faster top-line growth, but he also emphasizes that most companies attempting to do so fail in their attempts to increase their earnings at the same time. As a result, innovations are required to strike a balance between revenue and earnings growth. Following from this, Prahalad and Hamel (1994) argue that cutting down the denominator is not the only way in which companies can reap efficiency gains.

Viewed in this light, the major task of company managers is to guarantee the company's strategic flexibility. That is, they need to reduce costs by adapting to new and unanticipated events over time. Striking the balance between static and dynamic efficiency implies that the company develops a set of routines and capabilities guaranteeing that it always holds new options when facing unexpected events, in order to avoid being caught up in a 'competence trap' (Levinthal and March 1993). How is an organization then able to form this kind of flexibility and keep it up over the long term?

One way to provide flexibility is that company managers form venturing units in the organization to initiate and develop radical innovations. These units may provide the company with a sufficient amount of intellectual capacity to initiate change in the overall corporate strategy. Hence, an innovative company's ability to change its strategy depends on its managerial capacity as Burgelman (1983) has found. The development of this capacity depends on the availability of operational level managers and their abilities to conceptualize new business initiatives. Moreover, it also depends on the middle managers' abilities to conceptualize strategic implications of new business initiatives in more general system terms, and on the capacity of top management to rationalize strategically peripheral initiatives into the strategic context of the corporation and further change the structural context of the corporation accordingly.

On the other hand, the previous literature has also suggested that the management of an innovative company has the ability to allocate resources and make strategic decisions.

Resource based, capability and competence theories of organizations address managers' abilities to allocate resources in order to gain continuous growth and above-normal rents (Penrose 1959; Lippman and Rumelt 1982; Wernerfelt 1984; Dierickx and Cool 1989; Prahalad and Hamel 1990; Barney 1991). As Rumelt (1984, 558) points out: "the task of general management is to adjust and renew these resources and relationships as time, competition, and change erode their value". The integration of long-term strategic intentions with present and future organizational resources and skills is thus a major challenge for management. Unfortunately, the uncertainty of technical solutions, the estimation of market needs and the timing of technology-market development is hard to predict and almost impossible to quantify for decision making. Also, the prediction of commercial success is extremely challenging. Bower (1970) has even called into question the relevance of corporate decision making as an important event in the resource allocation process.

Additionally, the managers of an innovative company are able to turn inventions into innovations. However, this is not a simple task, as Fast (1978) found. In fact, Biggadike (1979) found that it takes on average 10 to 12 years before the return on investment in a new business equals that of mature businesses. At the same time, different institutional and product-market forces affect the development of innovations. Also, the preferences of individuals in the organization and the environmental norms are likely to change in unintended and controversial directions, making it hard for a new business to achieve survival[17]. Consequently, business knowledge is context-dependent and it develops through an interplay between the multiple intentions and resources of organizational actors at the different management levels. Thus, the management of an innovative company is able to provide circumstances that support organizational actors in their work and encourage commitment to long-term projects among these actors.

Therefore, the results of long-term development projects are likely to change during the course of the projects. Such change, in turn, allows managers of an innovative company

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[17] Besides, adding new services into the portfolio of a big company may be more risky because of organizational inertia. Similarly, the liabilities of size favor small companies in adaptation, because they are more flexible in resource allocation. In contrast, a large organization may use its competencies, learning and slack resources in adaptation. In addition, the bounded nature of organizational knowledge may favor the adaptation of a large organization.

some flexibility to define the aim of the innovation process. This requires support and coaching by top management during different stages of the process. Thus, innovative managers are able to change the conceptualization of an innovation based on the results of the project, and keep up this process (March 1981; Grove 1999; Hamel 2000). However, the path–dependent character of knowledge makes innovation a rare event (Simon 1993). Path-dependence, therefore, necessitates longitudinal studies in the search for new ideas within organizations in order to localize them and find out if they are institutionalized or not (Cyert and March 1963). Besides, understanding innovation processes requires longitudinal studies of the social and political processes through which people invest in or become attached to new ideas and to bringing them into fruit (Van de Ven 1986). However, the innovation process is a complex social process. The study of this kind of a phenomenon is in many ways challenging and can take the researcher's time and attention even for decades (Van de Ven et al. 1999).

Why then do we need further studies of radical business innovations from a managerial perspective? This is because in previous research on innovations, the empirical evidence is often taken as a non-contextual illustration of theoretical arguments. Simultaneously, the empirical material is not thoroughly depicted. The research designs are in many studies cross-sectional and static. In addition, actor-based process conceptualizations are rare. The few existing actor-based longitudinal studies using comparative designs do not, however, compare successive venturing or innovation efforts made by the same company. The Bower-Burgelman process model has become a viable basis for such studies, even though it has been criticized as being too linear (Lovas and Ghoshal 2000). Commonly, the previous literature recognizes managers' vital effect on innovation but does not explicate the nature of their activities over time (Maidique 1980; Kanter 1983; Takeuchi and Nonaka 1986). As Fulop (1991) indicated, a general model of innovation or corporate entrepreneurship has not yet been developed. This implies that the historical aspect is not fully taken into account. While historically sensitive research does not provide a straightforward way to develop new theory, it provides new insight into the wide array of factors involved in such processes. Therefore, more inductive field-based studies using comparative longitudinal designs are needed. Also, empirical evidence should be collected in ways reaching beyond interviews and secondary data sources. That is, organizational actors and their activities should be studied intensively over time.

Additionally, more conceptual studies on innovation processes in organizations are needed. The discussion on organizational adaptation emphasizes the need to understand the challenges of the adapting unit and this unit's ability to renew itself (March 1994b)[18]. This directs attention to the relationship between organizational actors' cognition and activities in the organizational structure (Penrose 1959; Polanyi 1962). Baum and McKelvey (1999) point out the importance of recognizing the level and unit of analysis at which a study is being conducted. They also argue that the magnitude and scale of change need to be carefully interpreted. On the broader scale of industries and technologies, the occurrence of 'blind' variation-creating events challenges the actor perspective (Van de Ven and Garud 1994). Generally, Darwinian evolution treats individuals in organizations mechanistically. Thus biological evolution, when applied directly to organizations, is vague in terms of concept and process levels – especially, when individuals affect and choose, as in the present study. Thus, evolution requires further research (March 1994b).

In summary, this section argues that it is a major challenge for management to create an innovative company, which is capable of producing radical business innovations and thus providing survival for the company over the long term. This is especially because multiple managers at different managerial levels of an organization should be able to provide the innovation initiators a sufficiently peaceful working space and the necessary collaborative activities with third parties in the successive stages of the innovation development. Additionally, these managers at each hierarchical level have to conduct these activities in a mutually consistent manner.

1.5 Aim and structure of the study

On the basis of the above discussion, it seems clear that company innovation and radical business innovations can be studied from a variety of perspectives and at many levels of analysis. For example, Tainio (2003) has shown the essential effect of the capital market on the rise and fall of Sonera's internationalization. Nevertheless, innovations

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[18] Adaptation in this discussion concerns a relationship between unit and its environment. Thus, adaptation includes both adopting and adapting.

are complex objects to conceptualize and study, especially if studied from a process perspective. Studying innovations over time is even more complicated, and in fact, many studies only address the outcomes or the late stages of the development process. In the present study, the interest is to study, from the early stages onward, the processes that led to the emergence of Sonera's radical business innovations, ARP and Zed. The special interests are to explore a substance-based process of managerial activities in this development and to provide an explanatory perspective on the radical business innovations under study. Together, these interests provide answers to the main research question of the study:

How did the managers at the Sonera Corporation contribute to the emergence of its two radical business innovations that took place in two largely different environments[19]?

A processual perspective (Mohr 1982) is adopted to study these innovations. According to this perspective, the interest is primarily in the process as well as in the explanation, but not to the same extent as in the process. This interest seeks to find the forces that affect an individual or a group of actors and to find how these actors affect each other when producing radical business innovations. Organizational actors have different aims, dominant logics, and interests in the organization[20]. Thus, we presume that the management in organizations is not a monolithic actor[21].

My research is a field-based longitudinal study of radical business innovations. In this study, concepts are induced from the data following the idea of grounded theorizing (Glaser and Strauss 1967; Strauss and Corbin 1990) and analytic induction (Johnson 2004). In most innovation studies, the primary data collection method is interviews. In this study, the aim is to go beyond managers' rhetoric and use participant observation

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[19] In the case of ARP, the macro environment was a national duopoly but in case of Zed, it was an emerging global capital market and national competition. See further information in Chapter 3.

[20] The company in this study is a bundle or coalition of interest groups. The interaction of management, company and its environment takes place in managerial arenas (See Burgelman 1980, 1983; Lilja, Tainio and Räsänen 1987). Also, Thompson (1967) and Giddens have discussed arenas. Nevertheless, this study does not primarily aim to contribute to this arena discussion.

[21] The non-monolithic nature of management has been studied in the innovation context but not in the context of radical business innovations (See Burgelman 1980, 1983; Kivisaari 1992; Eriksson and Räsänen 1998).

and respondent validations as the main data collection methods. Secondary data sources of the study are documented public data and different kinds of intra-organizational documents such as strategic and business plans[22]. In this study, I examine the development of Sonera Corporation and its predecessors from 1960 to 2006. The detailed analysis of the two RBIs in question covers the periods from 1960 to 1980 in the case of ARP and from 1997 to 2006 in the case of Zed.

Managerial activities are analyzed by comparing similarities and differences between different organizational actors' activities and environments during the two innovation processes (Burgelman 1980; Lilja, Räsänen and Tainio 1987; Kivisaari 1992; Eriksson and Räsänen 1998). Even though the time lag between the cases is 25 years, there is reason to claim that they can be fruitfully compared (see, e.g., Chandler 1977; Burgelman and Sayles 1986; Van de Ven et al. 1999; Hamel 2000).

This report is structured in the following way. In Chapter 2 of this report, the previous process studies and literature concerning buffering and bridging are reviewed. The aim of the review is to come up with the more precise research questions. Chapter 3 presents the basis for case selection, defines more explicitly the radical business innovations studied, and presents how this research was conducted. Chapters 4 and 5 present in chronological stages how the radical business innovations developed. These development processes are presented following the sequences of Burgelman's stage model, which are described in Chapter 2. In Chapter 6, an explanatory perspective to the studied radical business innovations is presented. This explanatory perspective concentrates especially on the managerial buffering and bridging activities and how they contributed to the development of the innovations under study. Chapter 7 summarizes and concludes the study by outlining the theoretical and managerial implications of the study. Also, issues for further research are taken up.

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[22] Secondary data sources are presented in the Appendix 9. See also Chapter 3 for further information.

2 RADICAL BUSINESS INNOVATIONS AND INTERNAL CORPORATE VENTURING

In this chapter, I present and discuss the process literature on radical innovations. In the first section, I present the process literature related to radical innovations. After this, I focus especially on intraorganizational processes concerning radical innovations. In the third section, I suggest ingredients for the present research, explicating a number of more precise research questions derived from the main research question of the study. In this last section, I also present the literature on buffering and bridging that will be used in the explanatory part of the study in Chapter 6.

2.1 A process perspective on radical innovations

The intellectual roots of innovation studies are broad[23]. Studies related to radical innovations can be classified into variance or process perspectives (Mohr 1982). Innovations are most often studied from the variance perspective, but for the present study, the process perspective is more relevant. This is especially because the process perspective not only explains, but also explicates the process through which the innovations unfold. Theories of the innovation process have their roots in decision making and institutional theories (March and Simon 1958; Cyert and March 1963; Burgelman 1980). The process perspective is characterized by an emphasis on situations, choices, and organizational search for stability. The process perspective can be further divided into environmental and evolutionary aspects.

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[23] They can be found in economics (Schumpeter 1934; Penrose 1959), administrative science (Selznick 1957; March and Simon 1958; Cyert and March 1963; Snow and Hrebiniak 1980) and strategy (Chandler 1962; Ansoff 1965; Andrews 1971). This literature emphasizes different perspectives. Rational economics is based on rationality and complete information, perceiving industry as a significant and explanatory level of analysis. The economics literature also pays attention to the part-whole challenge: e.g., Schumpeter argued that economic growth emerges from the company level and that the company is a significant level, and not only the industry. Penrose argued that all companies are not necessarily similar and they may have heterogeneous, even idiosyncratic, resources. Administrative science recognizes that organizations consisting of feeling human actors with different interests and motives, who are able to discover opportunities, make decisions and choices, and are also able to learn. The strategy literature has paid attention to the survival of organizations over the long term in evolving part-whole relationship between action and structure.

In general, the process perspective on radical business innovations can be organized around the question of the organization's performance and survival in the long term (March and Sutton 1997). Survival is then explained by focusing on the evolving relationship between the organization and its environment. March (1997) has written: "the assumption that organizations evolve to fit their environments has long been taken as an axiom – though usually with the qualification that the rate of evolution may sometimes be considerably slower than the rate of environmental change. Specifying the processes by which this convergence of organization and environment occurs is a major preoccupation of organization theorists"[24]. The environmental approach is built upon Schumpeter's (1934) idea of 'creative destruction'. The basic line of argument then goes to state that abrupt punctuated change is possible and even evident (Hannan and Freeman 1984). This approach also views the survival of a company from a traditional industrial economics perspective, which emphasizes barriers to competition, and presumes that the industry effect will explain the largest part of above-normal returns (Teece, Pisano and Shuen 1992).

This environmental approach, among process perspectives on innovation, takes major change as given[25]. The majority of the literature on product-market innovation processes approaches innovation from this environmental point of view. The environmental approach has become and still is vital within innovation process research. The explanatory perspective in this approach represents environmental determinism without systematic attention to the intraorganizational processes (Baum and McKelvey 1999). For example, the discussion on dominant design emphasizes that the environment selects technology. This implies that the competitive advantage of an individual organization is based on efficient adaptation. Yet adaptation is not in any way the task of organizations or the individuals working in them. As March (1997) says: "rather than seeking adaptive organizations, the argument goes, we should seek rigidly efficient

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[24] The theorists describe three broad mechanisms of organizational adaptation. The first is problem solving or rationality. The second is learning from one's own experience and from the experience of others. The third is variation, selection and retention.
[25] Product innovations are seen as competence-destroying and efficiency-increasing sources of competitive advantage. Utterback and Abernathy (1975) emphasize the role of process in achieving competitive advantage. Anyhow, process is not perceived to be enough on its own but in relation to market (Abernathy and Clark 1985) and components (Henderson and Clark 1990).

organizations, with "adaptation" occurring by means of society replacing obsolete rigid organizations with currently effective organizations. That is, when one rigid organization becomes inappropriate for the environment, we should discard and replace it with another rigidly efficient organization, one relevant to the new requirements. It is a system of disposable organizations, staffed by disposable people"[26].

Another stream of research in the process perspective considers change as occurring by small steps in an evolutionary way (Burgelman 1983, 1994; Levitt and March 1991; March 1994b). This stream regards companies as fundamentally different from each other, i.e., as idiosyncratic. Over time, companies accumulate unique combinations of resources and organizational capabilities, which allow them to gain rents on the basis of distinctive competences (Selznick 1957). Advantage stems from proprietary assets that are not easily purchased, stolen, imitated, or substituted for (Dierickx and Cool 1989; Barney 1991; Peteraf 1993). The most potent of such assets are posited to be intangible or tacit (Nelson and Winter 1982; Itami and Roehl 1987; Prahalad and Hamel 1990; Nonaka and Takeuchi 1995). However, all rent-generating competitive advantages have a limited duration (McGrath and MacMillan 1995).

Organizational learning is a central mechanism in this organizational evolution and adaptation (March 1994b). Opposing environmental determinism, the learning approach considers actors in organizations as capable of making choices. According to this approach, an organization has a memory and routines with which it adapts to environmental changes. Nonetheless, learning is not always adaptive, because the quick learners may end up in traps in the long term (Levinthal and March 1993). The organizational learning approach has been criticized (e.g., Nonaka and Takeuchi 1995, 45) by pointing out that the terms adaptation and learning are sometimes used interchangeably. Further, Nonaka and Takeuchi criticize the learning approach for relying on a teleological ex-ante defined aim. In consequence, because the outcome of action can be seen as given, the relevance of the learning process can be questioned.

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[26] "The idea behind disposable organizations and disposable personnel is a familiar one. It might be called off-line learning or experimentation. When the world is volatile and transforming, organizations and the people in them cannot learn fast enough if they have to learn at the same time as they experience their worlds. Therefore, we construct a system that separates the learning of how to act from the implementation of action. This is the basic principle behind almost all formal training" (March 1997). This applies also to strategy-making.

March (1991) agrees with this characterization and admits the partly rationalistic nature of organizational learning[27].

Even though the learning approach has been criticized, it refers to a useful mechanism in the research on innovation processes. For example, Hamel (2000) and Van de Ven et al. (1999; 2000) have contributed to process studies of radical innovations based on actors' abilities. This is the case even though the actors in their studies are mainly treated as homogenous in terms of their actions and effects on the changing environment. Moreover, in a similar vein Hamel (2000) has studied the development of revolutionary new business models. He argues that this kind of radical innovation capability is the key to competitive advantage for the new millennium. Additionally, he says that when imitation cannot be used to form content for the strategy, then organizational capability for radical innovations is the hard part, not only the implementation, as many executives keep on telling.

According to Hamel (2000), in the age of revolution it is not knowledge that produces new wealth, but insight into opportunities for radical innovation. The existence of an opportunity for innovation can be observed from the top line of an income statement and the bottom line tells about the validity of the business model. Hamel argues that adaptation happens as a combination of environment, actors, and luck (p.23): "New business concepts are always, always, the product of lucky foresight…The essential insight doesn't come out of any dirigiste (sic) planning process. It comes from some cocktail of happenstance, desire, curiosity, ambition, and need…(p. 25) dream, create, explore, invent, pioneer, imagine". Thus, a mix of learning by discovering, imagination, as well as trial and error are means toward insight. In other words, this means that both action and cognition are needed. Additionally, collective cognition emerges from the individual to the group level and from there to the organizational level (cf. Nonaka and Takeuchi 1995).

As said above, innovations are mostly studied from an environmental perspective, but for the present study, the evolutionary perspective is more appropriate. The stream of

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[27] Other authors, too, for example Senge (1990), emphasize the teleological nature of organizational learning.

research presented next emphasizes especially the managers' activities in an established company.

2.2 Intraorganizational processes in radical innovations

Burgelman (1980) has presented a process model of how internal corporate venturing (ICV) occurs. The model is based on an empirical study in a large diversified corporation called National Chemicals. He studied the managerial activities in six internal corporate venturing projects in the corporate R&D unit. He conceptualized managers' cognitive and action processes on three management levels, i.e., the corporation, middle and operational levels. He applied a framework that was originally developed by Bower (1970). Bower's process model was developed in the substantive area of strategic capital investments. Figure 2.1 presents this model.

| | Core Processes | | Overlaying processes | |
	Definition	Impetus	Strategic context	Structural context
Corporate Mangement	Monitoring	Authorizing	Rationalizing	Structuring
NVD Management	Coaching Stewardship	Strategic Building	Delineating	Negotiating
Group Leader/ Venture Manager	Technical and Need Linking	Strategic Forcing	Gatekeeping Idea Generating Bootlegging	Questioning

(diagonal labels: Product championing, Organizational championing, Selecting)

Figure 2.1 Bower-Burgelman process model

For Burgelman (1983), the core processes of ICV comprise the activities through which a radical innovation is defined (definition process in Figure 2.1) and its development gains momentum in the corporation (impetus process)[28]. The overlaying processes comprise the activities through which the current corporate strategy is extended to

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[28] The core processes consist of stages where inventions from exploratory research are integrated into a corporate context in the following stages: 1) Conceptualization stage: from exploratory research to a new idea for a business. 2) Pre-venture stage: from a new idea to a new product, process, or system. 3) Entrepreneurial stage: from embryonic business to one-product business. 4) Organizational stage: from one-product to multi-product business.

accommodate the new business thrusts from ICV (strategic context determination), and the activities involved in establishing the administrative mechanisms to implement corporate strategy (structural context determination). He generated these processes from problems that emerged during the ICV process[29]. The capability of corporate management to absorb strategic behavior is identified as a key variable in the determination of the corporate strategy of unrelated diversification over time. According to this conceptualization, the corporate management's major influence in the strategic process is used through the manipulation of the structural context. Nonetheless, corporate management may increase its strategy-making capacity by becoming a sponsor to the strategic projects.

Burgelman (1983, 231) has argued that the development starts with the operational level actors' technical linking and need linking activities in the definition process. In his words: "technical linking activities led to the assembling of external and/or internal pieces of technological knowledge to create solutions for new, or known but unsolved, technical knowledge. Need linking activities involve the matching of new technical solutions to new, or poorly served, market needs". Next, the same actor forces activities aiming for market success of a single business. As Burgelman (1983, 234) has formulated it: "strategic forcing required that the venture manager concentrates his efforts on the commercialization of the new product, process, or system. In particular, it required a narrow and short-term focus on market penetration".

We may note that the above-mentioned substance-based activity, which Burgelman calls strategic forcing, refers to venture manager's deliberate tendency to attend to survival criteria of the venture that enable fast growth. This then has a tendency to lead to failed recruitment, functional problems, and neglect of strategy building (Burgelman 1983, 234). In his words: "To carry out strategic forcing efforts, the entrepreneurial venture manager attracted or was assigned generalist helpers who usually took care of more than one of the emerging functional areas of the venture organization. This was inexpensive and worked sufficiently well until the volume of activity grew so large that

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[29] Burgelman (1984) has presented these as 1) vicious circles in the definition process, 2) managerial dilemmas in the impetus process, 3) indeterminateness of the strategic context of ICV development, and 4) perverse selective pressures exerted by the structural context on ICV development

operating efficiency became an important issue". Also, as the new product, process, or system reached a stage of maturity in its life cycle, the need for additional new product development was increasingly felt. The problem was that the venture manager gets too deeply involved in controlling various functional areas, which takes time and attention from the development of functional capability and administration. Consequently, the venture manager's manager needs to build a more generic strategy and administrative framework for a multiproduct business: "Strategic building involved the articulation of a master strategy for the broader field of new business development opened up by the product champion/venture manager and the implementation of this strategy through the agglomeration of additional new businesses with the original venture. This involved negotiating the transfer of related projects from other parts of the corporation and/or acquisition of small companies with complementary technologies from the outside" (Burgelman 1983, 235).

To summarize Burgelman's contribution, the development of innovation occurs in an emerging, bottom-up, autonomous strategic process. The research that has followed this seminal work has shown that this Bower-Burgelman model, as Burgelman named it originally, is unique as it combines organizational actors' behavior at different managerial levels with organizational resources during different stages of the radical innovation process. The Bower-Burgelman model also offers a foundation for empirical conceptualizations and theory development (Burgelman 1991, 1996; Lovas and Ghoshal 2000; Noda and Bower 1996; Taylor 2000). The model has become the core of internal corporate venturing research (Burgelman 1983; Burgelman and Sayles 1986), essential in intraorganizational ecology (Burgelman 1991, 1996; Lovas and Ghoshal 2000) and in the evolutionary adaptation of organizations (Barnett and Burgelman 1996), as well as in the strategy-making (Woolridge and Floyd 1990; Noda and Bower 1996) of established companies. Additionally, studies proposing managers' possibilities to manage development processes by interventions (Christensen and Bower 1996; Christensen 2000; Christensen and Raynor 2003) and research on corporate entrepreneurship or intrapreneurship are based on or explore similar actor-based behavioral explanations (see, e.g., Maidique 1980; Burgelman 1985; Baghai, Coley, and White 1999; McGrath and McMillan 2000).

In his studies, Burgelman (1994) himself has also extended the Bower-Burgelman process model to cover the issue of the strategic business exit of the corporation. This model is based on Intel Corporation's exit process from analog memories and entry into digital memories. He has raised the level of analysis to strategy-making in an intraorganizational ecology discussion integrating the organization's environment, internal selection environment, and distinctive competences (Burgelman 1991; 1994). These are based on studies (cf. Burgelman 1991) in which the innovation process is examined from a variation-selection-retention framework, wherein entrepreneurial initiatives are seen as competing within this intraorganizational ecology. The process begins with activities at the middle and operational levels of the organization that generate a requisite variety of alternatives. A process of natural selection forces initiatives to compete against a set of externally relevant criteria. Rather than directing decisions, top management ratifies the outcome of this process, thereby retaining the venture within the organization as a part of the official strategy.

The research on intraorganizational ecology also contributes to the strategy-making of the corporation. It is conceptualized by emphasizing executive action (Burgelman 1991; 1994), executives' ability to conduct selection and retention of initiatives (Lovas and Ghoshal 2000), or their ability to combine resource allocation and resource dependence (Christensen and Bower 1996). A group of literature outlines top managers' possibilities to make interventions in the strategy process. For example, George and MacMillan (1985) studied the challenges of business venture managers during the two fundamental stages of creation and momentum that the venture must pass[30]. The issue in strategy-making can be derived from Burgelman's (1988) argument of the ICV process. It contends that a central tension is caused by the combination of induced and autonomous strategic processes. The induced process follows the traditional top-down planning approach in the pursuit of incremental innovation. In contrast, the autonomous strategic process is a bottom-up process in which middle managers have a central role in the pursuit of radical innovations.

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[30] The creation stage was the period during which the venture was launched and developed to the point where it was starting to generate sustained growth in sales. The momentum started when management of the venture had to cope with rapidly burgeoning growth.

2.3 Further ingredients for the present research on the radical business innovation development

The above-described Bower-Burgelman process model has been criticized as being too linear, as was briefly stated in Chapter 1 (see, e.g., Van de Ven 1986). Similarly, the intraorganizational ecological discussion has also been claimed to over-emphasize the autonomous activities (Lovas and Ghoshal 2000). This criticism can also be viewed as extending to the perception of learning and knowledge usually attached to incremental learning (Hamel 2000). Despite the criticism, the previously discussed authors in the evolutionary process perspective agree that actors, time, attention, and action are at interplay between strategy and structure. This also poses major challenges for the innovation process. In addition, the evolutionary process authors share the view that both invention and innovation should be taken into account when studying innovation development. It is insufficient to address only one or the other when seeking to understand the development from a single product to a multiproduct business. This development has been suggested to take place in an iterative way[31]. They also agree that technical and administrative innovations can be separated[32].

The main conceptual purpose of the present research is to suggest further ingredients for Bower-Burgelman's process research in the substantive area of radical business innovations. For such an aim, Burgelman's contribution to strategic and innovation management is significant especially in the substantive area of internal corporate venturing. This raises the question of whether the behavioral generalizations of the

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[31] Cycles were illustrated in Burgelman's work as taking place in the definition process (see Burgelman 1980, 1984; Burgelman and Sayles 1986). Cycles were also illustrated in a process study by Van deVen et al. (2000).

[32] There is an ongoing discussion about the separation of these two kinds of innovations (Bower 1970; Maidique 1980; Burgelman 1983; Damanpour and Evan 1984). Even though Van de Ven et al. (1999) are worried about fragmentation of innovation research, they are aware of and see the necessity of separation to some extent, because they included in their definition of innovation both technical innovations (new technologies, product, and services) and administrative innovations (new procedures, policies, and organizational forms). Damanpour and Evan (1984) argue that understanding the close connection between technical and administrative dimensions of innovation ideas is a key part of understanding the management of innovation. Daft and Becker (1978) and Maidique (1980) have suggested keeping technical and administrative innovations distinct. Burgelman's (1983) findings are in the same line. In addition, those discussing incentives and career development support the division of these two. The opposite perspective is presented by sociologists of technology, who do not support this kind of a separation.

evolutionary processes researchers can also be used to explain radical business innovations. The present study aims to contribute on this question. Second, the administrative activities in the definition and impetus processes need further clarification, especially at the early stages of the development. Burgelman (1980) has also indicated this question by saying that the conceptual separation of the operational and innovation system in the early phases of innovation and the later combination of them seem to veil the observation of administrative innovations within and across innovation systems, but especially between innovation and operational system in the early stages of innovation. The present research aims to contribute on this point, too. Third, the observations made in the previous literature can be related to the managerial challenges of initiation, resource mobilization, resource allocation, as well as the gaining of support and impetus for the development of radical business innovations. These aspects are also related to the first two points made above. Especially, the apparatus developed for the present research aims to provide a substance-based explanation for the development of radical business innovation. It is suggested that this development takes place in an iterative, i.e., cyclical, way that provides a substance-level explanation to radical business innovation. Next, based on existing theoretical starting points, I present the more detailed research questions for this study. These questions are organized under the main interests and issues presented in the first chapter.

First, as Burgelman (1983) points out, the initiatives for radical innovations may occur with strategic intent (which he termed induced strategic change) or as a result of a relatively unplanned, serendipitous activity undertaken without particular reference to a conscious corporate strategy (autonomous behavior). In either case, the pursuit of new initiatives appears to be central to the preservation of requisite variety, itself essential to organizational adaptability (Van de Ven 1986; Baum and McKelvey 1999). However, in the case of radical innovations, the previous literature recognizes that in order to be materialized, the initiatives require that technical problems are solved and these solutions are offered for a market need at the operational level of the organization. Burgelman also emphasized the importance of informal 'bootlegging' research in the emergence of an initiative. To contribute to this understanding, we may ask if this is the way opportunities emerge. More precisely,

1) What kinds of bootlegging activities precede the definition of a radical business innovation in an established organization?

Second, the innovation processes examined by Van de Ven et al. and Bower-Burgelman are mainly results of functional and cross-functional resource mobilizations at the operational level of an organization. This resource mobilization provides content for Burgelman's substance-based generalization of strategic forcing. He defines this as unfolding in the impetus process. He found out that linking takes place primarily at the definition process. We may ask if the early stages of the innovation process can be sufficiently addressed with the concept of linking? In addition, it seems unclear whether and by whom the cross-functional principles are actually defined and to what extent they are conceptualized at the early stages of the innovation process? Further, to what extent do the actors involved take into account the existence of different managerial arenas and the organization's abilities to resource the pursuit of a radical business innovation? Additionally, the process literature recognizes surprisingly seldom the kinds of opportunities that radical innovation opens for the emergence of an industrial field. Based on these observations we may ask more exactly,

2 A) Can operational level managers or project managers define the opportunity and initiative for a radical business innovation and do they pursue those opportunities?
2 B) How do such managers mobilize resources and pursue such opportunities, i.e., what are the cross-functional principles used in these actions?

Third, Burgelman (1991), as already briefly indicated above, has found that the corporate level context set by top management has a strong selective effect on the strategic actions of middle and operational level managers. Namely, in Burgelman's study the existing resource allocation rules were a strong determinant of what the company did, regardless of the rhetoric associated with the official (or stated) corporate strategy. Like Noda and Bower (1996) in the case of US WEST, Burgelman has found that Intel's top management did not change the resource allocation rules, even though the outcomes regarding the DRAM memories were not what the top managers had in mind when they put the rules in place. The studies on strategy-making and strategic exit have emphasized the importance of middle managers in adjusting internal and external selection environments.

Bower (1970) and Burgelman (1980) have acknowledged corporate decision making but not considered it as an overly important element in the resource allocation process. We may ask whether it is in fact an essential element, e.g., as an opportunity for managers to integrate or intervene in autonomous activities, or for induced managerial activities. Additionally, we can ask to what extent managers from different managerial levels can affect different resource allocation criteria and how they are adjusted in relation to the external selection criterion. This relates to a more general issue, that is, whether and to what extent organizational actors are able to choose between different resource allocation criteria in strategic action, and more precisely,

3 A) How does corporate management contribute to the RBI process? If not, then who does?
3 B) What are the criteria on which resource allocation is based and how stable are these criteria?

Fourth, in Burgelman's (1980) study, the development of the ICV project was evaluated on the basis of a size criterion, in all of its forms[33]. As he argued (1980, 262): "more diverse growth evaluation criteria other than size for performance are difficult for corporate management because of lack of familiarity of new business field". Hence, using size as a measure of performance also provides impetus for innovation development. However, Ranta (2005) proposes that growth may not be the best measure of performance for venture organizations because a high growth rate can be artificially created, for example through a parent-venture relationship. Furthermore, size also indicates a search for economies of scale, e.g., created by product development projects. Therefore, if size is the only criterion, we may assume that managers divert time and attention to structures. Then these managers' time and attention is not available for the definition of linking or cross-functional principles or successful market penetration. Consequently, financial slack may accumulate more slowly and then the venture manager may get caught in a defensive position towards the institutionalizing and political forces of the dominant business in the organization. Hence, we may ask whether growth can be pursued on the basis of some other criterion than size, and how

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[33] Size here includes criteria for performance and, e.g., number of employees.

organizing takes place in that case. A further question is, what kind of a mutual relation is there between action, organizing, and evidence collection in RBI development?

Additionally, the previous literature illustrates the cyclical nature of development within the definition process of innovations. It does not, however, illustrate the nature of development across processes. Furthermore, the content of action within these cycles is largely missing from the illustrations. This may be due to several reasons, including difficulties in accessing data or the time limitations of researchers. For instance, Burgelman's observations of the definition process were based on interviews. With respect to the impetus process, the observations were based on corporate long-range business plans (1980, 236). In Van de Ven et al's study, none of the observed projects had taken off, and in Burgelman's study, only one project had gone through all the stages of the innovation process. Thus, the cyclical nature of development needs explicitness and further evidence. Moreover, it is mostly unclear how the creation of new core business for the corporation takes place over the long term. Hence, we may ask in more detail,

4) How does the radical business innovation process gain impetus and continuous support for its development in the organization?

Finally, the explanatory part of this study in Chapter 6 suggests and explicates managerial activities that buffer and bridge the innovations in question. Next, I shortly discuss these concepts and the related literature. In this study, it is fully acknowledged that buffering and bridging are not novel concepts[34]. In practical terms, buffering means providing peace to work with a development or protecting an initiative from third parties that disturb the development. Bridging means collaboration, co-operation, or networking with those third parties who are able to assist in the development of the innovations.

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[34] Lynn (2005) has noted that functional equivalents to buffering exist in many related fields, such as: Finance – working capital, budgetary slack, and various sources of short-term credit; Economics – peripheral industries and secondary labor markets, protectionism and monetary buffer stock; Business law – incorporation that protects employees from litigation; Organizational behavior – coping, such as with stress reduction, ego protection, and group performance.

In fact, the extant process literature pays surprisingly little attention to intra- and interorganizational collaboration and co-operation with third parties at different stages of radical business innovation development. This aspect is also lacking from the Bower-Burgelman process model. Originally, Thompson (1967) highlighted that "under the norms of rationality, organizations seek to seal off their core technologies from environmental influences" (1967, 19). Scott (1992) classifies different tactics to buffer the organization's technical core – to erect and bolster its protective boundaries. He refers then to the organization as a production or technical system for transforming inputs into outputs. He illustrates coding, stockpiling, leveling, forecasting and adjusting scale as technical buffering tactics, while institutional-level buffering includes such tactics as symbolic coding and decoupling of organizational action from the external environment.

Furthermore, according to Thompson (1967), no organization is able to produce all the resources necessary for its goal attainment or survival. Instead, organizations enter into exchanges with the environment, typically with other organizations. In these relations, organizations try to manage unequal power and resource differences by tactics that enhance their own bargaining positions. Organizations increase coordination, which means that they increase the mutual control over each other's activities (Pfeffer and Salancik 1978). Scott (1992) argues that organizations may modify their boundaries by activities including boundary-spanning and boundary-shifting tactics that bridge between the organizations. He presents as managerial tools for bridging, e.g., bargaining, contracting, co-optation, hierarchical contracts, joint ventures, mergers, associations and government connections. Additionally, Scott (1992) refers to forms of isomorphic processes depicted as coercive, normative, and mimetic, following the work of DiMaggio and Powell (1983). These mechanisms give rise to institutional bridging such as categorial, structural, procedural, and personnel conformity.

Moreover, boundary spanning and shifting have been studied also in terms of collaboration, co-operation or networking. For example, networking is a popular concept that has been studied, e.g., as contracts between companies (Araujo and Easton 1996). However, the networking literature does not so widely cover the meaning of informal and formal social relations (Oliver and Ebers 1998). Some network studies have been made in the development of products and production processes. Yet there is

not much in-depth research on how networking, collaboration or co-operation relate to innovation development, as e.g. Miettinen, Lehenkari, Hasu, and Hyvönen (1999) have pointed out. Moreover, networking, collaboration, or co-operation are most often not studied from the intraorganizational managerial perspective in the development of radical business innovations[35].

However, all the above-mentioned technical tactics are theoretical illustrations and as Scott (1992, 202) says: "represent standard operating procedures for conventional organizations". The tactics could also be characterized as rather passive and production industry oriented – in fact, not very applicable for knowledge-intensive companies. Institutional level tactics handle information by absorbing or incorporating it, not particularly by dynamically exchanging it over time. Additionally, the existing literature on buffering and bridging attaches them to stable or incremental changes, not necessarily to the early stages of innovation development, when change only exists in the form of ideas and information-loaded stories.

Even though the concepts of buffering and bridging have been introduced and discussed to some extent in the literature, Lynn (2005) has found that only three empirical examinations have been made of the buffering phenomenon since Thompson, and in all of them, the level of analysis was the company (Koberg 1988; Meznar and Nigh 1995; Sorensen 2003). Additionally, a further important issue is the balance between buffering and bridging. Lynn has further argued that this balance has not been empirically illustrated. As a result, there is too little knowledge of the more general innovation process taking place in a non-monolithic organization.

In the next chapter, I shall tell in more detail about the kind of research design used to seek answers to the above questions. The next chapter also describes how the data were collected and analyzed.

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[35] See more Laaksonen (2006).

3 RESEARCH DESIGN AND DATA COLLECTION

In this chapter, I present and briefly discuss the research design and data collection methods of the study. In section one, I present the bases for selecting ARP and Zed as the cases for this study. I describe them as radical business innovations of their own eras. Section two describes how the data were collected and analyzed. In section three, I discuss the quality of the research data and the expected validity of the results.

3.1 Selection of cases

In my preliminary examination of the development of the Sonera Corporation, I recognized four radical innovations and two emerging radical innovation initiatives. The radical innovations included ARP, Telesampo, New Services, and Zed. Privatel and Monica were initiatives with potential to become radical innovations. The details on the Telesampo, New Services, Privatel, and Monica innovations are described in Appendix 6. Why then, did I decide to focus on ARP and Zed instead of Telesampo, New services, Privatel, and Monica? In short, these four innovations or innovation initiatives either did not turn into radical innovations or did not gain good currency. Moreover, none of them formed the vital basis for a new, publicly communicated core business of the corporation in their own time. More precisely, Monica or Privatel did not become radical innovations because they were not extended from their original markets, neither did they gain good currency on that market. In the case of Monica, the representatives of Mannesmann[36] came to visit Sonera in the end of the 1980s. At the system presentation they said: *"We want to buy it [Monica]. How much does it cost?"* This was completely novel for the company: to provide or to even think about selling a supporting system to another telecommunications operator (TELCO). Nor was there an intrapreneur willing to take this kind of a risk and in general, the system was seen to support the existing business unit's growth on the domestic market. Even though Monica was later taken as a test case to one international seminar, Sonera did not start to pursue it seriously. With respect to Telesampo and New Services, they were not taken into the focus of the present study because although they gained good currency in

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[36] Mannesmann was the second GSM operator in Germany. Vodafone acquired it the end of the 1990s.

their own field, they did not form vital bases for publicly communicated new core businesses of the Sonera Corporation[37]. Additionally, it was also important for me to have especially good access to data on the studied innovations. For example, ARP was launched to the market in 1971 and thus it was possible to follow its development over a long period of time. Simultaneously, the central persons involved in the development of ARP and related business unit documents were also still available for me.

So far, I have presented the reasons to focus on the ARP and Zed innovations in the present study. Next, I shall present more exactly the nature of ARP and Zed as radical business innovations of their own era. First, I describe the international relevance of each innovation. Second, I shall discuss the extent to which I argue that they represent radical innovations. As a part of this, I describe how good a currency they gained at their own time.

3.1.1 Characteristics of the radical business innovation ARP

It seems clear that the survival and success of mobile systems, especially the GSM, was undisputable in the world by the late 1990s. This was especially the case in the Scandinavian countries and Finland. As far as the Sonera Corporation is concerned, the Mobile Communications Business Unit held the necessary competencies to operate this business successfully. During the research process, indicators emerged that technical, marketing, and organizational principles had been drawn up during the early days of the business. In consequence, in the further fieldwork I went backward from the GSM to the preceding technological systems in the same field, i.e. the NMT 900, NMT 450, ARP, Saimaa Radio, Coastal Radio (*RannikkoRadio*), and Maritime Radio (*MeriRadio*) systems of Sonera[38]. The other systems following ARP were incremental modifications of it, based on either the technology or the market. Later in this subsection, I will briefly

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[37] Many path-dependent arguments may be presented that Telesampo was crucial in the development towards Zed. Nevertheless, Internet replaced it in the end of the 1990s. Furthermore, this development can be traced back to ARP.

[38] The Maritime Radio was implemented in 1920 when the Finnish government required Sonera to take care of the communication of the Finnish fleet. Saimaa Radio was implemented in the 1950s. ARP provided the first nation-wide mobile telephone service. NMT 450 was the first automatic mobile telephone system developed together with the Nordic Country operators and manufacturers. Hand held mobile terminals were offered in the NMT900 system. GSM was a common European-wide mobile communication system.

discuss each of them. In fact, in Sonera and in Finland, the birth of the mobile communications industry, business, and system was first established with ARP. That makes it a contingent event (Mahoney 2000). This observation makes ARP an even more interesting innovation to study. However, the survival of the ARP system is clear ex-post, but it was not at all clear at the end of the 1960s when its construction started. As Toivola (1992, 16) writes:

> *"Already in the preliminary studies there were doubts that a new system will not gain commercial success…The chief of the Radio Station Section said in one meeting that the network will be constructed in three years, after which the gang can look for the work somewhere else. The situation was controversial and [eventually] the construction expanded to an enormous scale[39]."*

Several dramatic events preceded the emergence of mobile communications as the core business of Sonera Corporation, which occurred finally in 1996[40]. Fierce competition in the previous core businesses of Sonera had already eroded illusions of the overall competitiveness of the corporation in 1994. As the company's Vice President responsible for corporate strategy at that time said metaphorically:

> *"Sonera lost 50 percent of its revenue and 200 percent of its profits during one night"*

Thus, the Sonera Corporation was in need of a new core business. Soon, the Mobile Communications BU was to 'save' the company. In fact, the business was so profitable that it could cover all the losses generated by the rest of the company. The corporate 'crisis' normalized in 1996 and the Mobile Communications BU took its place at the edge of the corporate businesses. Even though its emergence took a long time, the managerial principles developed during the ARP system mostly remained in place up until the time of the GSM system. As the business unit director, a member of the Corporate Management Group at that time said:

> *"Most of the managerial principles of this business were developed during the ARP. Since then they have been only slightly modified".* (1997)[41]

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[39] ARP was followed by the networks and modifications in order of: YRP, NMT 450, NMT 900, GSM, DCS, HSCD, GPRS, EDGE and UMTS.
[40] See Chapter 1 for further information. This emergence happened with the GSM technology.
[41] This marking means that interview was made in 1997. This notation will be used onwards.

These original managerial principles were 'brought into fruit' at the Sonera Corporation 25 years after the market launch of the ARP system in 1971. Thus, the development from ARP all the way to 3rd generation mobile systems happened gradually in a path-dependent way. When we look at this development more carefully, we can make several interesting observations. For example, the manual switching procedure used in ARP was principally standardized and automatized in the NMT 450 system. Evidence of the system's customer success was then available and according to the BU director:

> *"The managerial challenge in the NMT 450 was to get the investments from the owner to satisfy customer demand".* (1998)

The NMT 900 system functioned at the double frequency band compared to the NMT 450 system. This meant smaller cells and more capacity. Also, hand-held mobile terminals were offered for commercial customers. According to the BU director:

> *"The managerial challenge was to handle the planning of capacity, frequency, and coverage of the mobile network".* (1998)

The distinctive features of the GSM system included the fact that it was a digitalized European-wide system. Again according to the same BU manager:

> *"Market competition was the managerial challenge in the GSM".* (1998)

The managerial principles learned in the ARP business were kept in the business unit partly by transferring these principles and knowledge from older managers by apprenticeship to the younger, future talents of business. The success of the mobile communications business did not affect the corporate management's thinking and discourse until the mid-1990s. Consequently, management initiated several changes in the previous operations. For example, they started to encourage moving from mobile and other networks towards end-customers, and first from call to text services and then to data and multimedia services. In addition, management started to encourage the imitation and transfer of services developed and implemented in one network also to other networks. Furthermore, in the late 1980s the Sonera management also started to encourage the questioning of established organizational routines by doing things partly or completely in different ways than had previously been typical in the corporation.

I also argue that ARP was a radical innovation for the Sonera Corporation on the technology and market dimensions. As far as technology is concerned, during the emergence of ARP in the 1960s, the main emphasis in corporate technology development was in the fixed telephone and the telegraph networks. Corporate telephone activities were divided into national long distance and local call services in the suburban areas of Finland, as well as international call services. The invention of radio waves produced the central technological discontinuity for the mobile communications systems. A mobile system based on this discontinuity produced personal and terminal mobility, their management as well as the combined billing and accounting features. Mobile technology was novel for the company even though it was operated at Sonera by the Radio Division on a minor scale in its systems of Maritime Radio, Coastal Radio, and Saimaa Radio. In the systems following ARP, technology development affected especially mobile switching centers and mobile terminals. The development of processing and memory technologies in electronics and information technology made it possible to automate humans' work at mobile switching centers and to decrease the size of the mobile terminals. At first, terminals were implemented in liners, then in boats and next in cars – finally leading to hand-held mobile terminals (see further information in Koivusalo 1995 or Pulkkinen 1997). The extension of automatic roaming was also important for the system's functionality. Namely, the functionalities of system handover, locating, and location update were manual in ARP. With respect to discontinuity in the market dimension, we may note that the ARP service was the first service for the Sonera Corporation and in the Finnish distributed monopoly[42] market that reached into other distributed monopoly participant's, i.e. the local telephone companies', areas to compete for the same customers. The service was also the first service with national coverage in this industrial field. During this development, the participants of the monopoly clashed for the first time with one another[43].

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[42] This means that local telephone companies had monopoly in the biggest cities and Sonera in the other sectors of telecommunications depicted in Appendix 2. This name originated from a company director.
[43] Later these two 'camps' clashed over a data communications system known as Telewar. It was a natural continuum from ARP and it occurred in the end of the 1970s. This led finally to the break down of the national duopoly, deregulation and partly to the privatization of both TELCO camps.

Finally, it is important to note that ARP also gained good currency. The local telephone companies' wireless systems competed for the same customers with ARP. These systems consisted of a network with one base station and from one to five wireless terminals. The number of these small systems exceeded 1100 in 1969 (Toivola 1992). Generally, the wireless networks could be divided into closed and public networks. For example, authorities such as the Defense Forces or the State Railroads (referred to as VR onwards) used closed networks[44]. Helsinki Telephone Company, for instance, had a public system called the public local radiotelephone system[45]. This system did not become profitable because, in the words of a Sonera service unit manager:

> "The system was expensive, functioned badly and it was local".
> (1996)

Swedish Telia (at that time *Televerket*) had since 1956 used local systems in Sweden that were similar to the one that the Helsinki Telephone Company had in Finland. The first system was called MTA and from 1965 onwards, the MTB system was used (Mölleryd 1999). The MTD system, which was very similar to ARP, was launched to the Swedish market in 1973. However, as Mölleryd (1999, 89) observed:

> "Profitability was satisfactory when the number of subscribers stood
> at around 10 000 but the costs increased immensely when the number
> came up to around 20 000".

When we look at the financial figures, ARP's revenue tripled during the first four years since the market launch, amounting then to 0.97 m€. ARP became EBIT (Earnings Before Interest and Tax) positive after its fifth year in the market and profit before taxes became positive after the sixth year in the market (Lätti 1978)[46]. Even though ARP did not emerge to the core business of corporation during its life cycle, the corporate management recognized its potentiality and position. As the CEO of that time said:

> "ARP was so profitable, that it could not be touched by a finger [in
> the late 1970s]". (1999)

The division's revenue was about 0.019 percent of Sonera's revenue in 1971. In 1998, the share of equivalent operations was 49 percent (Lätti 1978; Sonera 1998). Thus, the

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[44] The VR had e.g. a line radio system that engine drivers used in trains.
[45] Actors could define 'local' as Toivola (1992) said:"*At the flight from Malmi all the way to Lappeenranta, the public radiotelephone system of Helsinki Telephone Company was heard*". This distance is about 225 km and Lappeenranta is about 60 km from the Russia border.

Radio Division had made a breakthrough among the Sonera's businesses. Next, I describe Zed as a radical business innovation of its own time.

3.1.2 Characteristics of the radical business innovation Zed

Sonera presented Zed to the international telecommunications audience in autumn 1999. This audience 'hummed' about it because Zed emerged to the front line as a business initiative comparable with other major portals such as Yahoo, AOL-TimeWarner, Excite@home, and Imode. It is interesting that Sonera was able to produce and present a global mobile portal initiative like Zed credibly to the market[47]. The emergence of Sonera and Zed from one of the ordinary European TELCOs to the front line of global development was worth noting. It is interesting why companies with larger balance sheets, technology and competence portfolios, longer experience as publicly quoted, internationalized companies, and TELCOs with stronger political influence among European TELCOs (e.g. Vodafone and British Telecom) were not able to produce this kind of an initiative, even though they should have had more potential than Sonera to make it.

Zed was a radical innovation for the Sonera Corporation both on the technology and market dimensions. Let us consider the technology first. During Zed's emergence in the end of the 1990s, the main emphasis in corporate technology development was in the mobile communications networks. The Mobile Communications BU made massive investments in the GSM network in 1996. The fixed network was the other cash flow generating unit in Sonera even though it was recovering from a massive reorganization. In any case, the fixed business did not grow and its profitability was weak. In addition, the maturity of the mobile business could be outlined. In contrast, the New Media and especially the Internet business were growing. The Internet service production was organized into a separate service unit. Nonetheless, the Internet technology was novel for the company because it had started to grow in the customer market only since the mid-1990s. It had not yet developed a range of competences in this field. A combination of Internet and mobile systems produced a technological discontinuity in this case. The Internet became increasingly clearly the platform for service and content provision and

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[46] Multiple unprofitable years followed because of investments to the ARP and NMT networks.

its management, while the mobile system took care of the mobility management. Their combination was novel for the company even though it had been piloted on a small scale in a joint project of the Internet and Mobile units a little while earlier.

As far as the market dimension is considered, the business focus of the Sonera Corporation shifted from the domestic to the global customer market with Zed. In this market, Sonera's potential competitors were TELCOs, Internet and other service providers (ISPs), media houses, equipment vendors, content aggregators, application providers (APs) as well as software companies participating in service provision. These other organizations were waking up to either Internet or mobile communications businesses or acted in some part of the service provision value chain (soft- or hardware). ISPs saw the Internet as a platform for service provision. Especially, the U.S. companies were in the front at this, because there the historical development of the teleinfrastructure had directed innovations and managerial attention to the cable and the fixed networks[48]. Yahoo, AOL and Excite provided portals for fixed networks at first. @Home and Time Warner operated in the cable network. All of these companies also provided content, to some extent. For example, Time Warner had its traditional competence in content provision and it owned CNN News. The development took the direction that @Home moved forward in the value chain by buying content from Excite (Infoworld 25 Jan. 1999). They used telephone and cable as channels to distribute media content. AOL-TimeWarner became their competitor in the cable network when AOL bought Time Warner in the end of 1999. At that time, AOL-TimeWarner provided a portal mainly for the data network. The 'purest' Internet portal, however, was Yahoo.

If we estimate the internationalization of the activities of the above companies, the most global was Yahoo, then AOL, and the last was Excite@Home as a company that almost completely concentrated on the U.S. market. On a global scale, the mobile communications channel was still 'empty' in the middle of 1999. NTT had launched its own system called Imode to the Japanese market in the early 1999[49]. Nevertheless, the

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[47] The characteristics and services of Zed were presented in Chapter 1.

[48] In the USA, the fixed network was called a narrow band connection and the cable network was called a wide band connection.

[49] Imode was a walled garden, i.e., a closed system meaning that it was completely under NTT's control. Namely, they chose content providers and vendors. Additionally, they favored the chosen vendors, e.g., by providing information for them in advance.

management of Sonera did not perceive it as a functional system or concept over the long term. Hence, it was this opportunity in mobile communications that Sonera Corporation rushed to fill with Zed.

Why then was this channel of mobile communications empty? Briefly stated, the historical development in the USA and Europe had resulted in a situation in which the mobile communications infrastructure there was not as developed as in the Nordic Countries or especially in Finland. It seems that in Finland there was also a strong belief and insight about the global opportunities inherent in the mobile systems. As a result, Sonera was considered a 'mobile communications corporation' that had a possibility to pursue this opportunity 'credibly'.

Finally, it is important and may be a little surprising to note that Zed also gained good currency. However, this materialized in different terms than in the ARP case. Namely, Zed materialized in the form of the increasing share price of Sonera Corporation on the capital market. For example, MINTC presented the development of the relative valuations of some European TELCOs in 2001. Figure 3.1 presents them. The content of the initial public offering (IPO) of Sonera Corporation organized in 1998 consisted mainly of the mobile business. Thus, the Sonera management presented the company as one with an intention to grow internationally. Since then, the market capitalization of Sonera started to deviate from its competitors. The content in the second share sales in 1999 consisted mainly of the global mobile portal Zed and the security provider SmartTrust. The market capitalization of Sonera rocketed, leaving the other European TELCOs far behind.

These new business initiatives, Zed and SmartTrust, were important for Sonera. The investment bank Merrill Lynch valuated Zed's business worth at 17,5 billion euros in January 2000. At that time, the market capitalization of the Sonera Corporation altogether was about 50,4 billion euros. Thus, Zed formed about 46 percent of the corporation's capitalization and was the target of the greatest future expectations. The all-time peak valuation of Zed was about 20 billion euros. For example, Merrill Lynch gave a buy recommendation for Sonera's shares in its report on 20th April 2000. The

bank presented a 12-month price objective of 90 euros per share for the company. This was especially based on Internet businesses, including Zed. As a 'blue-sky scenario', they presented 165 euros per share. This would have meant a capitalization of about 121 billion euros for the corporation. The all-time high share price rose to 97 euros at the end of March 2000, meaning a market capitalization of about 75,6 billion euros. Altogether, these were quite unbelievable figures as the annual revenue of the Sonera Corporation in 1999 was 1849 million euros and its EBITDA (earnings before interest, taxes, depreciation and amortization) was 668 million euros (Sonera AR 1999). In the first IPO in 1998, the share value was EUR 7.5 per share. The growth had been dramatic.

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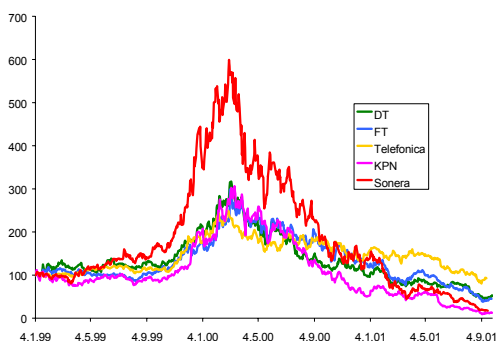
Figure 3.1 Relative valuation of some European TELCOs (MINCT, 2001; Source: Deutsche Bank, Index 4.1.1999=100)

Furthermore, when we look at Zed in financial terms, Zed's revenue tripled during the first four years since the market launch, amounting then to 83,4 M€. Zed became EBIT positive after its fifth year[50]. When the Finnish directory company Fonecta bought Zed Finland on February 6th 2006, its revenue was about 14,5 million euros, as Fonecta's managing director also commented:

> *"Zed has been for a long time the most important distribution channel for our Finder service to mobile subscribers. Last year 1,5 million Finnish people used the service and they made over 17 million retrievals to the system".* (Fonecta press release 6.2.2006)

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[50] These numbers were based on Sonera and TeliaSonera's annual and interim reports. EBIT and EBITDA information were collected from bit and pieces in different sources.

Let us still briefly compare the two innovations in focus in financial terms to justify their eligibility as radical business innovations. The comparison is based on the first four years of available financial information. However, it must be noticed here that in the 1970s and the case of ARP, there was none of the kind of financial market pressure that existed in the 2000s towards Zed. Nevertheless, ARP doubled its revenue during the first five years since its market launch, as did Zed. ARP was EBITDA positive after five years, while according to analysts, Zed was so after four years. When EBITDA was positive, Zed had an EBITDA relation to revenue of 1,2 percent, while ARP's was 0,34 percent. The profit before taxes was positive in ARP after six years. These figures are not available for Zed but it can be assumed that the huge investments into its development did not provide positive profit that soon. If they did, it would be even more surprising. EBITDA figures from the first years in the case of ARP were not available, thus cumulative EBITDA cannot be presented. The available figures concerning Zed indicate that the cumulative EBITDA had reached its bottom, and the business was turning into a profitable one. However, it is difficult to estimate the effect of the investments, transfer pricing and costs on cumulative break-even for ARP. In spite of this, an estimate can be made on the basis of the available profit before taxes numbers[51]. Since the fourth year, it took nine more years until the cumulative profit before taxes was positive: i.e., in 1981, ten years after the market launch. Taking into account the first three years when the losses are usually the worst, break-even can be assumed to happen after thirteen or more years. The development of the NMT450 can also be assumed to affect the investments since 1979, which moves the break-even point further. Nonetheless, a cumulative break-even for ARP may be set between 10 and 15 years.

By this far, the presented data indicate that both ARP and Zed gained good currency even though it was materialized in different ways in the two innovations. During the period studied, ARP became a functional system for the corporation and proved its viability in terms of profitability. Later, ARP produced the new core business of the corporation measured, for example in terms of revenue. In the case of Zed, Sonera corporate management communicated their intention to make Zed the forthcoming core

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[51] In the data, the first three years were missing.

business of Sonera (Sonera road show 1999). In the short term, Zed gained currency in the form of the rapidly increasing share price of Sonera in the capital market. Over the medium term, the capital market valued it at zero, and Sonera divested it. Hence, Zed can be considered a commercial failure for the Sonera Corporation. Nevertheless, over the long term, part of Zed, e.g., Zed Finland, still was in operation in 2006, when this report was prepared. Thus, for the purposes of this research, we consider Zed as a radical business innovation whose success was only temporary. This does not, however, invalidate it as the other radical business innovation to be compared with ARP in this study.

Additional reasons for selecting ARP and Zed as the two cases to be examined in this study include that the organizational processes that produce such radical business innovations in the same organization have not been systematically studied in the present literature. I also endeavored to obtain a holistic real-life view in order to improve our understanding of the extremely diverse and managerially complicated radical business innovation process. Besides, questions of "how and why" are typically addressed using case study methodologies (Eisenhardt 1989; Yin 1989; Van de Ven and Poole 1990). In addition, case study research often stimulates the development of new substantive theories (Ragin 1987, 44). Moreover, it can be mentioned that both Glaser and Strauss (1967) and Pettigrew (1990) recommend choosing cases of extreme situations and polar types. Additionally, as Ragin (1987, 23) observes: "some comparativists argue further that cases registering extreme values deserve detailed attention because they provide especially pure examples of certain social phenomena". From this point of view, the studied innovations were different with respect to the processes that led to the outcomes, the organizational actors involved, and the business environments in which they emerged. First, ARP emerged in a bottom-up way by incrementally accumulating customer market evidence and competence. Gradually ARP produced a core business of the Sonera Corporation. In contrast, Zed became a communicated core business of the corporation almost overnight, after convincing evidence on its future potential had been presented in the international capital market. Second, corporate management activity varied between passive in the case of ARP to very active in Zed. Third, ARP and Zed were produced in similar task environments, but in different macro environments[52]. I

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[52] Scott (1995) and Meyer and Rowan (1991) discuss different environments.

have given some details of this in the first chapter but we need to discuss this further in order to recognize important differences between ARP and Zed as well as to justify the research design.

In the 1960s, the Finnish Post and Telegraph acted in a distributed monopoly in the Finnish customer market. The Finnish State as an owner was embedded in the national political discussion based on the state budget. The constellation of the telecommunications industry was based on the cooperation between different organizations seeking for national advantage. This macro environment changed dramatically by the year 2000. By that time, increasing service-market competition had emerged. Also, the overall technological development in the field of mobile communications had changed to global forums, and the different parts of the value chain had started to become more diversified and fragmented. Privatization had also activated owners and corporate management to see the potential in the companies that operated in this business. The fact that Finland had been a member of the European Union since 1995 had gradually taken away emphasis from the systematic building of the national industry constellation.

In addition to differences, there were also similarities between the environments of ARP and Zed. Most importantly, in both cases the task or technical environment emphasized growth. In the case of ARP, intraorganizational resource competition and a will to survive led to a lack of resources and a need to grow. In the case of Zed, there was also a lack of resources due to perception of market opportunity, increasing market competition and a promise given at the IPO. In this context, the management of Sonera responded accordingly. As one manager at that time said when I asked to interview him: *"I don't have time for interviews because we have to conquer the world now, not tomorrow"*. Nevertheless, this similarity in the task environment increases the comparability of the two innovation processes and further justifies the adopted research design (Weick 1979). Finally, we may mention that innovation development in both ARP and Zed took place as an interplay between invention and innovation. This also means an interplay between cognition and action. Hence, I followed the spirit of Burgelman (1980, 21):

"Ideally, the research design of the ICV phenomenon and development process would be comparative and longitudinal. In such a design, a large number of ICV projects would be studied in the innovating systems of a large number of different types of corporations, and the development over time would be completely followed through."

I recognized that I was not able to strictly follow the research design suggested because of time and resource limitations. These are challenges especially when development processes take many years to complete and these processes happen at multiple managerial levels in a corporate hierarchy[53]. Then a longitudinal research design always increases our understanding of innovation processes. In addition, as Monge (1995) has found out, although longitudinal research is often recommended, it is seldom conducted. These aspects can be considered to warrant the research design in this study, which some would call a quasi-longitudinal study, but which is capable of challenging merely retroactive rationalizing (March and Sutton 1997; March 2006).

3.2 Data collection methods, analysis and procedures

In this section, I present and discuss the main data collection methods, the data analysis, and the procedures applied. In the beginning of the research, the idea of grounded theorizing was followed to derive essential descriptive and analytical categories for the research object (Glaser and Strauss 1967; Strauss and Corbin 1990). As the research proceeded, it took on more of the characteristics of analytic induction (Johnson 2004)[54]. Hence, I conducted simultaneous data collection, coding and analyzing of data. This was done during the main data collection methods of interviews, participant observations and respondent validations as well as while going through the secondary data sources. The same simultaneous process also characterized the theoretical and methodological reading sessions as well as the reporting process.

One of the first observations indicated that organizational actors really mattered and that they were able to choose, at least to some extent, and influence the action taken, as well

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[53] This is a very challenging task, as one researcher's capacity may not be enough to capture all the dimensions, even the important ones.
[54] Analytic induction is a set of methodological procedures that attempt systematically to generate theory grounded in observations of the empirical world (Johnson 2004, 165).

as the network of actors, the industrial field, and the authorities. This was clearly seen in the Mobile Communications BU of Sonera. Based on this observation, I selected as the unit of analysis the managerial activities in the innovation process. In this kind of a design, my interest was alerted to the similarities and differences in organizational actors' behavior. However, I recognized that these managerial behaviors took place in a multi-logic managerial structure constituted by the corporation, the individual business, and the service units. These levels emerged gradually as the core analytical levels in the studied cases[55]. Nevertheless, the innovation process emerged as the main level of analysis, from which I examined the other analytical levels of the unit of analysis.

I had a good and broad access to the Sonera Corporation. In part, this was because between 1991 and 1998, I was employed by the corporation and was provided with much information relevant for the study[56]. In addition, I had acquired an approval by the business unit management to conduct this research. When I presented the research project, he approved it on a few conditions. I would be employed by Sonera and would have an office at the company premises. Also, I needed to report my findings. Finally, I needed to preserve the anonymity of individual actors. I found this acceptable. After I started my research, I soon found that individual managers had varied opinions and perspectives on the issues examined[57]. My access to a large variety of empirical material enabled multiple iterative loops that gradually made it possible to understand the area and enabled me to go beyond the views of individual managers on the phenomenon under study.

3.2.1 The interview procedures

At the beginning of the data collection for this study, I identified the central individuals whom I wanted to interview in an unstructured way. Appendix 7 presents the kinds of people that I interviewed[58]. I chose these individuals from the different levels of the

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[55] Changes in these units could be associated with particular outcomes such as RBI, resource allocation, cross-functional principles and technical solution.
[56] I worked with the research and development of the 3G-networks.
[57] I knew most of the organizational actors in that particular division and some in the corporation. My previous employment in the company made it easier for me to contact them, for them to approve me and to develop a relationship of mutual trust, which would not have been the case had I not had any prior relationship.
[58] Actors are classified according to their organizational positions.

organization and from different interest groups[59]. Most of the first interviews with individual managers were tape-recorded and transcribed. I also took notes on topics that I found especially interesting. I analyzed the data in the beginning of the study by outlining possible descriptive and analytical categories and their interrelations in cases and across cases. After each interview, I tried to outline the most important observations for further data collection, discussions, and interpretation. I did this by coding the transcribed interviews and comparing them to each other and to my field notes. I formed figures and tables in order to clarify my initial categorizations. I tried to look at my empirical material from different perspectives and to collect supplementary data using the most appropriate method available (Eisenhardt 1989). For example, in the second phase of my interviews, I carried out semi-structured interviews to gain deeper perspectives into the development of the innovations. The main part of the interviews took place in 1997-1998. Altogether 82 interviews with 68 different persons were conducted. Forty-nine of these were tape-recorded and out of them, 31 were also transcribed. I was flexible in my procedures partly because some interviewees indicated that they were suspicious of my aims. As one individual asked: *"In which tabloid paper can I read this interview?"* It seemed that a promise of anonymity relaxed many such interviewees in a way that they felt easier to talk about more sensitive topics, even when the interview was tape-recorded.

The analysis of case study material is not a clear linear process (Waddington 2004). The exact focus and argument of this research were first unclear, but they gradually became focused and gelled up when traveling iteratively between data, theory, and methodology (cf. Eisenhardt 1989, Tainio and Shrivastava 1990). During the research process, the two radical business innovations already discussed above were taken as the main objects of the empirical investigation. This research therefore required shifting the 'research modes' between induction and deduction, or as Strauss and Corbin (1990, 111) say, constant interplay between proposing and checking. This was a challenge for the present study, which operated at the interface between theory and data. Generally, in

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[59] Attitudes of employees were excellent towards researcher. Especially, the HR-manager, being with the BU almost all its history, was helpful to open historical events and come back to them time after time. He provided significant help to find out the central persons. If I needed help e.g. authorization, the BU Director helped me in a superior way.

the early phases of the study when a research design is still in fluctuation, the focus of the research is on suggestive findings that help to formulate the final research questions.

When my research proceeded and preliminary analytical categories started to emerge, the fundamental issue in the study gradually became clear to me. It was a cyclical decision-making and action process involving resource mobilization and allocation, as well the gaining and maintaining of continuous resourcing and support for the innovation in the organization. The cyclical process emerged as a multi-stage process, involving multiple managers at different managerial levels affecting the radical business innovations under study. Even though the Bower-Burgelman model was, from the start, the analytical apparatus used to cover the internal corporate venturing and capital investment fields in these processes at the general level, it was only after this observation that I discovered the need to study its categories carefully in this particular empirical case. I found that the model could be satisfactorily applied to managerial activities during the radical business innovation process. Furthermore, these observations directed the further study and reporting so that I focused my contribution in terms of ingredients for this literature and these specific categories. As Pajunen (2004, 34) argues, case-oriented comparative research exploits theory to assist analytical interpretation and to guide cross-case comparison, thus leading to the identification of salient explanatory mechanisms. I provide such analyses in Chapters 4, 5 and 6 of this report.

When substantial categories emerged and were outlined, the causal mechanisms were explicated. These mechanisms were studied applying the criteria of 'differentia specifica' and the exceeding power of fundamental discrepancies used also by Lilja (1987)[60]. If I follow Pajunen's (2004, 27) argumentation concerning causal mechanisms, we can say that a mechanism at the higher level provides an explanation in an abstract form of what behavior is needed to produce radical business innovation.

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[60]In his work differentia specifica defined the criterion that distinguished workers' workplace organization from other types of collectives. In this study, managerial activities are outlined in the context or structure characterized as employee's identity, common technology based intention or program as well as reciprocal assistance despite of conflicting interests. Additionally, the exceeding power of managerial activities means that they are repeatedly able to solve situations in which two or more practices compete with each other.

This relates exactly to what the Bower-Burgelman process model considers. The substantial categories then present lower-level and more precise combinations of functional components explaining in detail how the causal mechanisms were activated and radical business innovations produced in each case. This is the stage level of the Bower-Burgelman model. In this report, Chapters 4 and 5 capture this analysis level. We can also say that substantial categories describe why the activity of and outcome produced by the causal mechanism at a higher and more abstract level is true. In any case, both explanations address the same thing.

3.2.2 Participant observation procedures

I used participant observations mainly for collecting data on the business, cross-functional and intrafunctional levels of this study. It also made it possible to validate data and preliminary findings from interviews and documents at several 'unofficial moments' (e.g., coffee table discussions). At Sonera, I was a member of the business unit's human resource development group. I participated regularly in all group meetings. This participant observation took place mainly during 1997-1999 and 2000-2001.

I also participated in some technical working groups at Sonera due to my previous technological experience in the field. I was also fortunate to be able to participate in some external and new arenas, such as investor meetings. Participation in ad hoc groups, such as external consultants' projects to support intraorganizational work, also offered an exceptional opportunity to observe the integration of the interests, intentions, and actions of persons at different managerial levels. I was also able to follow the argumentation by the managers of Sonera when they talked to 'third parties'. These observations also served to further clarify the corporate context. It was even easier for me to combine observations from different levels of analysis and to present them back to the managers. When I got deeper into research, I sometimes found myself wondering what I was actually doing in particular meetings. I found that at the beginning of this study, meetings were sources of knowledge for me. Later, they became places for observation and validation. To enable this, I also asked questions to deepen my understanding on the objects of study.

Because of my previous working experience and being present at Sonera, surprisingly many in the company knew who I was and what I was doing. If they did not, I of course told them. The really interesting moments in discussions were not necessarily interviews, even though they were extremely important. The most interesting discussions took place in informal situations such as lunches after interviews or at corporate parties or when taking a sauna. This then further emphasized the importance of making participant observations. The main difference between these informal discussions and interviews was that at the interviews, individuals tried to be precise in what they say and how they said it - especially if the interview was tape-recorded. I found that in informal situations the same individuals said more directly how they thought things were without acting or covering them up. The higher in the organizational ladder I went, the more the interviewees used fancy concepts and rhetorical expressions when formally interviewed.

3.2.3 Respondent validation procedures

When the fieldwork for this study started, the Sonera manager who allowed me to do this study naturally became one supervisor for my project. A project steering group was also established, to which I was to report my findings and the progress of my study. This group was practically the same as the Management Group of the Mobile Communications BU. Also, a separate academic steering group was formed consisting of my academic advisers and two managers from the management group. The other of these managers was the main supervisor of this project, acting as the chief financial officer of the BU at that time. In the beginning of the process, these meetings were regular, thinning down now and then only to intensify again. I usually delivered written material for the next meeting. In the meetings, I made short introductory presentations of the process and findings. Discussion took place during and after my presentation. These meetings were the first moments where I could present my argumentation, but they also served to legitimate my research and obtain permissions for further data collection and analysis. Later, respondent validation was used personally with central individuals in the corporate management. The procedure in these meetings was similar to that already described with respect to interviews. A major difference, however, was that when my research proceeded, I was able to present more sophisticated findings and test my argumentation (cf. Johnson 2004). Iterating between theory and data did not

stop until only incremental improvements to the conceptual apparatus could be made (cf. Eisenhardt 1989). This theoretical saturation allowed me to end the field study stage of my research and to enter the phase of final reporting (cf. Glaser and Strauss 1967). Also, some individual managers read one of the last versions of this report[61]. Based on their responses, I made some changes to this report if needed. Appendix 7 presents also the individuals who participated in respondent validations. Altogether seven steering group and four academic steering group meetings took place during the field study. Twenty-two official respondent validations with 18 different persons were made. Ten of these were taped and three also transcribed.

3.2.4 Secondary data collection and analysis procedures

Secondary data were collected on the Sonera Corporation, its interested parties and the industry and societal environment. This material was especially important for the study on Zed because the access to the persons involved was less comprehensive here than in the case of ARP. These documents also formed a source to which I could compare observations from primary data. For example, they helped to reveal the importance of the capital market in the development of Zed. Comparisons between primary and secondary data were the most frequent in the end of the research process before explicit reporting started, mainly during 2002-2003.

The secondary data sources here included both public data sources and intraorganizational archival material. The intraorganizational material consisted of strategic and business plans as well as descriptions of the business environment made in the company. Appendix 8 presents more details on these documents. I was also fortunate to receive transcribed interviews intended for the business history of the Mobile Communications BU. That material consisted of twenty interviews of Sonera managers from different managerial levels on the development of the business. That material was valuable in data analysis when I derived categories as well as to get an overview of the organizational environment and activities in relation to the ARP innovation in focus. For example, these interviews helped me to identify the importance of cross-functionalizing and national activities in the case of ARP. Sonera Corporation

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[61] I promised this when I started this project.

also holds a large library and considerable archives covering its entire history. For example, in the case of ARP, the minutes of management meetings provided understanding of the timing and content of resource allocation in the corporate decision making in the early 1960s. Also, I gained access to the personal archives of a director who acted as head of the Mobile Communications BU between 1986 and 1995. Additionally, when I was asked to participate in any of the projects in the unit and company, I also got access to the documentation on that project. For example, some of these projects considered the future of the Sonera Corporation in general and the mobile communications business in particular.

The large database already collected for this study was further extended when the media turned its interest to the corporation at the turn of the 21st century. The media interest in Sonera rose enormously especially because of its IPO. Actually, it was the first time when government property on such a large scale was abruptly privatized in Finland under circumstances when major profits could also be gained. There had earlier been media interest in Sonera as an institutional actor in Finland, but definitely not on the same scale and with the same aggressiveness as in 1999-2002. The public interest in Sonera received its highest level in 2001. After that, in the summer 2002 an anonymous Internet book "where did Sonera's money disappear" [freely translated from Finnish] appeared. Later the same text was also published as a printed book written under the pseudonym of Pekka Peloton. Sonera's ex-managing director requested a criminal investigation to identify the author because he accused the author of defamation[62]. The second wave of the media publicity started in the summer 2002 when Sonera wrote down 4,3 billion euros from its 3G investments. Especially, politicians required that somebody should take the blame for this failure. The third, and in mid-2006 still ongoing, public discussion topic was initiated by the Finnish national newspaper *Helsingin Sanomat* on whether Sonera had been involved in a misuse of identifier information from its telecommunications system. The first hint of this was given in the above-mentioned anonymous Internet book.

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[62] The Supreme Court finally ruled that the publisher did not have to reveal the author or authors.

Suspicions about illegal activities in Sonera led to several persons resigning from their management or board positions in 2001-2004. These persons included at least two ministers, two chairmen of the Board of Sonera Corporation, one CEO and one managing director. In this situation of intensive public discussion on Sonera, I could not avoid the temptation to collect all media presentations on the company, both on TV and in the public press. The electronic archives of the main newspapers provided huge assistance in this[63]. When I put the published printed media stories into piles, the piles were of the following thicknesses: 1997 - 3,5 cm; 1998- 3,5 cm; 1999- 4,5 cm; 2000 - 6,3 cm: 2001 - 22 cm; 2002 - 20 cm and in 2003 - 8 cm. Thus, the top year was 2001 with a 22 cm-thick pile of printed media coverage. Ever since, the amount of media coverage has decreased. Appendix 8 also presents the main printed media sources of this study.

3.3 Quality of the research data and expected results

The provided evidence on the data collection and analysis indicate that the findings can be expected to have high internal validity. This is supported by the diversity of the data sources and the continuous comparisons between data and the research claims (cf. Eisenhardt 1989). Besides, Barley (1999) argues that without empirical fieldwork, we have little opportunities to build the kinds of concepts that we need to grasp the changes that are happening around us. Additionally, he says that building descriptively adequate concepts is fieldwork's forte, because it forces the researcher to take comparison and observation seriously. This also guards against the danger that researchers may reach premature conclusions with particularly vivid, unusual, or interesting data (Hartley 2004). Nonetheless, Silverman (1993) has warned against the use of triangulation as the sole form of validation because it may lead researchers to overlook issues of history, context, and social independence.

On the other hand, Weick (1995) urges researchers to learn more about the context of the research object under study. Knowledge of only the research object per se is then not enough. According to him, knowledge of the context can only be reached through the process of theorizing. The combination of action and context in the present study's

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[63] Of course, I was not able to or willing to collect all published stories e.g. a story in some

longitudinal comparative design is in line with this thinking. Additionally, Ragin (1987, 31) argues that the comparative research strategy attempts to identify comparable instances of a phenomenon of interest and then analyze theoretically important similarities and differences between them. He further argues that this approach provides a basis for establishing modest empirical generalizations concerning historically defined categories of social phenomena. In the present research, an iterative process was used at every phase. I made use of the opportunity to access historical and real-time data with different methods, and combined it with participant observations and respondent validations, which turned out to be excellent occasions not only to validate observations but also to extend them (cf. Fielding and Fielding 1986).

External validity is usually a major challenge for field-based studies. The actor, context and path specificity of such studies tends to discourage generalizations. In this study, analytical generalization may take place in the context of earlier theoretical process findings of multidivisional companies (see e.g. Tsoukas 1989; Numagami 1998)[64]. Analytical generalizations may also take place when this study's results in the substantial area of radical business innovations are compared to process literature in substantial areas of strategic capital investments and internal corporate venturing. In addition, the high technology company in this study, Sonera, could be compared with previously studied functional and product companies as well as with companies in the chemical and consumer industries. Also, organizations in the telecommunications industry such as operators and manufacturers are nowadays facing similar challenges of long-term survival as those studied here in the context of radical business innovations. For example, Nokia Corporation has struggled with similar problems for several years. Thus, the challenge in the focus of the present study is not necessarily idiosyncratic but faced by many companies in several industries. Furthermore, tying this research closely to the process literature enhances the internal validity, generalizability, and the level of theory building from case study research (cf. Eisenhardt 1989). Besides, as Pajunen (2004, 27) argues "as a result, the hierarchical structure of a mechanism provides a

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town's or district's own newspaper. Only the biggest newspapers were covered.
[64] Tsoukas (1989) has addressed generalizations in idiographic research. Numagami (1998) has argued that reliability and external validity are irrelevant not only for case studies but for any method of management studies.

possibility, not to explain how a particular outcome was produced in a particular case, but also to compare how the same higher-level mechanisms work in different cases".

The original purpose of this study was to make a field-based study of a mobile business unit's competence development, which quite typically for a qualitative research later shifted to another object, which was the processes producing radical business innovations. The major point of interest was then to conduct an in-depth study and collect multifaceted data on this research object. In terms of reliability, researchers and corporate actors have different abilities and interests. A new field-based study on the same object would very likely to end up in a different research design and results. Waddington (2004) discusses the difficulties of maintaining a balance between insider and outsider status in an organization while using participant observation as a data collection method. According to him, 'going native' is a constant danger. Observers often lose their criticality and become ordinary members of the field that they are studying. At the same time, remaining as an outsider, cold and distant from people in the field, would not encourage informant rapport and would therefore invalidate the method. The categories identified in this study were substance-based categories needed to construct a research object, which is not a typical aim in a theoretical study (Eisenhardt 1989).

The mechanisms and processes identified in this study may not necessarily hold if previously unpublished and surprising data were to emerge. However, this does not seem a serious threat in this case. In contrast, actor-based process studies in an organization face the challenge of finding the actors, gaining access to them, and getting them to talk about the process under study. Moreover, it is difficult to identify the cross-organizational relations among actors in a process over a long period. In consequence, I as a researcher had to make compromises between empirical explicitness, methods, and concepts during the research and report processes. Additionally, different observations from different levels of analysis can be connected to each other. This may lead in an inductive study to a massive amount of even too detailed data. On the other hand, a deductive study may direct the data collection too much. Then, the collected data only answers what is asked, and the study usually ends up as theoretical illustration. If my research had followed the deductive path, the research would have focused on successive shorter periods of time using a cross-sectional design or theoretical

illustrations. In any case, the adopted research design enabled a recognition of the essence of what the organizational actors had done during the process from the perspective adopted in the study. Multiple data collection methods and good access to data in the study provided a strong basis for this. Furthermore, the iterative method enabled me to capture complex process. However, the basic question remains regarding the extent to which pure deductive or inductive research is possible (cf. Johnson 2004). It may be that whatever choices the researcher makes, (s)he always loses theoretical, empirical, or methodological sensitivity to some extent.

This chapter has presented the basis for case selection, has defined more explicitly the radical business innovations studied, and has presented how this research was conducted. The next two chapters present the chronological iterative stages of managerial activities involved in the radical business innovations, ARP and Zed.

4 THE DEVELOPMENT OF RADICAL BUSINESS INNOVATION ARP

In this chapter, I describe in chronological order the emergence of the radical business innovation ARP as a substance-based process. I present this development process following the sequences of Burgelman's stage model described in Chapter 2. Managerial activities are presented in sections from one to four in the chronological stages of bootlegging, definition, decision making, and impetus according to first iterative cycle of development. Sections five and six will describe managerial activities during the following two cycles, when the concept was modified and further impetus for the development of a radical business innovation was pursued. The data from the case are organized according to these stages. Short summaries follow this chapter and each section.

This chapter follows the chronological event history of ARP from the 1960s until the end of the 1970s when ARP had shown its success and legitimated the Radio Division's existence among the businesses of the company that would later be Sonera. Thereafter the same unit took the responsibility of the Telegraph and Telecommunications activities of that time's Post and Telegraph Administration of Finland (PTA onwards, later Posts and Telecommunications of Finland, PTT onwards)[65]. Appendix 4 presents organizational charts describing how the company was organized during this period.

4.1 Bootlegging activities preceding the definition of ARP

In this section, I describe the activities preceding the definition of ARP. Important activities at that time included national activities, knowledge creation forums, foundation of the Radio Division and its previous technology systems as well as labor contracts. However, these activities could not be earmarked ex-ante to the development of ARP, as their consequences would have been difficult, if not impossible, to predict.

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[65] The significance of ARP for the company and business unit studied emerged during the research process, and after this, its development was reconstructed. Actually, this observation required the researcher to go back in time until to the end of the 19th century but that inquiry is not reported here.

4.1.1 National activities and knowledge creation forums

National activities and activities at knowledge creation forums preceded the emergence
of ARP in the 1960s. With respect to the former, important organizations in the Finland
that needed radio systems, from the ARP's development point of view, were the State
Railroads (VR onwards), the Defense Forces, the Administration for Roads and Waters
(*Tie- ja Vesirakennushallitus, TVH)* and the Police. For VR, accidents on railroads
affected the development of radio systems. According to Toivola (1992)[66]:

> *"VR was ahead of the PTA in radio systems. Short distance radio
> connections existed at the railway yards in the 1950s...A railroad
> accident at Kuurila occurred in 1957...after this the Director General,
> Erkki Aalto, determined to make a radio system with which a train
> could be caught anywhere".*

Consequently, the Electro-Mechanical Works (*sähkökonepaja*) of VR developed a line
radio system[67]. In 1962, VR's Director General, Erkki Aalto, raised the need for a radio
communication system for the transport industry. VR also briefly considered using its
line radio system to serve train passengers. VR's initiative did not lead to the start of
system planning, nor did their repeated initiative a couple of years later. In addition, the
General Headquarters of the Defense Forces had addressed questionnaires to four
companies in order to develop a military company radio in the beginning of the 1960s.
This also significantly affected the birth of the mobile terminal industry in Finland (see
more in Koivusalo 1995)[68]. In contrast to VR's initiative, the initiative from the General
Headquarters had a significant effect. People from the General Headquarters knew the
good quality of the line radio system, as a former engineer at VR's Electro-Mechanical
Works said in 1997. The Defense Forces raised the question of a radiotelephone
network that would cover the main roads in the Consultative Committee for

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[66] Toivola was the secretary of VANK and worked in VR at that time.
[67] Thanks to the system, a further accident was later avoided and the system paid for itself at
once. (See more in Toivola 1992).
[68]Toivola writes (1992):"Salora, Televa, Aga and Autophon started to work… General
Headquarters asked for help from VR. A trial was organized in Erkylä at Riihimäki, in which
workers of General Headquarters and VR as well as all the four-radiotelephone vendors
participated. Domestic telephones reached from 2 to 4 km, but Autophon reached well over 6
km…in the street Martti Jurva from Salora stopped Toivola and asked if anything could be
done. Toivola recommended making a proper device so they could test it. After six months,
Jurva called and asked if the appliance would be tested. It was a fixed radio for a locomotive.
An extra train was set up in 1967. The radio functioned faultlessly…The result of this was that
all the rest [actually, some] of the locomotive radios were Finnish-made".

Communications Affairs (*Viestialan neuvottelukunta*, henceforth VANK) in December 1966. This network would serve military transportations too. According to Toivola (1992):

> "The system had to cover the most important main roads. A planning group was founded and Toivola was made its leader.. Also, persons from the PTA belonged to this group. Toivola made a system diagram... There was also...a cost estimate and four tariff proposals. A statement was also requested from the PTA. Teräsvuo [Mr.] wrote it saying that the plan is not good if it covers only the main roads. Instead, the system should cover also forests in a way that berry pickers could use it".

The second important bootlegging activity that contributed to the emergence of ARP took place at specific knowledge creation forums. They were the above-mentioned VANK and working groups in the Nordic Country co-operation. These were places for both social and technological knowledge diffusion[69]. In Finland, a small country, all the people in the field knew each other. The chief of the Inspection Section of the Radio Division described the vendors:

> "Telephones were made in the Finnish State's Electrical Works (sähköpaja), later known as Televa. ASA-radio made also something as well as Helvar. Star-radio also existed and Salora started then...Foreign manufacturers were Swedish Ericsson and Svenska Radio, Simrad from Norway, Storno, and another small firm from Denmark –Telefunken and Siemens from Germany as well as Pye and BCC from England". (1997)

The Nordic Countries had different kinds of co-operation groups in this field. Radio issues were handled in a group called Nordiska Radio ('Nordic Radio', onwards NR). The director of the Radio Division usually participated in this work. In these meetings, knowledge and plans about radio systems were distributed and they were openly discussed. Also, national characteristics and organizational issues could be discussed[70]. The central market was Sweden, which was followed by Denmark, Finland, and Norway[71].

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[69] The Ministry of Transport and Communications was called at that time the Ministry of Transportation and Common Work founded VANK by a statute in 1962.
[70] When the NMT development started at the turn of the 1960s and the 1970s, as more clearly depicted in this chapter, the system requirements were made in this Nordic Country co-operation. Each national organization implemented own solutions to their own country. These solutions and their consequences could also be discussed openly in the meetings.
[71] Three last ones are not in any particular order.

4.1.2 Foundation of the Radio Division, previous technology systems and labor contracts

Important bootlegging activities also took place at Sonera's Radio Division, with previous technology systems and labor contracts. The third important bootlegging activity preceding the emergence of ARP took place at the newly founded Radio Division in the early 1960s. It was easy to recruit new employees to the division who were interested in radio systems. Surprisingly many of the division's employees at that time were radio amateurs, for example the division director and about the half of the section chiefs. Many employees of the division had studied and worked at the Helsinki University of Technology (henceforth HUT). Among others, the Professor of Radio Technology was a person from the Radio Division, becoming later the director of the division. He also recruited persons from the HUT to work at the Division. Fairly many also found their way to the division when they heard from other radio amateurs that working at the Radio Division also involved radio technology. Many amateurs also moved to industry and into state administration. A joint hobby formed a natural liaison for them. An example of this was the foundation of the Radio Division, which officially took place on 1st November 1960[72]. According to the chief of the Radio Station Section:

> "The foundation of the Radio Division was quite a joke…the Commissioner for Coordination [virastovaltuutettu] of the Finance Ministry was Master of Law Olavi Koskipirtti, who was a radio amateur and lived near the Hesperia park. He thought that a little higher transmission power would not harm his hobby. The Radio Division director organized that for him on some excuse, bypassing the radio amateur instructions of that time. The return service was that a new organization matrix for the PTA appeared one autumn. In that official document, the Teletraffic Division was changed to office and the Radio Division founded. Of course, that did not do any damn good for the Telegraphic Division". (1997)

According to the chief of the Radio Link Section, the division's position as an independent unit, positioned under the direct supervision of the director general, was significant for its further development because the division was able to present its issues straight to the Collegium of the PTA. However, within the PTA, the dominant business

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[72] In 1934, radio-branch (*konttori*) was founded to take care of the statute of radio equipment (9/27) and their inspection (367/54). Granting of licenses for the radio equipment was moved to the PTA from the Ministry of Transportation and Common Works in 1947. Next, Radio-branch was changed to an independent Radio-office in 1958.

at that time started to eliminate the Radio Division immediately when it was founded. Then the Radio Division used all the connections to access the ministries. Suddenly, the director of the Radio Division died in the summer 1964. It took almost one and a half long years until the new director was nominated. According to the chief of the Radio Station Section:

> *"When the division director died and his position became available, there was terrible worry that the division will be abolished. We were surprised how inconspicuously new director was nominated. I don't know what went wrong with them [opponents] because they didn't act".* (1997)

The suggestions to abolish the division became later concrete in the form of different kinds of statements attached to budget proposals as well as organization and committee reports. A threat of abolition created a context of a lack of resources and a search for survival for the division.

The fourth important activity that preceded ARP's emergence occurred among the previous technology systems in this field. The Maritime Radio was launched to the Finnish market already in 1920[73]. The service was offered for the shipping companies to increase their safety[74]. These companies also wanted to coordinate transportation and maintain connections from sea to land. Radio traffic from boats to land gained 180% from 1960 to 1970[75]. The demand for the Maritime Radio came also from small private boats sailing near the coast. For their own purposes, the Radio Division started to construct a VHF system called 'Coastal Radio'[76]. Timber rafting companies had their own HF radio systems functioning on the lake Saimaa. They also used radio connections from vessels. The quality of these systems was poor, and they wanted to get

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[73] The service was first based on the Morse alphabet and since 1927 on speech. A radio telegrapher was an educated specialist using the service. The service was provided by PTA based on the Act on Radiotelegraphy and –Telephony Equipment issued in 1919, in which the State received a telegraph monopoly to construct and use telegraph equipment and lines. This act included also radio as Turpeinen described (1996, 344).

[74] Historically, wireless activities were intensive in the Gulf of Finland. The Russian Aleksander Popov was active in providing wireless telegraph connections to Suursaari, an island in the Gulf of Finland, in 1900 for the purposes of Russian Defense Forces. During the First World War, several radio stations were constructed on the coast of the Gulf of Finland.

[75] In 1960, 55 000 radio calls were made, in 1970 154 000 and in 1980 202 000 (Turpeinen 1996, 354).

a better system and started to look at the VHF system. Finally, the timber rafting companies wanted to construct their own system covering the lake Saimaa in 1960. This was an additional trigger for the Radio Division and awoke its interest to the issue. At that time, the division rejected the idea of the system construction. The issue rose again in 1964 when the Association of Boat Traffic Companies on Lake Saimaa (*Saimaan laivaliikenteenharjoittajat ry*) rushed the system[77]. The Radio Division perceived that the best solution was to make a VHF network of the Maritime Radio covering the entire basin. The PTA then decided to construct the Saimaa Radio in autumn 1965. As an engineer in the Radio Station Section remembered:

> "The Saimaa Radio was not decided in the Collegium sessions because…it was an extension of the Maritime Radio. Telephone operators were centered in Savonlinna where the Maritime Radio was connected to the local long distance center...The Saimaa Radio provided plenty of experience of the network construction that was later valuable for ARP". (1997)

The inaugural ceremony of the Saimaa Radio was on 23rd August 1966. Yet the lack of equipment and vendors created a challenge for developing a technical solution for the Saimaa Radio. As one technician recalled:

> "Fabricated equipment was partly base stations, which were not completely ready either. Electrical Supplies Shops Inc.(Sähköliikkeiden Oy) agreed to make a switching entity according to our requirements. A technician was involved in planning and constructing the steering apparatus, which was central to the functionality of the network...There was no model, everything had to be invented… No prototype was made because only one piece of each apparatus was needed. They were constructed and implemented straight away". (1998)

Finland was at least among the forerunners of VHF systems in Europe. VHF systems existed also elsewhere and the abilities to take them into use existed, but no one seemed to do so. According to the chief of the Radio Station Section, who visited Germany in the early 1960s:

> "The station manager of the Kiel Radio told that they had received VHF terminals, even though no German vessel had equipment. The

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[76] The system was basically the same as the Maritime Radio, but it covered only the coasts and its terminals were much smaller than those used in the Maritime Radio. The Maritime Radio and the VHF system both functioned at the 150 kHz frequency band.
[77] At the same time, there was a wave of interest in the Saimaa channel and it was found that via the channel, also foreign vessels could enter that waters.

terminal had been quiet for a year. Suddenly speech was heard. Two Finnish vessels, the tankers Tupavuori and Nunnalahti of the Neste Corporation were at the bay of Kiel. The station men asked how the Finns had these equipment when they didn't exist in the world. The crew of the vessels proudly announced that the VHF is quite common in Finland". (1997)

The fifth important bootlegging activity took place when the labor contract was changed in the PTA. This change concerned the technical work and created flexibility for doing it. Namely, all the employees in the PTA were civil servants at first. At the turn of the 1950s and the 1960s, an intensive construction of the fixed network was ongoing. The PTA could not offer permanent positions for technical staff, only temporary jobs aimed mainly for younger engineers with a low salary. The hiring of technical personnel demanded flexibility, but new administrative positions were only approved in the state budget. Both the employer and the employees wanted to change the relationship from administrative positions to employment contracts but the state did not approve this and was very slow in dealing with the issue. A strike was organized in 1961 and the electric current was cut off from the networks on Saturday at 1 p.m. Then the state got in a hurry to bring the strike to an end. The strike lasted less than an hour, and the employment relationship worked out. Consequently, responsibility was moved from the Finance Ministry to the PTA, which could now hire employees and define their salaries. Office staff still stayed in positions of division, however. This affected people working especially in distribution and customer service. We shall consider this in Section 4.5.

In summary, this section described the most essential activities that preceded the definition of ARP. We saw that the Finnish and other Nordic Country organizations, the need of the Radio Division to maintain its position in the company, and the latter's ability to attract employees familiar with radio systems, as well as competence from previous technology systems were important activities at this stage of the development.

4.2 Defining ARP

In this section, I first describe how ARP's definition process was triggered and then how that definition process proceeded. The market need for ARP emerged from the small and medium sized transport companies, which among others served the forest

industry. There was no communication system supporting them on the roads[78]. Because of this, "VANK set a working group in 12th December 1966. Its task was to clarify questions concerning the nationwide radiotelephone network and its users, the requested technical requirements and their costs" (Toivola 1992). About at the same time, in the end of 1966, the director of Radio Division heard from his Danish and Norwegian colleagues at a meeting of the Nordiska Radio committee that their organizations had decided to construct manual nationwide networks and that the preliminary experiences from them were very encouraging. As the implementation of Saimaa Radio was simultaneously ongoing, the director of the Radio Division gave a task for the section chief of the General Radio Affairs Section[79] to make a plan for a public radiotelephone network, which would cover Finland[80]. Thus, the initiatives from VANK and the Nordiska Radio committee came almost at the same time (Toivola 1992; Turpeinen 1996).

4.2.1 Defining the technical solution and cross-functional principles

Important activities at the definition stage of ARP concentrated on defining the technical solution and cross-functional principles for its market penetration. The director of the Radio Division, who triggered the definition activity in the first place, had returned from the Helsinki University of Technology (HUT) to the Division. Tesvisio was merged with the Finnish Broadcasting Corporation (YLE onwards) in spring 1965. One year later, the director persuaded the technology manager of Tesvisio to take the position of chief of the General Radio Affairs Section[81]. He for his part persuaded another engineer from Tesvisio to join the Radio Division with him. These two engineers then purchased information about other corresponding systems and accommodated them to the needs of ARP. As the chief of the General Radio Affairs Section described:

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[78] As told in the first subsection, VR had radio system for trains and PTA offered the Sea, Coastal and Saimaa Radio services at sea and on the lake Saimaa.
[79] This person was the first project manager in the development of ARP.
[80] The Inspection Section was separated from the Section of the General Radio Affairs into an independent section in 1968. Appendix 4 presents the tasks of the different sections.
[81] Tesvisio operated at that time in the Helsinki University of Technology. It was founded in 1959 to continue TES-TV that operated at that time in the control of the Foundation for Technology Advancement. TES-TV started in February 1956 and continued the first TV activities that the Association of Radio Engineers started in spring 1955, as the former technology director of Tesvisio recalled in 2006.

"What are the obvious connection needs that could be satisfied with a radio? That is what customer orientation means. Radio was the only alternative for mobile connections. The question was accordingly about whether users need common mobile connections, when fixed telephones were growing strongly and long distance technology was still waiting for automatization. Different kinds of VHF radiotelephones existed in civil use; there were only about 5000 in the end of 1966 but the number increased rapidly [over 1000 pieces/year]". (2005)

Also, there was a problem of how to implement a two-way system, which would efficiently use radio frequencies. At this point, they were not in efficient use in the Maritime Radio system. These problems emphasized the technical solution and switching issue, but could not be separated from the way in which customers used the service, or the service production and its distribution. The chief of the General Radio Affairs Section made a memorandum dated 18th August 1967. This set out further grounds and the main principles for the definition and development of ARP (Turpeinen 1996, 361). These included, among others, that the system has national coverage, that 'selective call'[82] will be implemented, that customers should purchase the terminals and that the radio system will be connected to the fixed network. According to Toivola (1992), a working group set by VANK presented its preliminary plan for the network on 19th July 1967[83]. This plan was presented to VANK on 12th September 1967. Toivola (1992) also adds that even though the plan, with budget and tariff proposals, was practically ready then, it was not taken to the Commission until its meeting on 25th May 1968[84].

In the late 1960s, there were at least 29 different relevant radio communications systems applied in different countries in the world[85]. According to the chief of the General Radio Affairs Section, the important and significant issue was how to catch rapidly a moving terminal irrespective of its location, what kind of a technical solution is required, and

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[82] "Selective call meant:"A code sent from the center at the calling channel generated a calling signal at the receiver. Users named it as the "tilulii" -sign". (Toivola 1992, 21)
[83] The plan outlined a technical solution for network model with channel allocation and a calling channel. It also presented a closed manual national network, a nation-wide selective call system and recommended favoring the national industry.
[84] It was difficult to estimate objectively in which order principles were made and by whom, partly because of retrospectiveness and partly because of two or three disagreeing, even competing views.
[85] According to the memorandum made in the Radio Division.

how to implement it. This plan concluded that each base station should have a national call channel, a national working channel, and from one to four local speech channels as well as seven national channels (see Turpeinen 1996 for more information). On the other hand, TV technology provided a basis for mobile networks because of mutually similar network planning principles:

> "We pondered then about the channel solutions. Two alternatives were available. The first one had two channels, the other national and the other regional. The second one had seven national channels, which had to be found from every terminal and the rest of the channels were regional. We preferred the latter alternative but industry considered us crazy. Fortunately, we held out on our requirements and that was the model for the network construction".
> (1997)

Thus, the ARP network was constructed based on seven-frequency replication even though VANK suggested a four-channel system. VANK's proposal would have meant a network with bigger cells, wider coverage, and lower costs. Moreover, the capacity to operate communication traffic had been small because frequency disturbances decrease their repeatability. A basic requirement for the ARP was that a 160 MHz frequency band was still unused in Finland. This made 80 channels available for the radio system, as Turpeinen (1996, 361) writes: "Attempt had been barely worth to begin with the considerably less channels". The maximum number of subscribers was outlined as 20 000 - 30 000[86].

According to the chief of the General Radio Affairs Section, the issue was how to reach a moving vehicle, e.g., when a call came from the fixed network. The applicable selective call solution was developed for the Maritime Radio. Nevertheless, the further issue was whether the call would be sent in all the channels or only in one channel[87]. An article of the system used by power plants in England proved that it was possible to use only one channel under certain conditions[88]. However, equipment with selective call characteristics was not available, and thus a system using speech calling was implemented first. An obvious challenge was that the increased number of customers

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[86]This estimation turned out to be surprisingly right. The maximum number of ARP subscribers ultimately rose to 35 600.
[87] One calling channel was finally realized with the selective call.
[88] He provided explicit references also to the Christiansen's radio system in Denmark, the land mobile system in Norway and Lauhrén and Berglund's system in Sweden (see also Mölleryd 1999).

meant an increased number of operators to make calls. Hence, increasing the costs of service production.

Moreover, one issue was whether call switching occurred manually or automatically. Turpeinen (1996, 361) argues that these aspects were related. An automatic system would have made the technology in the network and the mobile terminals more complicated and also increased their prices. In addition, the public fixed network was not sufficiently automatized. Furthermore, the automatic switching would have also possibly required more radio channels and would thus have increased the weight of terminals. These aspects would have possibly resulted in difficulties for the emerging Finnish manufacturers, at least, delayed the market launch of the system launch (Turpeinen 1996, 361).

Moreover, the users had experienced difficulties in selecting numbers during driving (Turpeinen 1996, 360-362). The central issue in focus was soon how to balance the number of operators and the way the customers use the service. It was considered to be the user's problem to find out a free channel in ARP when calling. This implied that the operator did not have to locate the subscriber. Thus, the tasks of the operator remained moderate, when some of the tasks that the operator performed in the Maritime Radio were given to the customer. According to the chief of the Link Section:

> *"In the Maritime Radio the caller had to know where the b-subscriber[89] was with an accuracy of one base station. The result of this was that the operator became really encumbered by this. The ARP-subscriber always had to know in which base station coverage area (s)he was. The subscriber saw from the map the channels in use at that base station. The advantage was that M-subscriber[90] chose the channel and the operator just chose a number for the fixed telephone and connected these subscribers...If the phone call came from the fixed network, the operator sent a call over the calling channel...When receiving a call, the M-subscriber acted as I explained before."* (2000)

The Radio Division decided to present a manual switching system with the selective call. It is interesting to compare the solutions of the Radio Division to those of Televerket in Sweden. Televerket planned the system called MTD at the same time as

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[89] B-subscriber meant the receiver of the call.
[90] M-subscriber meant a mobile-subscriber.

the planning of ARP occurred. These systems were very similar in many ways. However, MTD had a single calling channel from the beginning and the way the customer used the service was implemented in a significantly different way than in ARP. According to Mölleryd (1999, 89):

> *"To place a call to a MTD telephone, the operator had to know roughly where the subscriber was located in order to direct the call over the nearest radio base station".*

Hence, Televerket adopted a customer-friendly way in which they took care of locating the user. This led to an increasing number of operators, who had to find out the location of mobile terminals and base stations in that particular region, and whether there were any free channels available. Besides, this caused long waiting times for users and decreased the capacity of system. Thus, the costs of call transmissions increased and efficiency decreased even though the number of customers increased. These features partly explain why Televerket's system was no longer profitable after the number of ten thousand subscribers had been exceeded (Mölleryd 1999). He further (76) observed:

> *"Swedish Telecom did not regard mobile telephone as becoming a "big business", but it did expect the business to show a minor profit when subscribers exceeded a hundred. Neither MTA nor MTB was profitable for the Swedish Telecom, according to Olle Gerdes, who was engaged in mobile telephony at Swedish Telecom from the 1950s."*

Moreover, Televerket recruited operators at a 'market price', while the Radio Division could recruit them 'below a market price' because the automatization of the fixed network made them unemployed in Finland. Moreover, when the number of operators could be kept relatively low, the cost advantage of ARP was significant. Nonetheless, there was a remarkable pressure to automatize the selective call in Sweden but, nonetheless, this practice was implemented first in Finland in 1971, and in Sweden not before 1974. This further relieved the need for operators at the Radio Division and accelerated the diffusion of mobile terminals. Subsidized terminal distribution started in Sweden in 1967. In Finland, it was clear from the beginning that the subscribers should purchase mobile terminals. The Radio Division outlined the distribution as taking place as in the Coastal Radio via independent radio dealers. Subscribers still had to pass an examination in the same way as in the Maritime and Coastal Radios. This was seen to slow down the increase of customer numbers and it was given up. Instead, the Radio Division still had to approve mobile terminals. Terminal distribution is considered in

more detail in the Section 4.4, in the context when it came under managers' more intensive attention.

Even though the central person for the development of ARP at this stage was the chief of the General Radio Affairs Section, the Radio Station Section chief's motivation, knowledge and skills also accumulated and affected the definition of this initiative[91]. This chief's motivation and later studies at the Helsinki School of Economics provided grounds to set out preliminary principles for the pursuit of an opportunity. These studies gave her a perception that a service had to be profitable[92]. As she said:

> *"The service had to make 'cabbage' (rahanaa). This called for users*
> *and volume of usage. Besides, costs had to be kept in control".* (1999)

The chief of the Radio Station Section said that the service had to be launched fast to the customer market and made widely available, the customer had to get it easily into use, and the service had to be also easy to use. Additionally, the implementation had to take place at a reasonable price and the network and equipment also had to be as simple as possible. These were the grounds for the Radio Division to pursue a customer-oriented course of action aiming for customer volumes. As the chief of the General Radio Affairs Section recalled of the savings of the system:

> *"The company could save one car and driver out of five if the*
> *company implemented the ARP telephone in the remaining*
> *four".(2006)*

After these modifications, also the manufacturing industry became more interested in the project. Automatic switching had increased the prices of equipment and could have meant difficulties, at least, or might even have become an obstacle for the Finnish equipment manufacturers because of too complicated technical solutions. It is suggested that in order to encourage participation by the national industry, the Radio Division gave up a part of its cost advantage generated from the automatic switching. This was

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[91] Many people at the Radio Division had personal experience of equipment construction, among others of terminals. An engineer at the Radio Station Section told: "*She was permanently employed at the Radio Workshop...There she planned and tested different kinds of equipment...previously she had made amplifiers for antennas and other stuff needed at the radio center [early 1950's]. The Second World War had an important impact on the Finnish radio industry. For instance, the State's Radio Workshop made radio equipment for Russian vessels, which were provided for them as indemnity.*

also a natural way to favor the national industry, as VANK had also recommended. On the other hand, the Radio Division did not have plenty to choose from because the lack of resources and the low costs compelled them to get the industry more forcefully involved in the development in one way or another. Other operators in the Nordic Countries purchased their equipment 'without question' from Ericsson. The Radio Division considered Ericsson's prices all too high, and expected them to come down. From the Radio Division's point of view, the Finnish manufacturers had some competence. Network competence existed at Televa and terminal competence at Salora and Nokia. Especially, the companies with the network competence needed encouraging and motivating (Laaksonen 2006). The intended combination of low costs and high profitability led to the distribution of work especially with these manufacturers. Work was also divided within the company to make use of the company's other divisions' existing infrastructure such as fixed transmission network.

The above-mentioned principles, e.g., profitability, were not major or novel issues in the mobile communications at the end of the 20th century. But in the 1960s, things were different and profitability was a novel topic. In fact, at that time the investment basis of the corporation were costs and revenue. Profitability was not such a major issue at the corporate level. Income went straight to the Finnish State and the corporation was genuinely interested in costs from the national economy point of view. Following this, the success of ARP was crucial to legitimate the division's existence and the possibility to continue the work with radio systems in the early 1960s. The chief of the Radio Station Section remembered the opportunity as follows:

> *"The director of [the Radio] Division came to ask whether we can make it or not. I considered it for a long time and we decided together that yes, we can".* (1999)

Work at VANK and the interest of customers and other actors in the telephone field in a new service and system also partly affected this decision. Also, the existing competences in the Division had an effect on this and supported the management's belief in ARP. These aspects are next considered in more detail.

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[92] Chronologically, this happened later but this is so related to the profitability principle that it is presented here.

4.2.2 Previous technology systems confirmed belief and provided competence for ARP

Existing functional systems provided those involved with realistic confidence in service implementation, its market need as well as in the existence and the accessibility of the required competences. As a technician, participating at the time in the construction of the ARP system said:

> "The Saimaa Radio provided encouragement that there is a need for a network and a service offered for a moving person…instantly in the spring, when the waters opened, tens of telephones were in use".(1998)

According to an engineer in the Radio Station Section, another potential reason for the demand for the service was that users did not 'stare at the tariffs'. On the other hand, even though the first users had been estimated to be log-floating companies, surprisingly also ordinary people with their pleasure boats became users of the Saimaa Radio. This happened despite the fact that its call prices were set at the same, high, level as in the Maritime Radio. Especially, this customer experience strengthened the views in the division that it was worth making a public network. Existing competence at the Radio Division was employed as much as possible. Experience from the Maritime and the Saimaa Radio existed at least concerning technical solution, switching, service use, service production, construction, and planning of the network, the use of other division especially in signal transmissions, as well as in distributing mobile terminals via independent radio dealers. During the construction of Saimaa Radio, it became clear that the mobile terminals placed in cars could be made by using solid logic technology[93]. In the words of an engineer in the Radio Station Section:

> "Networks constructed for cars were in use around Europe. Deutsche Post had a network and also Helsinki Telephone Company had their own network[94]. She [the engineer] considered what were the problems, why did they had such low volumes, and why were they not profitable?. She concluded that their operations emphasized administration very much, subscribers had to fill strict criteria, the equipment were expensive, they looked complicated, and the calls were expensive". (1997)

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[93] This technology enabled terminals that weighted less and could be powered by batteries.

[94] "Manual mobile telephone systems were independently developed in a number of countries in the late 1940s and early 1950s. For instance a mobile telephone network opened in St. Louis, USA in 1945, the Netherlands launched a mobile network in 1948, Switzerland opened a system in 1949, Denmark launched a network in Copenhagen in 1950, and in 1951 a system was opened in Hamburg, Germany." Mölleryd (1999, 73)

Also, the operator competition in Sweden may have affected the belief of central persons at the Radio Division in the opportunities of ARP in Finland. Namely, telephone networks owned by private companies threatened Televerket in Sweden. In 1967, Televerket had 500 subscribers and the private companies 215 (Mölleryd 1999, 88). The private companies showed interest in a national mobile phone network, which forced Televerket to hurry. A report made in 1967 by Televerket's Carl-Gösta Åsdal recommended an extension of the MTB system to national coverage. However, the Swedish industry opposed the proposal by appealing to the required large investment in relation to the expected number of customers (Mölleryd 1999). Also, inside Televerket the finance function opposed the proposal[95].

Nevertheless, the situation within the Radio Division was such that when the chief of the Radio Station Section and the division director had made the preliminary decision, an initiative was fine-tuned and a presentation prepared for the corporate decision makers, and finally to the Collegium[96].

In summary, this section described how the definition of ARP started. The data indicate that at this stage definition concentrated mainly on the technical solution but that cross-functional principles were also outlined to force action in order to penetrate into the customer market. Previous technical systems confirmed the belief that an opportunity existed and provided competence for the pursuit of that opportunity.

4.3 Decision making on ARP

ARP was discussed at many different meetings within the PTA, the precursor of Sonera Corporation. The timing of decision making is hard to define explicitly but it is suggested to have taken place between September 1967 and late summer 1968, even though the official decision of the equipment purchase was made on November 22nd, 1968 (Toivola 1992). Toivola writes:

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[95] The finance function had significant power at Televerket.
[96] If these two persons and the first project manager, had not decided to pursue an opportunity, some other might have done that but possibly later and maybe based on different administrative principles, perhaps even following similar principles as Televerket in Sweden. This could have

"The building of the ARP network was presented for the first time in the PTA in fall 1967. This took place after the Ministry of Transportation and Common Works had ruled to make a five year plan for the years 1968-1972 in its letter of Sept. 28,1967...A draft of this plan was sent to the ministry already on Oct. 9, 1967...but the final version was not sent until 4th March, -68".

Even though the timing of decision making is uncertain, the observations of the individuals involved in the process appear to be coherent. As Toivola writes of the five-year plan:

"This includes as a new investment target "radio telephone communication on land" and the sums are for the year -68, 125 000 FIM (prototype stations) and for the years -69-72, 720 000 FIM for each year. The investments are used to construct a radiotelephone network including 150 base stations that are able to operate the traffic of about 2000...3000 car stations...The investment is estimated to increase traffic incomes correspondingly to costs...They referred to the growth curve of the network in Denmark that was presented".

The director of the Radio Division and the chiefs of the Radio Station Section and the General Radio Affairs Section prepared a proposal for decision makers emphasizing the decision-making criteria of the PTA of that time, i.e., revenue and costs. At the same time, they were also prepared for a profitability-driven discussion over the matter. As an engineer at the Radio Station Section remembered:

"Persons from the Radio Division assured that it will not become so huge that it would annoy anyone...The director general applied a procedure in which new topics were handled by the preliminary bunch...All the Collegium members participated in this preliminary meeting. From the Radio Division also other experts than the director participated...ARP was handled in that meeting for an hour... the directors had them so full of the topic that no one wanted to ask or struggle against it in the Collegium session. The chief of the General Radio Affairs Section presented maps on which telephone operating centers were marked...The Collegium did not require any estimations of customer numbers...Our luck was that the equivalence between income and cost did not interest anyone else except us". (1997)

The chief of the General Radio Affairs Section remembered that he made the preliminary frequency plan in summer 1968. Furthermore, a chief engineer from the Telegraph Division recalled that when radio affairs were concerned, they passed usually with minor discussion at the corporate-level Collegium. This was because decision

meant also that the manufacturing industry would have most probably developed in a different way from how it has developed ever since.

makers were not professionals in that field; they were lawyers and economists. The same chief engineer also participated in the decision making concerning ARP. He remembered that when the director of the Radio Division presented the proposal on the construction of a radiotelephone network, its budget was 4-4.5 MFIM. He told about his doubt that the network could not be completed with that budget. The director of the Radio Division had assured that the original budget would be kept. Toivola (1992) tells that one of the main preparatory persons of the five-year plan had told some kind of a joke at the Collegium session. It went in a way that the Radio Division had taken onto its agenda also the issue of redefining the organization structure at the same time with the ARP investment. They proposed the forming of five Offices and a separate Section. A quarrel emerged from this and drew attention away from the investment proposal. This practically left the ARP topic untreated and led to the approval of the construction of ARP.

As already mentioned, the main decision-making criteria at the PTA at that time were revenue and costs. These criteria were in line with the budget practice of the Finnish State. The investment promise of ARP was formulated knowing that keeping the costs down was going to be difficult. Additionally, the investment approval was more easily obtained when the issue was taken to the corporate-level Collegium. Then intraorganizational competitors were not able to intervene in the decision, although they might have been concerned on other organizational forums. The Collegium was more neutral, even careless in this matter. On the other hand, everything that increased the anticipated revenue was supported because this increased the PTA's relative size, market share, and power in the field of telecommunications operations.

Then a conflict emerged at VANK regarding who may construct the ARP network. In contrast, every participant at VANK accepted that the planning of ARP was an issue of the PTA. The conflict was solved or actually moved away from VANK by setting up a working group to consider this issue in more detail (Turpeinen 1996). Even though the Radio Division had the possibility to choose whether it would pursue the opportunity and implement ARP or not, there existed a real threat that the local telephone companies would pursue it. This kind of a choice situation was the first one for the division and the PTA.

In summary, this section described briefly the procedure of the decision making on ARP. The presented data suggest that those who presented ARP had a different resource allocation criterion in mind than the one held by the corporate management. The former criterion, however, conformed more to that of the other organizations of the state owner.

4.4 Further definition of ARP and providing impetus for it

When the ARP project was approved to proceed, it was further defined and a pilot launched to market in order to provide impetus for its development. This section is organized according to these stages. After decision making, the responsibility of the project moved from the chief of the General Radio Affairs Section to the chief of the Radio Station Section[97]. I first describe the way in which ARP was further defined.

4.4.1 Defining ARP more specifically on the way to pilot it

The project manager's perception was that ARP will be pursued with minor costs, aiming for customer volumes and profitability. These were hazy principles, not in any sense clear or distinctive. For example, profitability was discussed even in the Radio Division only in a small group, and definitely not outside the division. At this further definition stage, important activities related to technical solutions, especially the availability of equipment and the construction of the network. The manufacturers and regional teledistricts were motivated to participate in the work[98]. Additionally, the intraorganizational pressure and hazy profitability principle forced activities to the customer market and favored a reliance on existing organizational competences. On the basis of this foundation, the more precise definition led to the implementation of the technical solution in the system pilot stage.

First, the Radio Division and the project actively motivated the Finnish industry to participate in the development and the construction of equipment. The people at the Radio Division were well aware of the existing co-operation between Televerket and Ericsson in Sweden, as the chief of the Radio Station Section recalled:

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[97] This person was the second project managers in the development of ARP.
[98] Sonera's teledistricts took the responsibility of the local area fixed telephone activities of such as providing telephone service in the Northern part of Finland.

> *"When people from the Radio Division kicked Nokia's people to get them going, that was the same kind of home industry favoritism as Televerket and Ericsson did in Sweden…The first stirrings-up [i.e., interventions] occurred so early that the national industry did not come off too well in technical or financial terms…The knowledge and technical requirements of the Radio Division were world-class but that cannot be said of the Finnish industry."* (1997)

Even though open competitions were always organized on the equipment procurement, messages were sent through informal channels to the national industry that if the quality of the equipment is at the required level, then 'deal will be brought home'. The chief of the Radio Station Section remembered:

> *"Prices were never revealed and the national equipment did not cost an arm and a leg. The price-quality relation had to be at the right level and the division raised the technical requirements…However, they [national industry] were rather clammy…when the national vendors finally believed us and started to make equipment worth something, they became competitive".* (1997)

Televa[99] and Danish Storno provided the base stations for ARP. The cable factory of Nokia made parts of base stations, but not entire base stations. Another central part in the system were the mobile terminals. As an engineer at the Radio Division described:

> *"An everyman's radiotelephone had to be developed that any car driver could use…. Televa made the first one and we had to find a competitor in order to decrease the prices. Salora was very sticky because they wanted to make only televisions but finally they agreed to make one of their own".* (2000)

Competence in terminal manufacturing started to develop at the Salora Corporation. This formed the later core of Nokia Mobira, which became later known as Nokia Mobile Phones. The making of specifications for mobile terminals and later the type approval were the slowest work around the system, according to a technician participating in this work. The first type approved telephone was from the Aga Corporation.

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[99] The roots of Televa were in the Defense Force's Electricity Laboratory (*sähkölaboratorio*), which was founded in 1925 (Koivusalo 1995). It was moved to the PTA and merged with PTA's own State's Electricity Works (*sähköpaja*), which was founded in 1945. This combination was renamed Televa in 1962. Televa became later the core of the Nokia Cellular System (NCS). This was because the development work that was started in Televa produced the DX-200 center, replacing NCS's own development work around the NMT900 mobile switching

Second, the project focused on the planning and construction of the mobile network. An engineer at the Radio Station Section recalled the timetable for construction as follows:

> *"Within 5-6 years the network was estimated to cover the main roads. The aim was to make the network wide enough quickly, or not construct it at all".* (1997)

Network planning consists of coverage, capacity, base station places, frequency, and equipment purchasing. Additionally, the construction itself consists of implementation tests of the base station's functionality as well as network's operation and maintenance. Network planning was done in the Radio Station Section that also coordinated the network construction and made the order of work priorities. A technician coordinating the construction organized this work. He negotiated with the teledistricts in order to make sure that the base station places had roads ready in time and the backstays of the masts could be attached to the land next to the mast. He usually went personally to check that everything was ready at the base station place for the construction group to come. Even though technology was essential, the customer was taken into account ever since the beginning. As an engineer said concerning economic issues:

> *"The market view has always been essential. Customer orientation, serving customers, was highlighted and the technology was only a tool".* (1998)

The search for profitability at low cost and with speed to the customer market were important and could be seen, e.g., in the selection of materials and structure for radio link masts. The constructors of ARP preferred guyed masts, which were cheap and fast to build. Additionally, the public broadcasting company YLE had them in use and they worked well. In contrast, one Collegium member wanted caves to be built into rock and another towers built of concrete. Over time, this was solved in line with the ARP constructors' plans. Additionally, base stations were constructed in existing places already owned by the corporation or some other organization. For example, the masts of YLE were popular because they were high enough. In the beginning, the Radio Division's own construction group built the base stations and masts because only they had the necessary special equipment for this work. This was also the reason why the workers at the teledistricts did only minor work on the masts, e.g., changed lamps.

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center. Most probably, Nokia's people noticed this development work in the early stages and bought Televa from the PTA.

However, collaboration with the teledistricts was crucial already from the beginning, exactly because of the base station places. An engineer who coordinated the construction at that time recalled:

> "Help was received in the same scale as the relations were with the teledistricts…Districts organized connections to the base station and only after that, the base station could be built". (1998)

Third, concurrent attempts to abolish the Radio Division and the profitability principle focused activities to the customer market and favored the employment of existing organizational competence. The report of a committee led by Chief Secretary Häkkänen was completed in 1967. It suggested the abolition of the Radio Division and the foundation of a Teletraffic (*teleliikenne*) Division. In practical terms, this would have meant returning to the time preceding the foundation of the Radio Division[100]. Häkkänen's committee report was dealt with in 1968[101]. According to a later nominated personnel manager:

> "Again, one committee recommended the abolition of the division. The division had good relations with the Union of Telegraphers, which was because every telegrapher had to pass an examination…. Every ship had a telegrapher and the ship's communication to harbors and the outside world happened via this telegrapher. Both parties availed of this continued collaboration. It happened that the Chair of the Telegraphers' Union marched to the ministry and announced that if the Radio Division is abolished, Finland's foreign trade will be halted. Somehow the division was not abolished". (2001)

Even though the threat of abolition was prevented at that time, further threats of abolition became permanent and kept popping up in different discussions and presentations. Consequently, the personnel of the Radio Division knew and got used to the fact that they would not receive extra investment money for any procurement due to these abolition attempts. According to the chief engineer of the division:

> "When personnel recruitment was not permitted, we had to draw on our own inventiveness …all work was done by the available

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[100] The existence of the Radio Division was legitimated referring to the following tasks: taking care of legal tasks, international contracts, and special assignments attached to radio such as radio terminal inspection, admission of permissions and certificates as well as administration of radio frequencies. Division managers willingly showed the high growth of the admitted radio terminal permissions and certificates for the radio usage.

[101] Interestingly, in this dealing the issue of dividing Post and Telegraph into two separate independent offices emerged the first time. This was about 30 years before the division actually came true.

personnel. Folks were very motivated. Compared to the other parts of company, demanding work was done at the Radio Division. Technicians did the kind of work that engineers with university degrees did in other parts of the company". (1997)

This intraorganizational threat also contributed to a mindset of 'if something is decided then it is also done'. As the chief of the Radio Station Section at that time depicted:

"Many manufacturers requested to delay the network construction by one year but the people of the Radio Division unanimously agreed that it was out of the question. We had got used to the situation that postponement meant an opportunity for delayers to get their hands on the project, even inhibit it completely. Thus, speed was a necessary factor". (1997)

Before the division could provide evidence of the development of its new businesses, the Union of the Telegraphers protected the development of ARP[102]. Commonly, also other connections with labor unions were important and relations with them became close. In general, the personnel at the Radio Division represented a distinctive, even different, kind of a band of people in the company. Radio technique differed from telephone technique and this group clearly had its own imprint. An engineer, who came to the Radio Station Section in the mid 1970s, described the working and organizing at the Radio Division at that time as follows:

"Work in the division was rather much attached to taking care of growth, financing, and existence. The division director used a lot of time for the survival struggle. The Radio Division's future and its abolition was discussed rather much because the division was so small. In fact,…all the radio activities were perceived as some kinds of construction activities of connections. Link technique was the dominant part of division; mobile phone activities were only a small but growing, even a bit hidden part. Another part was a strong frequency and permission administration, which dominated the image others had of the division…Customer service and technology functions were in adjacent rooms. Customer pressure came along the corridor to the technology side when the chief of the Customer Service came to give feedback to technology. People became red in the face and then hard language was heard. After a quarter of an hour, the issue was agreed. The most important thing was that a common responsibility for customers emerged then".

New employees were hardly ever hired and the work of ARP was divided between the existing sections in the division. Employees with experience from previous systems were encouraged and motivated to participate in the development and implementation of the new system. Interesting and challenging problem-solving work and curiosity

mainly for technology development motivated most of them. Problems were discussed with experts and courses of action were formed together. The opinions of experts were asked, their expertise appreciated, and their opinions also followed in many situations. These experts then took care of the system implementation. Equipment construction provided technological knowledge and thus people at the division knew about the technical possibilities. One such construction work was needed when there was no equipment available to connect the radio network of ARP to the fixed network. An engineer at the Radio Station Section remembered in 1998 that this construction work gave the division a good opportunity to follow the technology development, providing knowledge on what could be realistically required from the industry.

4.4.2 Piloting ARP in order to provide impetus and support for its development

In this subsection, I describe the organizational activities that took place when ARP was piloted in the market. An engineer who the coordinated construction of the base stations described the situation as follows:

> "The first ARP mast and antenna were completed at Leppävaara in the late summer 1969. One week before Christmas the second base station was put up at Olos in Muonio". (1997)

However, it was not enough to construct base stations. The radio network also had to function reliably and according to plans, which was taken care of in the operational inspection of the base station. A technician from the division told about it as follows:

> "Measurements were made at the factory when the base station was accepted…The base station's transmitter was tuned, power and sensitivities were controlled, frequencies were set up, and levels of speech and signaling were tuned both at the base station and the center". (1997)

In the beginning, many people were required in the operational inspection of base stations in the field. A technician remembered one inspection that had taken place in Kokkola. In that case, two persons took the base station with them from Helsinki and drove to Kokkola, about 450 km north from Helsinki, in a cheap Russian-made Volga car. A bus-full of engineers followed them. The journey took one week, which was not even enough to complete the station. Moreover, the coverage area of the base station

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[102] Even though strike possibility was flashed couple of times, it was never used.

had to be checked before it could be taken into use. In that work, knowledge of the propagation area of radio signals is needed. Actually, that knowledge is a prerequisite for the planning, construction and functioning of a mobile network. The coverage area is found out by measuring the propagation area of the radio signal. Furthermore, principles for the network's operation and maintenance had to be developed. For that purpose, the Radio Division developed a model in which the operation and maintenance as well as responsibility for the division's fixed lines would be given to the teledistricts. Later, also the construction of the stations was transferred more and more to them. The first base stations for the ARP system were launched to pilot in 1969. Toivola (1992, 21) writes:

> *"There were only free-of-charge terminals for use by the administration (virkaliittymä)...external subscribers were only received when a radiotelephone tariff could be confirmed".*

Management activities during the pilot stage were directed towards the testing of the functionality of the network's technical solution. The network was further constructed to cover the main roads and cities. Then it was expanded further to rural areas. Nevertheless, the managers started to pay more attention to customers, i.e., how customers get access to service and how they use it. Terminal and service distribution was thought about and outlined more carefully. To do this, independent dealers were used. In practice, this was done in a unique way in the world. As was previously mentioned, this had become partly a standard practice since then. The Radio Division took care of the terminal permissions, which dealers provided to end-users. Together with the Radio Division, dealers took care of attaching the terminal to the mobile system. Independent dealers were used partly because they were seen to have motivation to sell terminals and subscriptions, which supported the division's search for customer volumes. On the other hand, the division's internal calculations together with available evidence from the Swedish Televerket indicated that subsidizing the terminals and distributing them via one's own distribution channel, as Televerket did, required large financial investments. As Mölleryd describes (1999, 116):

> *"The Land Mobile Radio Survey Commission of 1967 proposed that Swedish Telecom [Televerket] should own the mobile telephones and lease them to the subscribers. This was the established model to organize telecommunication services and was also used for the first two mobile telephone systems, the telephones being considered an integrated part of the system. The NMT-Group also suggested this model for the new manual systems in January 1970. However, it*

required a considerable investment of the part of Swedish Telecom…the necessary investment for the procurement of mobile telephones was estimated at SKr 40 million".

The liberalization of terminal distribution was discussed in Sweden. It was liberalized in principle, but practically still concentrated around Televerket (Mölleryd 1999). In contrast to Televerket, the Radio Division perceived that customers would take better care of their telephones if they owned them, compared to leased ones. The number of changed or replaced or 'accidentally broken' terminals was perceived to be directly proportional to accumulated costs. However, the independent dealer distribution annoyed the dominant corporate business, because mobile terminal distribution challenged and threatened their existing practice of subsidized fixed terminal distribution. Another annoying feature was that the company's own and independent dealers would be treated equally, meaning that the company's own distribution had to face increased competition.

The way customers would use the service was explicated, even though the emphasis was still definitely on the technical solution. On the basis of their technological knowledge, service unit and functional staff knew that it was possible to implement the selective call in mobile terminals. The organizational actors' interest concentrated on how customers perceived and managed the activities they had to do while using the service. In order to help customers in this service use, they were given a map of Finland marked with base stations and channels, instructions for the service use and some kinds of blank forms in order to be attached as subscribers to the system.

In summary, this section described the managerial activities when ARP was further defined and a pilot launched to market. The data concerning this further definition stage suggest that cross-functional principles of market penetration were confirmed in the minds of the project managers, and were most likely also reflected on the functional level. Project managers together with other persons at the division paid attention to motivating vendors to produce equipment, and third parties to participate in the network construction. The abolition attempts of the division made it force activities toward market penetration and also made it pay attention to interest groups who could weaken these abolition attempts. Data from the impetus stage suggest that emphasis was on the implementation of technical solutions to develop the technology. However, the data also

suggest that attention moved partly from the technology towards customer market development. Thus, cross-functional principles outlined in the definition stage were further forced into customer market penetration.

4.5 Modifications to ARP and providing impetus for its development

ARP activities required fine-tuning before the innovation could be launched to the customer market in order to pursue impetus for its development. This section is organized according to these stages, focusing first on activities at the Radio Division before ARP's customer market launch occurred.

4.5.1 Fine-tuning the definition of ARP

Important activities at this stage forced cross-functional principles and pricing of the ARP service towards customer market launch. Important activities at this stage served to direct the development of cross-functional principles and the pricing of the ARP service toward launching the system to the customer market. It became clearer that manual switching could be 'one bottleneck' to inhibit the search for customer volumes and it also could slow down the quest for profitability. The solution was the selective call. The Radio Division rushed to apply it in the mobile terminals. Every subscriber would receive their own number and would no longer have to listen to the calling channel; instead, a signal was given. This would also provide comfort for the user during car traveling. Namely, the pilot had shown that listening to the calling channel meant keeping up the volume in order to hear one's own call if it was presented. Cars in the end of 1960s had quite a bit of background noise[103]. One person from the Radio Division commented the noise level at that time:

> "The ruckus was so enormous that you could barely talk there at all, if you talked, it was almost shouting". (1998)

In 1969, the Radio Division outlined the selective call as a requirement for the manufacturers in a way that implementation would start in 1971, and it would be compulsory in all mobile terminals in 1972 (Toivola 1992). The selective call was

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[103] At that time, the Volkswagen 1300 was one of the best cars in Finland.

specified only in 1973. It was implemented in Sweden in 1974[104]. At the same time when the Radio Division prepared the customer market launch, the development of the Nordic Mobile Telephone (NMT) started as a Nordic Country co-operation. The first words for NMT were said at the Nordic Teleconference in Kabelvåg in the end of June 1969[105]. The Nordic Teleconference approved plans for manual systems in 1971. These MTD systems were implemented in Sweden, Denmark, and Norway in 1973. The manual system was generally considered a step backwards but especially Televerket's Östen Mäkitalo thought that it was necessary to wait for the progress of microelectronics[106]. While the Nordic co-operation provided simultaneous development and excellent opportunities to compare alternatives, it also provided information about other mobile systems in the world. In 1968, the Swedes made an excursion to get familiar with the AT&T system in New York. They found out the good frequency use efficiency of their MTB system (Mölleryd 1999). Contemporaneously, the persons from the Radio Division also made a study trip to the USA. It was a significant market to compare because the first wireless system in the world was launched to market on April 71928, when Detroit's Police radio started (Calhoun 1988). Hans Myhre acted as a secretary and later chairman of the NMT development group. He said that NMT's development principles in 1969 were the following :

> *"1) automatic connection and billing from and to MT 2) cover all Nordic Countries, 3) same characteristics and functionality as in the fixed network, 4) reach based on number and independent of location, 5) automatic handover to new base station, 6) minimum change to existing telephone network, 7) minor complexity in mobile terminals".*
> (1999)

Roaming, selective call and handover functions highlighted the importance of switching in mobile networks and they were significant indicators for its automatization. These principles in the NMT work confirmed for the Radio Division that the business may have a future, and that the conceptualization of ARP was outlined and aimed in approximately the right direction. However, before the customer market launch, the Collegium of the PTA had to decide about the call prices for the ARP service. Pricing

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[104] In Finland, calls were sent with both the call and "tilulii" –signs until 1.7.1975
[105] The previously mentioned hurry of Televerket to provide a national service affected the start of the NMT development.
[106] This made it possible to construct an advanced system in which microelectronics could produce cheap processing capacity. This was perceived as possible in the end of the 1970s.

was challenging, while at the same time a group of local telephone companies was extremely interested in ARP and wanted to participate in the system implementation. As the chief of the Radio Station Section recalled:

> "The division director had some group, which tried to cool down the group of local telephone companies at the same time as an engineer at the Radio Station Section constructed the network...and at the other end of the house, the chief of the Radio Station Section was thinking about how to fix the price in a way that the network would make money". (1997)

There was no exact procedure to fix prices. An engineer from the Radio Station Section said that they were "snatched from a leaf". An engineer who later became the Radio division director recalled that they were based on exact calculations. However, the prices of the Maritime and Saimaa radio formed the bases for these prices. Anyhow, the Collegium approved the prices in the presented form. The project started to prepare a customer market launch.

4.5.2 Customer market launch for providing evidence for impetus and support of ARP

This subsection will describe the activities that took place when ARP was launched to the customer market. Important activities at this stage concerned solving problems that prevented penetration in the customer market. The emphasis of activities changed from technology towards customers. First, the market launch was basically possible on 17th June 1970 when the PTA confirmed the tariffs (Toivola 1992). The first commercial subscribers were connected to the network 1st April 1971. A technician participating in the construction looked back in 1997 highlighting the novelty of the first real paying customer describing: "it felt strange, even unrealistic in 1971". When telephones were type-approved, more customers started to become subscribers, even though the first telephones were expensive. A customer service clerk at that time continued of the same topic:

> "The superior of customer affairs taught at a telegraph course and he called during the day to hear if there had been any new subscribers. During the first few months, we always marveled together when a new subscriber joined the system...After a few months, more than one subscriber started to join the system". (1997)

The independent dealers took care of subscription delivery, no special marketing or publicity campaign was organized, and not a word was said about marketing, as a customer service clerk depicted:

> *"We relied on the dealers, who lived on terminal sales, to work on our behalf. We had maps where the base stations were marked and short instructions for how to call. These were given to everyone interested, but action was rather much based on the "grapevine". (1997)*

Second, at this stage the managerial attention moved from developing a mobile technology towards customer affairs. Active customer feedback was one of the reasons for this shift. When a customer bought a mobile terminal, (s)he could not use it immediately but had to wait for a license for it. Dealers usually sent these papers to the Radio Division. The Billing Attendant remembered:

> *"Dealers had to use a paper made by the Radio Division to apply for a subscription. A dealer usually filled in this paper together with a customer. It was delivered via mail to the division. It was extremely important that the paper was original and signed. It was not possible to open a connection until the paper came to the division,. In the beginning, opening happened fast, in a few days but then jams started and opening times extended to weeks". (1998)*

When people were doing new things, practices for them had to be developed as well, which took time. For example, when the commercial usage of ARP started in 1971, some kind of a system for customer billing was needed. The division's own employees developed it, led by a previous traffic inspector from the Maritime Radio. The first customer service clerk remembered the outline and procedure for it:

> *"Large numbers of subscriber cards were copied. The model was the old subscription card of Tele [Sonera]…Subscriber information was marked on this card and monthly fees were calculated…At the same time, a register of ARP subscribers was formed both in a number and in an alphabetical order. This knowledge existed in the Flexo-system, where it was ripe for picking. A copy of the register was actually the first catalog of the ARP mobile phone numbers. The dealer got a number that was coded to a terminal and then the customer could call. The center did not check if a contract was valid or not". (1997)*

Thus, almost everything was done manually in the beginning. The few existing customer service clerks cut and glued locations of the base stations to a map and made user instructions. Every time when a new base station was implemented or the channels changed, new copies had to be made. One customer service clerk recalled how information was delivered to the customers of that time:

> *"New things were communicated to the subscribers by the available means. We didn't use advertising agencies or print fine brochures...nobody talked about customer service but that was how we took care of customer affairs".* (1997)

The increasing number of customers created a need to hire more customer service clerks, who could then help to avoid blockages in dealing with subscription applications. Hiring was not easy because, as already mentioned, at that time office workers were still employed as public officials. This did not provide much flexibility for hiring. Also, the permission side of subscriptions followed bureaucratic rules, according to which it was important that information was filled exactly and on paper. The chief of the Link Section remembered:

> *"New subscribers were in queue for weeks, applications were dealt with as paperwork and phone service was out of the question. The paperwork made the dealers furious".* (2000)

Additionally, the inspection of the type of terminal took additional time from three to four days, according to the chief of the Inspection Section and also reserved the measuring device for that time.

As said, the customers gave feedback actively, which also had the effect that more attention was paid to them. Subscribers called the division directly ever since the market launch. They first called the operators and customer service clerks. Especially, traveling salesmen were outstandingly active concerning service quality and they also started to suggest ideas for further service development. Sales representatives had use for the service because at that time hotels collected 'greedy' fares for hotel room calls, as an engineer from the General Radio Affairs Section remembered. Thus, sales representatives were prepared to purchase their own mobile telephones. This partly led to the fact that ARP's acceptance was much more favorable than expected. The Radio Division welcomed the customers' feedback. This feedback influenced the way the development took place, as the chief of the Radio Link Section described:

> *"We could conclude from the customer feedback that they were not interested in the service price but in its quality...The telephone had to work where promised and pressure to expand the network coverage became obvious. Mobility and accessibility are inborn for the Finns. Finns have come from the countryside to cities and they have an internal yearning back there. Hence, holiday houses and summer*

> *cottages are frequently visited at different times of the year. People*
> *want their mobile phone to work also in those places".* (2000)

When the subscribers noticed that technical personnel had the knowledge of the service, they started to call them directly. This started at that time but was materialized later. Anyhow, in addition to their normal work, the total workload became heavy. Then a separate customer service and billing unit was outlined and later established.

Third, the customer market launch meant intensified co-operation with manufacturers, which emerged slowly but naturally. They were the natural co-operators in network and terminal development, inspection, distribution, customer service and in the Nordic co-operation. In this co-operation, the division director perceived that it was important to create Finnish nationalists in addition to Swedish nationalists. She instructed those who went to meetings: *"remember that you are Finnish".* The problem from the Radio Division's point of view was that Ericsson received information from Televerket before other manufacturers did. The aim was to give the same information at the same time to all manufacturers. In Finland then the insights of the future were shared with manufacturers and especially national manufacturers were motivated to participate, as an engineer working in accounting remembered:

> *"The destiny of Nokia was solved already around 1974-76. I used*
> *several weeks merely to make them understand the long term*
> *view…the 1970s were a decisive time for the Finnish mobile*
> *communications industry".* (1997)

The development of the mobile communications industry was largely initiated by the national-level actors in Finland. In the beginning, it was thought that everything could be planned and developed in Finland. This attitude was typical in co-operation, e.g., with Nokia, as the Radio Link Section chief described:

> *"It was enough for Nokia to sell equipment to the PTA, other national*
> *buyers, and Russia. In the early stages, Nokia was thereby completely*
> *dependent on us and we were in some sense their test laboratory".*
> (1997)

Fourth, recurrent attempts to discontinue the Radio Division forced action further to the customer market in order to ensure future survival. The next concrete abolition initiatives after Häkkänen's committee were made in 1973 and 1974. The following serious attempt of the same kind was associated with the so-called Rauvanto Working

Group's proposal on the organization development of the PTA in 1980[107]. The division's abolition was officially presented for the last time at the corporate level in 1982. After this, the corporate dominant business wanted to fragment the value chain of ARP and in that way also to get part of the future growth for itself. The director of the Radio Division recalled:

> "The popularity of ARP rose eyebrows at the fixed network side…It conveyed to a situation in which everyone wanted to stir up the matters of the radio side. The teledistricts wanted to have the administration side but we opposed that starkly. A few persons took care of that in the Radio Division. If that had been given to the teledistricts, it would have meant a lot more people whose costs would have been taken from the earnings of ARP…There were also intrigues between individuals, which culminated in the budget proceedings. These people wanted to play rough and settle scores". (1997)

Political aspects were also seen in the technical argumentation about the relationships between the different networks. As an engineer involved in accounting emphasized:

> "The idea was that the radio side is an extension of the fixed network. Now it is quite the contrary, that is, the fixed connections are in the service of radio network. We should have been able to sell this matter a little bit better already then". (1997)

The context of survival compelled the service unit level actors to force activities toward the development of customer functions. It also restricted founding too many new functions but first and foremost, it spurred the development of new innovative procedures inside functions. Often, this meant the automatization of people's manual work or the creation of new inventive ways to facilitate work in the functions. For example, when a mast construction lacked equipment, the constructors invented a winch to set up a mast and then raise the equipment there[108]. Additionally, activities towards third parties were organized at the expert level without major involvement of their superiors. This concerned especially the co-operation with competing divisions in the PTA (Sonera), which tried to abolish the Radio Division at the same time. An example of this was the collaboration with the teledistricts in the network construction work, which decreased the Radio Division's costs on one hand, and eased off the enthusiasm

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[107] On September 28 1979, the Ministry of Transportation and Communications set up this group to clarify if the activities of Posts and Telecommunications could be managed more efficiently by dividing the PTA into a separate Post Office and Telecommunications Office or should they still be kept unified. A unanimous proposal was that the office should remain unified and the Radio Division independent.

to abolish the division, on the other. Additionally, this released energy and time for planning and other work. This co-operation also mobilized workers at teledistricts to their own work and also forced their activities toward collecting evidence from the customer market in that particular area in Finland in which they worked.

In summary, the presented evidence indicates that ARP was fine-tuned at the definition stage. At that stage, a selective call was perceived to solve the challenges encountered in customer market penetration, i.e., the problems of cross-functional principles and the technical solution. Also, the definition of NMT confirmed to the belief in ARP. Additionally, the previous systems in the Radio Division provided experience to tune the price fixing of ARP for decision making. Thus, the activities of ARP were designed for customer volumes and profitability, focusing the action on customer market penetration at this definition stage. In the impetus stage that followed, the data indicate that special attention was paid to developing a customer market. Many challenges existed: problems in terminal inspection and strict rules on recruitment slowed down customer penetration, and a system for billing had to be developed. Customers started to give feedback on the service also to the technical experts of the division. The previous abolition attempts changed partly into attempts to seize parts of ARP's value chain from the Radio Division into other parts of the organization.

4.6 Further modifications of ARP and providing impetus for its development

Investment needs for customer market penetration caused further fine-tuning of ARP and accelerated the evidence collection from this market in order to legitimate ARP's development. This section follows those stages: first briefly describing the fine-tuning of ARP and then describing how ARP was legitimated.

4.6.1 Definition of ARP fine-tuned due to owner's interventions

In the mid-1970s, the Radio Division started to insist on more investments from the state budget in order to serve the increasing number of customers. Officers in the

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[108] It is not a simple task to put up a 100 meter mast.

Ministry of Finance resisted this[109]. They insisted that the division should increase service prices in order to decrease market penetration and investment needs. This had been done in the fixed business and now the ministry wanted to implement the same logic also in the mobile business. The division, on its part, resisted the ministry's suggestion because they thought that decreased market penetration would threaten the survival of the division. However, prices were raised, in fact six or seven times starting on 1st April 1974 (Toivola 1992; Lätti 1978)[110]. The surprise for the division was that this did not have a major effect on the customer growth. In fact, it improved the profitability of the business, shortening the time to break-even point and legitimating the development and the division's position even faster than without these increases.

4.6.2 Customer market evidence provided impetus and support for the development of ARP

At this stage, evidence of the influence of cross-functional principles on profitability became available and it could be used to legitimate the further existence of the Radio Division. The first study on how customers perceived the service usage was made in 1973 (Kangasluoma and Merontausta 1975). An engineer involved in economic affairs told:

> "The study clearly showed that many issues had been guessed quite right...This was the first time when a few thousand subscribers were asked about how things have worked out, and how would you like to have them?...He [the author of the study] translated his investigations also into English. They were very popular because, for example, in Sweden similar investigations had not been made". (1997)

As said above, the income from ARP went directly to the state but the Radio Division knew the sums. Nineteen billing points took care of billing, while also compiling traffic statistics from which the division could infer the customer market development. A report called "A Common Manual Mobile Network" was prepared in 1975 at the division. This report presented how activities linked to and selected for service production, distribution, service usage and call switching affected the profitability of the business. The report tells about the network construction as follows:

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[109] Generally, an individual civil servant (a Telesector man) at the Ministry of Finance was an important person. This was because he, e.g., presented all the investment proposals from this sector agencies in the Ministry.
[110] The second time prices were put up was in 1.1.1975, followed by 1.1.1976, 1.9.1976 and 24.9.1980.

"The construction of the public manual radiotelephone network was estimated to cost about 5-6 MFIM at the planning stage in the end of the 1960s. According to the 1974 price level, the cost of the network including 15 000 subscribers and 140 base stations (about 300 call channels) is about 20 MFIM". (p.8)

On page 17 of the report, it is said that when the network is complete the remaining equipment investments are almost 10 MFIM. Further, the report indicates that if existing telephone lines and masts had not been used, the fixed investment would have been threefold. Thus, the network investment was altogether about 30 MFIM and the savings from using the existing fixed infrastructure were at least 20 MFIM. How about the principle that subscribers purchase their own mobile terminals? Page 9 of the report states:

"The mobile terminals constitute without a question the biggest investment…The mobile terminals for 10 000 - 15 000 users would need already now an investment of about 50 - 70 MFIM".

Thus, the purchasing of the mobile terminals would have required from two to seven times the investments that were used to form the network. Further, the report claims that users were estimated to use a mobile terminal for six years. This presented them with fixed costs of about 1500 FIM per year. Telephone calling costs were estimated to be also about 1500 FIM per year. If an operator had purchased the terminals and users had used them for, e.g., three years, this would have doubled the fixed costs and investments. How about if the users had changed their phones annually and not taken as good care of them as when the phone was their own? The last principle considered was usage and call switching. Page 9 further states that in the planning stage, more attention was paid to the network planning than to the call switching. Automation of the fixed network was originally planned to relieve telephone operators. However, the number of operators and their salaries increased more than estimated. Thus, over the long term, switching could form about 70 – 80 % of the total maintenance costs of the network, amounting to 8,5 MFIM. These costs formed 56 % of all the costs in 1977. The same source claims:

"The radiotelephone network is… a good source of income...In 1977, the earnings of the manual radiotelephone network are about 21,5 MFIM and the costs about 15,2 MFIM. Network investments can be financed by annual surplus. Because subscribers' paid income covers the costs, the state does not have to support the construction of the network with the other funds".

These figures meant that EBIT (earnings before interests and taxes) was about 30 percent. Thus, the rush to implement the selective call was the right kind of action. The division managers started to communicate these figures to other divisions. As accounting engineer of that time recalled:

> "He made calculations in an income statement format and the margin was quite huge. That created envy in the organization...Some even claimed that all the costs had not been taken into account. That created an inter-division dust-up". (1997)

As said, the representatives of other divisions of Sonera also became envious and wanted to get a part of this growth. After this, the division did not necessarily show all the profit potential, in spite of the prevailing threat of abolition. Nonetheless, the preliminary evidence from the customer market started to legitimate the development of the project and the survival of the Radio Division. Additionally, ARP also gained profitability even faster due to price increases. The Radio Division director and the chiefs of the sections were allowed to continue the development of ARP when communicating such profitability. This kept other divisions at a distance, providing the stable conditions that finally resulted in the confirmed continuity of the division. Thus, the profitability was used to buffer activities at the division from external pressures. On its part, buffering forced activities and resources towards the customer interface and focused efforts on the development of technology and the creation of a customer market. This accelerated the organization's knowledge creation towards and in interaction with the customers. Customer market growth continued to be stronger than people in the division had estimated. As the chief of the System Section remembered:

> "We made predictions of the customer trends. Usually, they went wrong. The direction was right but the customer numbers were always two to four times bigger than we predicted". (1997)

An engineer who later became the director of the Telegraph Division estimated that there was no previous experience on the basis of which to expect larger customer or traffic amounts. The success of ARP was surprising also internationally. As the chief of the Radio Inspection Section remembered:

> "I mentioned at one international meeting in London that a public mobile telephone network was in use in Finland. A similar system was also in use in England but they did not have too many customers. He told that the Finnish system had thousands of subscribers by that time.

> *The meeting participants 'fell out of their chairs' when they heard this".* (1997)

The survival of ARP seemed pretty safe based on economic calculations in 1977:

> *"The 10-year examination period has been used to evaluate the income of the automatic radiotelephone network. The subscriber base at the end of the 10-year period is estimated to be about 24 000. (The calculation method used was present value. The interest rate was 15 %, which is at the upper limit according to the Nordic Country guideline)... Hereby, the discounted income to present moment would be about 39 MFIM. When we take into account that nowadays the income of manual radiotelephone networks per subscriber is already about 50% bigger than the above mentioned sum, this means that the automatic radiotelephone network offers subscribers essentially cheaper calls (or more income for the state). As well, we can take into account that automation entails 60-200% growth meaning even cheaper calls for subscribers".* (Appendix of the decision-making material for the Corporate Collegium concerning the purchasing of the NMT 450 network)

The network covered the entire Finland in August 1978 when the last base station was taken into use (Turpeinen 1996, 369). The end of project was celebrated with an official opening ceremony on 17th August 1978. It got plenty of positive publicity in the national media. Turpeinen (1996, 370) writes:

> *"The CEO picked up a mobile phone handset and requested the number 173 6230. After a few moments, we heard "Ministry of Transport and Communications, Rauvanto". This contact showed to the representatives of the media that the network covered the entire country. Its 15 000 subscribers could call from anywhere to any part of the country".*

Last, in order to understand the legitimating of ARP, it is important to briefly tell about the career development of the project and business managers and the general working climate in the Radio Division during this development. I first consider careers. The first project manager retired from the company in the late 1990s. The second project manager became the deputy director of the Radio Division when the permanent director suddenly died in 1973. She was never appointed to the office of division director. She held the deputy position from 6th June 1973 to 31st October 1976. All that time she unofficially took care of the office, as she recalled:

> *"It was difficult to take care of the tasks of deputy director because there was no continuity, not even to the same extent as in the other divisions because of the constant abolition attempts...When the permanent position of director was again established, I applied for it".* (1997)

She admitted that she could not get familiar with the technical details during the last year because she had a hard job to fight for the investment money and to keep the division running despite the external pressures. She recalled that additional pressure ensued from the fact that she was a woman and because the division progressed all the time. According to an anonymous interviewee, the deputy director 'burned her bridges' in every direction when ensuring peace to work in the division. For example, she did not share knowledge with those trying to abolish the division. Many persons within the company and even at the division did not support her nomination, and the nominated person eventually came from outside the PTA. After nomination, the deputy director returned to her previous position as section chief on 1st November 1976. She resigned from the division in 1977. A person who came as a summer trainee to the division in 1974, later becoming its director remembered:

> "An accounting engineer recruited me there. Many still remember him as a visible and influential person. I remember him as an encouraging and idea-rich superior, and considered it very unfortunate that the PTA at that time was not able to use his energy. The superior of this engineer was another daredevil to whom the following generations owe the prevailing attitude of the Radio Division 'we carry out mobile communications despite the obstruction from the fixed telephone people'. Thanks to this attitude, they were not able to merge the mobile communications into the depths of 'the common Tele [Sonera]', especially when tight focus was needed to create a competitive mobile operator. Without this, Finland would not be a leading mobile communications country or Sonera its leading company. May this be a deserved acknowledgement to the right address, even though it is very modest compared to stock option millions". (Tietoviesti 5/2000)

In spite of the quarrels, a large state office provided finance and rather secure institutional conditions for the development, as the acting division director of the early 1970s emphasized in 1997. Additionally, the division had a habit of not throwing out people they had employed. Actually, the staff was proud of their work at the division. Employees worked passionately and enjoyed the novelty, and the continuous development created a positive working climate in the division. This could be seen in the large amount of voluntary work that was done: for example, a sauna was constructed in Santahamina. It became a place to meet interest parties and distribute information among working groups. Additionally, people's motivation to work emerged from inspiring work tasks, regardless of the not-so-pleasant circumstances, as the division's two technicians recalled:

"We have also lodged in the field. We lived in the office's old trailer at Konnevesi. At Kaamanen we lived in summer cottages. There the portable radio could not be heard properly and we hung it by the cord next to the ceiling. It was so drafty that the radio swung there…A technician told that he has bunked in the attic of a radio station, at a link cubby and even in a tent for a week". (1997)

In summary, this section described how ARP's price increases and customer market success gained support for its development. First, functional principles contributed to the profitability and customer market success. Next, this section highlighted that the employees' motivation for the development of ARP emerged from the challenging work and their curiosity toward the novelty of ARP.

4.7 Summary of the development process of ARP

The evidence presented suggests that the central **bootlegging** activity involved in ARP was the Radio Division management's **search for survival** under the abolition threat. Also, the Finnish and Nordic Country co-operation as well as the previous technology systems of the division produced pressure on the one hand, and on the other hand motivated the organization to study and define an opportunity and an initiative for a technical solution in order to produce the mobile system and service.

The director of the Radio Division triggered the **definition stage** of ARP. The person at service unit acted as the first project manager and defined the **technical solution** i.e. made the **technical and need linking** for the initiative. In this linking, technological knowledge of global scale was used. After definition, the responsibility for the project moved to another person. This second project manager also had personal experience from previous systems and technological knowledge. These allowed the key individuals at the division to compose cross-functional principles, i.e., **cross-functionalizing** emphasizing service volume, low costs, and then finally profitability for the customer market penetration. These outlined principles also started to guide resource mobilization in the functions. They also mobilized resources of third parties and developed their competences. The lack of resources also stimulated bridging: it directed the second project manager's attention to gaining investments to finance the activities. This led to the sharing of knowledge to the third parties and finally to the creation of an industrial field Thus, the principles for system, services and equipment – simple and cheap

implementation and ease of use – motivated and started the industry development and further forced activities to the customer market. The business unit manager decided to take the initiative to the Corporate Collegium in order to pursue this opportunity.

The evidence indicates that corporate **decision making** was based on the existing resource allocation rules of that time, i.e., the **internal selection** criterion of the corporation. The discussion in connection with decision making did not consider any other internal criteria, e.g. such as the number of customers or profitability, nor were there any other external criteria, either. According to the data, profitability was only in the minds of those presenting the initiative presenters, or perhaps only the second project manager. At that point, the development of ARP was already financed by corporate investments.

The project managers of ARP further **defined** it when the pursuit of an opportunity was approved. Their main activities focused on the system's **cross-functionalizing** principles and the development of an industrial field in order to penetrate the customer market. Activities practically concentrated on the definition of **technical linking**. The pilot launch to the customer market is suggested to be the stage that started the search for continuous **impetus** and support for the development of ARP. This stage emphasized **strategic forcing** of activities to the customer market in order to first collect evidence of technology development. At this forcing, the project management emphasized the need for a functional implementation of the technical solution and its customer usage. The ARP managers relied on the existing staff of the division and their competences in this implementation.

The **definition** of ARP was further modified when the project manager fixed the price for the service in order to be presented in the decision making. This definition is suggested to start the second definition stage, i.e., the second iterative cycle. At this stage, the project management adjusted **cross-functional** principles to the technical solution and aimed activities further to create an industrial field and collect evidence from the customer market. The same level management searched for further **impetus** and support for ARP's development by launching ARP to the customer market at this second iterative cycle. At this stage, the second project manager's personal knowledge received from the business school complemented the previous technological knowledge

at the division and confirmed the importance of profitability. Moreover, this market launch **forced** activities to the technology and customer market penetration and development. Additionally, this forcing emphasized adjusting the technical solution to the customer need and service distribution. Also, the increased number of customers caused the managers of ARP to pay attention to the customer interface, i.e., how to serve customers and how they access the service and use it.

The **definition** of ARP was further modified when the representative of the owner did not provide additional investments and then demanded an increase in the service price. This definition is suggested to start the third definition stage, i.e., the third iterative cycle. At this stage, activities were aimed even more to customer market. When the price increases were introduced to the customer market, action was even further **forced** to that market. To the surprise of project management, the price increases did not become an obstacle to the market penetration. On the contrary, as a result, the development achieved profitability even faster than without it. The development of ARP gained final **impetus** when it was able to present its profitability.

Figure 4.1 presents a summary of the previous analysis in a chronological order. Four managerial levels are identified on the left hand side. Activities are categorized into the above-described substance-based stages of bootleg, definition, decision making, and impetus. The above-described iterative nature of the development means that cycles consisting of stages happen simultaneously and consequentially in a way that, e.g., the definition stage of the second cycle overlaps with the impetus stage of the first cycle. The shaded areas refer to the central managers' activities in this substance-based stage model. The central managers' activities at each stage are outlined in the figure, as well as the time when the stages and cycles occurred[111].

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[111] This model is adapted from the Bower-Burgelman process model.

	Bootleg	I cycle Definition	Decision making	Definition	Impetus	II cycle Definition	Impetus	III cycle Definition	Impetus
Owner									
Corporate Mgmt									
Business Unit Mger	surviving		internal selecting						
Service Unit Mger		cross-functional. t&n linking		cross-functional. tech.linking	forcing technology develop.	cross functional.	forcing tech&ma develop.	cross-functional.	forcing tech&ma develop.
		1960 - 1968	1967 - 1968		1969 - 1970	1969	1970- 1976	1975- 1976	1976- 1980

Figure 4.1 Stage model of the managerial activities in the development of ARP

Thus, the development of ARP occurred in an iterative or cyclical way. This iterative cyclical development is illustrated in a different way in the next figure. Let us discuss this a little bit further. The presented evidence suggests that the first cycle is emphasized, because the most important managerial activities occurred then and major changes were not made after that. The key processes during the **first iterative cycle** were definition and decision making. The key managerial activities during the first cycle's definition process were strategic cross-functionalizing as well as technical and need linking. The key managerial activity during the decision-making process was internal selecting. At the impetus process, activities were forced to the development of technology and customer market by launching a pilot to the market. The two identified **project managers** were the key persons during this first cycle. Modification to the definition of ARP by fixing its price triggered the **second iterative cycle** of its development. This cycle also included the stage of customer market launch, which aimed to provide **impetus** for the development of ARP. Then the customer market evidence and the commercial success became possible. The **service unit level manager** orchestrated activities at this second cycle. The owner's intervention triggered the **third iterative cycle**. The evidence from the customer market provided the final impetus for the development of ARP. Because of the presented evidence, the key organizational actor at this cycle was the **division director** from the middle managerial level of the organization.

Core Processes of Internal Corporate Venturing

Managerial Levels

	Definition			Decision Making	Impetus		
	I cycle	II cycle	III cycle		I cycle	II cycle	III cycle
Corporate Mgmt							
Business Unit Manager				inter.select			
Service Unit Manager	cross-functional. tech.&need linking				forcing technology&market development		

Legend:
→ I -cycle
↔ II -cycle
⇢ III -cycle

I -cycle def	II cycle def	III -cycle def		I -cycle imp	II cycle imp	III -cycle imp
market need	Market Pilot	Inv's & Prices		Market Pilot	Market Launch	price increase

Figure 4.2 Iterative cyclical process of ARP

5 THE DEVELOPMENT OF THE RADICAL BUSINESS INNOVATION ZED

In this chapter, I describe the chronological event history of the development of Zed loosely from the late 1970s, and explicitly from autumn 1997 until spring 2006. Important activities preceding the definition of Zed started in the late 1970s cumulating toward the explicit reporting period. The present account ends at the point when the Finnish directory company, Fonecta, bought Zed Finland on 6th February 2006. Burgelman's stage model, as in the case of ARP in Chapter 4, will be used to present this development process. I describe the managerial activities in the chronological stages of bootlegging, definition, decision making, and impetus according to the first iterative cycle of development in sections one to four. Sections five and six will describe managerial activities during the following two cycles, when the concept was modified and further impetus for the development of a radical business innovation was pursued. The data from the fieldwork are organized according these stages. Short summaries will follow this chapter and each section. In this chapter, I use the name Zed throughout the analysis even though the global mobile portal was not given this name before the autumn of 1999.

5.1 Bootlegging activities preceding the definition of ZED

In this section, I describe the activities preceding Zed's definition. These important activities concerned competition, liberalization, regulation, experience of

internationalization and technology change in service production. As in the case of ARP, these activities could not be earmarked ex-ante to the development of Zed. The consequences were very hard, almost impossible to predict when these activities took place.

As concerns competition, we may say that the emergence of ARP started to practically break down the national distributed monopoly[112] in the Finnish telecommunications operator (TELCO) market in the end of the 1960s. It was followed by a dispute about a data network known as Telewar in the 1970s. This finally led to the privatization of Telecom Finland, as it was called at that time (henceforth Sonera). Since Telewar, a group of local telephone companies was active in breaking down the national distributed monopoly. In the end of the 1980s, the management of Sonera already saw a need for internationalization as one company executive recalled:

> *"There was a relatively clear view that competition comes to all fronts of telecommunications operations at national markets…The alternatives were to grow internationally or remain a national operator. The latter would have clearly meant the position of defendant [for Sonera] because local telephone companies controlled the most difficult area from the competition point of view. That was the local telephone services in the major Finnish cities".(1998)*

Sonera saw the national competition as a matter of equal resourcing. It wanted to get rid of the state's budget principle towards corporate-based investments. This led to the liberalization of national legislation and regulation and the above-mentioned privatization[113]. This was also influenced by the international development. Namely, the TELCO market in England was deregulated and British Telecom was privatized in the early 1980s. In the USA, the market was deregulated by breaking the AT&T into regional 'baby bells' and a long distance company in 1985[114]. In the late 1980s and early 1990s, there was also a tension to remove national obstacles from the flow of global capital. In Finland, the capital market was liberalized in the early 1990s (Tainio, Huolman and Pulkkinen 2001).

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[112] This was described in Chapter 1.

[113] The Managing Director of the Sonera Corporation said that the Telecommunications Act in 1987 was the turning point in this development (Toivola 1995, 7).

[114] AT&T is an abbreviation for the American Telephone and Telegraph Corporation, which was founded in 1875. One of its founders was Alexander Graham Bell, the inventor of the telephone.

5.1.1 The internationalization of the Sonera Corporation since the late 1980s

Sonera's internationalization started at the end of the 1980s. Then the first signals of the collapse of the Soviet Union were also perceived[115]. The first internationalization operation of Sonera was carried out in St. Petersburg in the Soviet Union in the late 1980s. A joint venture was established to carry out this fixed network operation[116]. Gradually liberalizing Russian society also allowed discussions directly with the directors of telecommunications and let Sonera managers hear their problems and tell them their own opinions. Additionally, St. Petersburg was geographically close and common traditions between Russia and Finland existed in this area. Sonera's management perceived it even as a matter of honor to take care of this issue. On the other hand, the disintegration of the Soviet Union roused Finnish companies to set their eyes on Russia and especially St. Petersburg. Altogether, Russian and Finnish companies needed viable international connections from St. Petersburg.

The first mobile communications operation was made in Karelia in the Soviet Union about 1990-1991. After a successful operation in St. Petersburg, people from Karelia got in touch with Sonera in order to organize their telephone activities there. In that area, distances were long and equipment for the maturing NMT 450 technology were available and could be implemented there[117]. The network became functional and rapidly turned profitable. High telephone call prices did not hinder the popularity of the system and they accelerated the return on investments. Namely, when customers could call, they did not care about the calling prices. Thus ability to call was worth more than the costs of calling. Rather soon, Sonera had activities in Karelia, Novgorod, Pihkov, Kaliningrad, Murmansk, and Archangel. People from the other more distant Soviet

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[115] Sonera's director responsible for the fixed network at that time and later responsible for Baltic joint ventures remembered: " The first signs of forthcoming change could be observed in 1985. In the end of the 1980s, an example from the Estonian Television was a concrete sign. The Estonian flag was publicly carried, which would have previously meant automatic sentencing to Siberia".

[116] It was necessary to found a joint venture because the Russians did not otherwise allow access to the transmission infrastructure. The Russians typically owned 51 % and the other parties 49% of these joint ventures.

[117] Actually, Sonera donated NMT450 base stations and transmission equipment to Karelia with which the system was launched to customer market. This network was connected to Sonera's mobile center in Finland, which made it practically an extension of the Finnish network.

areas also wanted to co-operate with Sonera. However, its hands were already full with the existing areas and the company did not want tie up too many resources in these kinds of activities. Nevertheless, Sonera was the largest mobile operator in Russia at that time.

Even though the Russians did not at first understand the technology too well, they woke up when they noticed the profitability of the system. They did not approve any longer of circulating traffic via Finland, but insisted on establishing joint ventures that would own the network, e.g., in Karelia. Sonera did not go along with these joint ventures. Some of the reasons were that Sonera had seen the Russians' tendency to control through majority ownership. Also, due to the common prejudice towards the Soviets and Communism, the risk in the investments was perceived as being too high[118]. Likewise, the payback was risky. Experience from the Finnish market had made the company management expect investment break-even points after a few years. On the other hand, the work attitude of the employees in Sonera as civil servants of the state did not include risk-taking, from which it followed that a state company did not take them either.

At the same time with these operations in the Soviet Union, around 1990-1991, the Baltic countries, and especially Estonia presented similar wishes. The issue was again considered as a matter of honor by the Sonera management. As in Karelia, the market launch was made with the NMT450 technology[119]. Sonera's Mobile Communications BU bought the mobile center and leased it for ten years. The center was placed in Helsinki and radio links were used to take care of the connections to Estonia. The organization in Estonia did not have competences in network construction, hence people from the Mobile Communications went over to advise them.

The Nordiska Radio was still a valid forum in the Nordic Country mobile communications co-operation in the end of the 1980s[120]. In this forum, the telemarket

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[118] However, different persons in the corporation perceived the same risk differently.

[119] Again, Sonera donated the required equipment.

[120] The Nordic mobile operators discussed actively and openly of market-, product-, technology- and organizational topics at their home market in this forum. In the end of the 1980s, the first signs of decomposing of this co-operation were seen. Especially Swedish Telia wanted to get rid of this co-operation.

opportunities in the east and Sonera's ongoing activities particularly in the Soviet Union and the Baltic Countries came forward. Based on these discussions Sonera and Swedish Telia decided to penetrate together to the Baltic area, where Sonera already strongly existed in the NMT network. They talked about a GSM license with the Ministry of Communications of Estonia in 1992. NMT functioned and the timing was good when considering their challenges, which the representatives of Sonera knew quite well. Eesti Mobil Telefon (EMT) was also founded at that time[121]. When the mobile telephone network was constructed, Telia wanted to buy Eesti Telefon, which owned and operated the fixed network. Telia asked Sonera to join it, but mainly in the role of a 'errand boy'. When the CEO of the Finnish Posts and Telecommunications (PTT) heard about this, he declared: *"No damn way, will we give Eesti Telefon to Telia."* After a long process, both Sonera and Telia owned equal shares of 24,5 % of Eesti Telefon[122].

The foundation of Latvia Mobile Telephone (LMT) went in the same way as the EMT above. The foundation of Lattelcom that owned and operated the fixed network is worth mentioning. Namely, an American-Latvian businessman got the local Ministry of Communications to organize competitive bidding of licenses for mobile communications. At that time, Sonera's Mobile Communications BU led a strategic management team dealing with the company's participation in Latvia. This team decided not to participate in the bid because they considered the project too big and the local political circumstances too difficult[123]. Also the Swedes had again asked Sonera to participate, and again very formally. When the CEO heard this proposal, he decided again that Sonera had to participate[124]. The consortium originally consisted of Bell Canada and Cable & Wireless. Bell Canada withdrew and Sonera took its place. Sonera's share was 30 % and Cable & Wireless had 70 %. Another potential consortium was build up around Telia. The license was awarded to the consortium of Cable & Wireless. Sonera's director responsible for operations in the Baltic recalled:

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[121] Telia and Sonera both had 24,5 % and the Estonian Ministry of Communications had 51 % of shares.

[122] This founded consortium received monopoly to the Estonia market for eight years.

[123] The bid terms insisted that a foreign organization had management responsibility and an offer should cover three million subscribers.

[124] This decision was made three months before the bidding time ended.

"The Swedes have not yet understood why they did not get the license. They are especially rankled by the fact that the Finns got it but they didn't". (2001)

Since then Sonera applied for licenses to operate GSM networks in different consortia in different European countries. Especially, Sonera's technical competence made it a wanted partner. Sonera received licenses to Turkey, Lebanon, and Hungary. Nonetheless, the Mobile Communications BU wanted to keep mobile-related competences focused on Finnish market growth. The previous examples also illustrate that there was no Sonera-wide aim for internationalization. For example, Sonera had received a 2G license for Belgium but was not willing to commit resources to that market. Resources in internationalization were very narrow, practically a couple of persons. As the same director responsible for the Baltic operations remembered:

"Generally speaking, Tele [Sonera] did not have a strategy for internationalization. On the other hand, nor did any other operator, not even those operators that already operated on a global scale".

Generally, the Finnish State encouraged Sonera to purchase as many GSM licenses as possible. The State was even ready to guarantee all the political and country risk via its financial institutions such as FINFUND (Finnish Industrial Development Fund) and Export Guarantee Fund. Additionally, in the mid 1990's, the Spanish Telefonica wanted Sonera for its partner to apply mobile operator licenses in the South America. The European Union and the Finnish Government promised all the political support for Sonera. For instance, the chief secretary of the Ministry of Trade and Industry personally persuaded the company management to participate to these activities In spite of all the supporting activities, the Corporate Management Group decided not to commit on further projects

5.1.2 Service production and technology change

The company management also had experience of services and value-added services developed in different networks. Technological change had continuously surprised them during the company history. For example, the mobile system substituted the fixed system. Moreover, the Internet replaced data networks and technologies developed, e.g., such as intelligent networks. The corporate management saw services evolving from one technological system into another. Especially the GSM system had shown huge

opportunity for internationalization, but on the other hand, this opportunity had closed relatively fast, particularly for small organizations in the capital-intensive business. Thus, the company management saw that internationalization meant risks but they had to be taken when there was an opportunity even though market development would take time.

A significant event for value added services was the entry of profit center thinking into the company in the mid-1980s. At that time Sonera's dominant business, fixed telephone services, faced the challenge of making its local telephone business profitable[125]. Then the goal was set to increase prices, decrease costs, and increase demand by 1/3. These goals did not come true as such. However, the last goal was significant for value-added services. At that time, telephone penetration was very high and the challenge of how to increase telephone usage was topical. The solution was just simply to increase the attractiveness of telephone usage, i.e., to provide the kinds of services that would attract customers to use their telephones more.

The development of ARP, Telesampo, and New Services[126] had provided experience for the company management that the development of technology and a customer market for a profitable business takes a long time The Mobile Communications business provided an example in the company that new businesses are difficult to form with old practices. The management of Sonera had created circumstances for the development of Telesampo and New Services allowing their management the freedom to change organizational routines in any way they liked in order to produce services as long as they delivered in terms of 'the bottom line'. Additionally, it was almost impossible to predict which technological system would deliver commercially successful services. For example, many services developed for the fixed network such as the answering machine did not succeed within that system, but only when implemented and offered as a mobile service.

The Internet started to emerge in the middle of the 1990s. It emerged as a channel to distribute services but also as a platform to create them. The Internet was exactly what

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[125] Sonera provided local telephone services at the rural areas in Finland
[126] Telesampo and New Services are described in Appendix 6.

had been aimed for in Telesampo, as described in Appendix 6. The Internet progressed fast. Sonera's 'Inet–keskuskatu' portal was set up in 1994. Its international potential was first seen in connection with the European Track and Field Championships in Helsinki, 1994[127]. At the same time, AOL and Yahoo accelerated their development. Generally, the Internet penetrated into cable television, and mobile communications systems started to 'absorb it' when the first steps were taken towards the 'all IP' approach over all telecommunications systems.

5.1.3 Towards international growth

The future of Sonera's business portfolio did not appear very attractive in the middle of the 1990s. The mobile communications business continued its strong growth with excellent profitability but the limits of its growth could be seen. Not too many believed in mobile phone penetration numbers above 100 %. The fixed network did not grow, and appeared more likely to decrease. The profitability of the fixed network collapsed when competition started. There were plenty of ideas for value added services, but it was a very small business and unit within Sonera. There, Internet operations grew but did not generate profit, nor did other value-added services.

The research director of Sonera at that point collected opinions about the future of the industry by considering the changes that had happened since the mid-1990s and the ongoing changes at that time. He presented a view that value would increasingly transfer from the transmission network layer to above layers. Namely, the mobility functionality of the mobile networks had added value to the sole capacity transmission. The implications of mobility were visible in Finland and were also estimated to appear in other countries as soon as their mobile penetration rates would catch up with that of the Nordic Countries. Media would bring along content production, which was perceived as a potential source for growth. The relation of the content to distribution and to control of the value chain was started to be estimated.

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[127] After heats, their results were put on the Internet where they were immediately globally available.

The company management saw the limits to growth of the Finnish market. Even though previous internationalization had taken place without major effort and intention, it had proved that Sonera had internationally relevant competences. Previous value-added services had shown slow development and difficulties in new business development. More explicit planning started around the middle of the 1990s. It aimed for long-term survival and searched for an international competitive advantage for the company. This need emerged from the management of Sonera but also from the management of PTT. The management of Sonera started to communicate this need since the middle of the 1990s.

Managers responsible for the company strategy planning typically monitored and estimated the development of different business and company environments. Industry convergence was a common and shared view. It considered tele-, media-, content-, and information-intensive industries in general. The company strategy process brought up these options in the spring 1997. More detailed attention was paid to different business logics and the emerging roles and tasks for future organizations among converging industries. The question was also raised concerning which of the existing organizations possessed the competences to evolve into that kind of an organization in the future. These exercises, among others, produced a view of information changing into digital form, which can be retrieved, edited, and distributed via different channels such as TV, Internet, cable, fixed telephone, and mobile networks. Also, information could soon be received and used from different terminals such as TV, PC, PDA, and MT as well as from multiple possible combinations of these. Users could modify and send this information further, meaning that the users, in fact, become content providers. Also, typical for this planning was that the youngsters of the organization, i.e., the newly graduated, participated in the planning process.

Sonera was going to be privatized in the autumn 1998. Preparations for that started a couple of years earlier and they intensified towards the initial public offering (henceforth IPO). Goldman Sachs valuated Sonera's worth as 10 to 12 BFIM in 1995. One essential part of this preparation was that the name Telecom Finland was changed

to Sonera on 15th April 1998[128]. In spring 1998, all the preparations towards the IPO were going on. Representatives of the investment bank organizing the IPO went through the company in order to valuate it. Investors were often seen visitors at corporate headquarters receiving and giving information. Also, consultants were looking for assignments from corporate management. The forthcoming IPO also intensified the corporate strategic planning process further.

The corporate strategy plans from the spring 1997 consisted of a clear message that Sonera aimed to continuously increase its market capitalization. Its intention was that the most significant business areas in domestic and international markets would be mobile, data and media services. In these business areas, Sonera operated already at that time as a service provider and network operator. In all other areas, the organization emphasized service provision. In practice, this meant shifting from excellence in operating networks to higher layers in the value chain and creating excellence there. In the spring of 1998, the strategy planning process focused on the following question formulated by the director of company strategy:

> *"how was a resource-modest TELCO such as Telecom Finland*
> *[Sonera] able to internationalize?"*(2002)

The answer to this question was assumed to emerge from somewhere where consolidation had not yet taken place. Additionally, the solution had to be reached without considerable investments in the networks. A preliminary answer to the question was outlined in May 1998. Namely, fixed and cable networks were closed out because plenty of portals were provided via them such as Yahoo, AOL and Excite@home as more explicitly described in Chapter 3. The only possible and globally free channel was provided by the mobile networks. Global consolidation had not yet started there, not even in the network operations. At the same time in spring 1998, the director of the Cable Television of Sonera started a small project to make a business plan for a cable TV consolidation in Western Europe[129]. As the company strategy director said:

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[128] One reason was that Telecom Finland was too closely associated with the 'old PTTs'. An international advertising agency invented the name Sonera together with Sonera's marketing function.
[129] Sonera launched the first commercial high-speed cable TV data service in Europe. It covered the whole city of Lappeenranta in Finland in 1996.

> *"It was the same as what <u>excite@home</u> had done, a cable TV portal*
> *but for the European market".* (2002)

The plan was finalized and the director presented it to the corporate management group in the end of summer 1998.

In summary, this section described how national and international liberalization and deregulation, as well as Sonera management's experience of previous services and internationalization, increased the company managers' perception that the company would only survive by internationalizing. These activities enabled the definition of Zed.

5.2 Defining ZED

In this section, I describe how Zed's definition was triggered and then how that process proceeded. I first consider the activities that triggered the definition of Zed. As said, the director of Cable Television presented his plan for a cable TV consolidation to the Sonera Management Group in the end of summer 1998. The management group rejected his proposal based on their existing views and the strategic planning done. The management group encouraged him to:

> *"make that plan for the mobile channel".*

The director responsible for the international operations and internationalization of Sonera saw an opportunity here. As the company strategy director remembered:

> *"Maybe he saw him [the Director of Cable Television] as a type of*
> *person to drive an idea through in the organization".* (2002)

He was a suitable person to implement that initiative because he was neutral in the sense that he came from outside the two historically 'competing' businesses of mobile and fixed. He also had access to Internet competences in the organization[130]. Appendix 5 presents Sonera's organization chart at that time. As a consequence, the director started a Mobile Portal (MOPO) project, which aimed to define principles for a global mobile portal (Zed). This definition focused on evaluating the following questions: is there an

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[130] At that time he was the Senior Vice President of the Data and Media Communications BU that included Cable TV, an Internet portal called 'Inet-keskuskatu' and Info Communications as well as Data Communications.

opportunity, is the opportunity realistic for the Sonera and how to pursue and organize for it?

5.2.1 Technological systems, emerging operations and organizational activities

The success of previous technological systems and emerging competition confirmed the belief among Sonera managers in an opportunity. Also, ongoing organizational activities confirmed for the central actors that Sonera had the necessary competences to pursue the opportunity. I first consider previous technological systems. The technical solution of Zed was based on mobile and Internet systems and competences there. Sonera had successfully adapted to market competition in Finland. Especially important was a market leader position in the leading mobile and Internet technology market in the world[131]. Additionally, mobile value-added SMS–based services (MVAMS) had achieved a good customer penetration rate[132]. MVAMS-based applications, which were launched to market in the summer 1998 are presented in Appendix 9. These applications also provided the basis for the project that customers could be interested in real-time interactive services. These services typically involved plenty of transactions during one service session. These kinds of services were perceived to be, e.g., banking, trading, location-based services, gaming and video telephone. Additionally, real time low-transaction services were seen to include broadcasting services such as news, location-based advertising, or entertainment. In contrast, mailing and message services were not seen to demand immediate response. Moreover, downloading of books and videos did not need many real-time transactions. As well, calendar applications belonged to this category. Thus, the 'application space' was perceived to be almost limitless and belief in their growth among Sonera managers was strong. Moreover, the positive development of SMS supported the perception that value could be detached from the network towards services and applications.

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[131] As was mentioned in Chapter 1, Mobile and Internet penetration numbers in the Finnish market were the highest and the market the most developed in the world at that time.
[132] The Short Message Service (SMS) was launched to the market in December 1995. The service usage remained modest for a year, but increased clearly starting in 1996. Namely, by the end of 1996 about 150 000 short messages were sent and by the end of 1997, about 620 000.

It seemed that technology was developing rapidly. GSM was emerging into a dominant mobile technology in the world in the end of the 1990s[133]. Sonera had some forerunner's advantage especially in operating mobile networks. Mobility had provided accessibility to users anytime and anywhere. This observation lay behind the expectations for the usage of real time transaction-based services, and also other service categories. However, the limited air interface capacity of 2G systems restricted service development. Wireless Application Protocol (WAP) and GSM system modifications were believed to solve these problems partly, until the 3G system with its 2 Mbit capacity would replace them as the dominant technology platform. Research and standardization of the 3G system had been going on since the late 1980s. Market launch was believed to occur in the early 2000s. Vendors had set up a WAP forum in the late 1990s to specify a new access protocol stack to integrate Internet service provision to the mobility management of mobile systems[134]. Sonera's business unit manager presented WAP as follows:

> *"The specification defines a protocol family, which makes it possible*
> *to offer Internet–type services vendor-independently to mobile*
> *terminals via radio connections".* (1999)

There were indications that WAP would diffuse fast. For instance, Nokia published its WAP terminal on February 24 1999. The Finnish business newspaper *Kauppalehti* presented it as an "Internet-mobile terminal". GSM system modifications for network technologies would provide higher bit rates in the near future with High Speed Circuit Switched Data (HSCD), General Packet Radio System (GPRS) and Enhanced Data

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[133] GSM's main technology competitor was narrow band CDMA. The GSM system was superior because of mobility management. GSM defined the entire system with its mobility components of Home Location Register (HLR) and Visitor Location register (VLR) as well as protocols in handover and roaming. CDMA was only a radio system without mobility protocols especially between MSC's, not to mention roaming. CDMA also had a serious power control problem. Metaphorically, it functioned as a chorus consisting of opera soloist trying to sing a solo. When the first one was singing, the second one had to sing a little bit louder so that her voice could be heard, the third again a little bit louder than the second one and so on. Finally, everybody in the chorus was yelling. Thus, this problem was handled in CDMA in a way that the mobile terminal with maximum power was cut off. Then the call was also cut off. In a less advanced market, customers would accept this, but not in the markets where customers had got used to non-disturbed and good service quality. Power control took care of this problem in GSM, which was defined in the system specification series number five.
[134] WAP was seen as a first step towards an "all IP" -approach, which would combine data and telecommunications in the long term. The converging industries of teleinformatics and telecommunications would then start to compete in different parts of the system. One of the areas would be mobile terminals, where the former manages software and the latter mobility.

rates for GSM Evolution (EDGE). These were also considered to support terminal and service development of 2G networks towards multimedia

Second, ongoing organizational activities gave people in the MOPO project preliminary confirmation that Sonera already had the required competences to pursue this opportunity. The question was, whether it was technically feasible for Sonera and whether Sonera really had the necessary competence to pursue it. The organization's technical competence was supported by the cable TV portal in Lappeenranta, Finland. Even more importantly, another project within Sonera that aimed for a mobile portal was ongoing since autumn 1997. Based on this project, the director of the Mobile Communications BU gave a presentation at *Teleakatemia* in 29th September 1998[135]. He introduced the pocket-Internet by saying:

> *"Internet is going to be integrated to the mobile system and offered to consumers, not vice versa [i.e., mobile system integrated to the Internet]".*

Next, I provide more details of the first steps of this project. The starting point was that there were plenty of Internet-related service ideas that needed mobility management. On the other hand, there were plenty of mobile-related service ideas that needed Internet's profiling at the customer interface. In fall 1997, the Vice President (VP) of Internet business at Sonera contacted the mobile business's manager responsible for service development. VP suggested a common project. The project would define a concept according to which new services were offered for the existing Finnish mobile customers. The customers could use these services through their mobile terminals profiling them on the Internet via PC. This was a step in the direction of 3G.

The project was set up in the end of 1997 and it started in the early 1998. The project was then called a 'regular customer' ('*kanta-asiakas*') project. Participants came from the mobile and Internet businesses. The project manager came from the mobile business. The Internet business was responsible of the technical solution. However, rather soon difficulties in the co-operation hindered the development. Despite the fact that both sides wanted the project to proceed, people from the mobile business did not understand or accept the divergent practices that the 'Internet people' had. 'Mobile

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[135] Teleakatemia was a seminar aimed for the company's interest groups.

people' were used to planning functional services. Customers paid an access fee and the service was profitable. 'Internet people' preferred to first act and only then plan, the service needed not function perfectly and it was all right for the service to collapse. Access to the Internet was absolutely free and profitability was a minor, forthcoming issue after customer penetration was considered. Penetration would increase when customers became addicted to offered service. This would increase the site's media coverage for advertisers and others.

As the project continued, the project manager saw a need to do something because the challenges for the project increased all the time. The biggest challenge was on the technical side, which suffered from the lack of developers[136]. The project manager suggested to the Mobile BU director that the project could be made the mobile BU's internal project. This then happened from the beginning of 1999 and the Internet unit was left out of the continued project. After this, the development was fast and the portal was launched to market in less than a half year in June 1999, under the name of Messi. Messi extended existing mobile services, therefore, was not taken to the Management Group of the corporation with a global intention. Even though the project was completed successfully, the dropped-out unit was not too happy about it.

Third, the emerging market competition caused a rush for the MOPO project. By the time that the definition of Zed was accomplished in the MOPO project, significant international competition had emerged. Namely, AOL, Yahoo, and Excite@home presented successful cases of market penetration and privatization in Internet and cable TV. Their market capitalizations had sky-rocketed. Customers were increasingly using Internet, e.g., for information retrieval. Then the international consolidation of mobile operators started in the end of 1998 when Vodafone and Bell Atlantic started the acquisition of Airtouch (FT Jan. 7, 1999). During winter 1998, the operators presented ideas at international conferences about combining Internet and mobile technologies that were similar to the ones that the MOPO project had outlined. Moreover, NTT Docomo launched the Imode service to the Japanese market in February 1999. The

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[136] Major service Inet keskuskatu of the Internet business grew all the time and all the resources were committed to its development. The managers of Inet were not willing to divide their scarce persons with this project.

service success that ensued was surprising. The service received 5000 customers after the first month. After the second month, it had 58 000 customers. Not too much information existed about the service but the project management saw it as a 'walled garden', i.e., a closed system. This was because Docomo selected the manufacturers who were permitted to manufacture terminals for the system. They also received information about forthcoming services. Docomo also selected content providers and organized them in favor order by different kinds of user icons and lists. Additionally, customer behavior deviated considerably from that in Europe. The Japanese usually used trains for commuting, which provided good time to play Nintendo-type games or use Imode's services. Also, Japan had a modest Internet penetration rate and its service usage culture differed from that in Western countries. Thus, Sonera and the project management did not believe Imode's way was the appropriate one to provide services in the GSM world.

5.2.2 Opportunity was defined and developed in co-operation with several organizations

Several external organizations and internal persons participated in outlining the opportunity and also in defining an initiative for this opportunity. Persons within Sonera and external consultants saw that the internationalization of telecommunications operators was accelerating because of privatization and deregulation. Sonera was viewed to be better positioned compared to other incumbents because of Sonera's history and present business portfolio. Especially consultants brought in the view that incumbents face challenges at all managerial levels from the owner to business management because of internationalization. Despite this better position, lack of resources in Sonera was an even bigger issue than previously, as one Sonera executive told:

> "I hope discussion will take place on the issue of what would be the appropriate way for this kind of a TELCO to internationalize…an important question in privatization is how to balance activities between home and foreign markets". (HS 18.9.1998)

The project manager together with the corporate director were committed to the development of Zed. They took the initiative for the further development, or actually gave it to several actors from different organizations. They threw 'the ball' at least to (global) consultants, academics, investment bankers, employees, and technology

developing companies co-operating with the company[137]. The representatives of the state owner did not get 'the ball' because they were seen to have an owner's interest to accept strategy, not particularly formulate it.

Consultants actively told the company management about new market opportunities and showed what kind of valuations different strategies received in the stock market and into what kinds of value components these could be divided. Academic consultants actively reflected and showed possible content for diversification strategies and evaluated the corporation's competences. Investment bankers competed for an assignment to organize the forthcoming IPO of the company. They actively presented the company's value creation for the management. The selected bank scanned the company in detail. Sonera had an internal education program for the company's future talents called Telecommunication Business School (TBS). The initiative of a global mobile portal was also developed there during winter 1998. Vendors also had a central role because they had the technology production and knowledge of technology development. Different kinds of open and closed meetings about possible terminal and network development were organized with them. Also, features and timetables of product launches were on the agenda in these meetings.

The first IPO took place on 10th November 1998. The management of Sonera promised to internationalize and grow faster than the other telecommunications operators in the largest growing business areas. The content of the IPO was mainly based on the mobile communications business and new value-added services. The IPO succeeded, even though the market was uncertain[138]. Sonera management interpreted this success as meaning that investors and their representatives heard and believed what Sonera told them. The analyses made at that time showed that expansion-seeking international

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[137] These different roles, activities and aims got blurred. For example, some people serving as consultants had academic positions. Consulting firms made interventions in order to do business. Investment bankers did consulting and coaching as well as acted independently, e.g., while organizing market transactions. Also, many organizational actors participated or planned to participate in academic activities. They also gave speeches at seminars that were consultative in nature.
[138] A few weeks earlier, the IPO of the State's oil and electricity company, Fortum, failed.

investors had invested in the Sonera[139]. Naturally, these investors expected the company to keep its promises.

The market capitalization of Sonera increased steadily from the IPO to the end of February 1999, with a growth of 45%[140]. The capital market generally grew and favored growth promises in the spring 1999. The Sonera corporate management started to worry whether the company could fulfill the given growth promise and meet the investors' expectations on the way to the second share sales. This can be seen, for example, in the views that Sonera management presented for the industry and company development in 1999 presented in Appendix 10. Sonera aligned the industry development in the direction of the company but the revenue of the company did not grow. However, the representatives of the capital market expressed their strong belief in Sonera giving them time to work on their growth[141]. Sonera started to save in costs and especially search for more content for the growth promise. In addition to the mobile and new value-added services emphasized in the IPO, media and data transfer were also seen as potential sources of growth. However, a more detailed intraorganizational analysis of the existing business portfolio showed that the growth that they provided was insufficient to fulfill the investors' expectations. Pressure for international growth increased, which partly materialized in the MOPO project.

5.2.3 Preliminary technical solution and cross-functional principles to pursue an opportunity

In the spring 1999, it became clear that the Messi project was going to provide a technical solution for the establishment of Zed. The MOPO project outlined the technical solution to be based on SMS,WAP, billing, and accounting platforms, exactly in the same way as in Messi, which was at that time in the implementation stage. The

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[139] These investors formed the majority of the foreign institutional investors that invested to Sonera.

[140] This is calculated from corrected share issue daily closing rates (provided by *Kauppalehti* information service).

[141] Merrill Lynch reported on 12th March 1999: "Forecast proportionate EBITDA growth was 23%. Normalized ES was 9% above consensus and grew 36% (vs. reported growth of 13%)". Further (p.11): "the FY98 results indicate accelerating growth, primarily driven by a combination of the powerful data and mobile trends, both domestically and internationally. As the fastest growing full service operator our universe, we believe Sonera provides a positive and important precedent for all TELCOs, both incumbents and new entrants alike".

MOPO project did not perceive technical solution as a problem at that time, even though they did not have direct access to the Messi project because it was located in another business unit. The project management thought that customer organizations would buy technologies 'off the shelf' and use them more freely when deregulation would open the interfaces between network's technology elements. Competition was expected to increase considerably. The pricing basis of mobile communications would also change from a time- to a content-based pricing.

One central issue at this point was the kind of roles that Sonera as a small TELCO was able to take among a range of possible roles in a fragmenting value chain. Some of possible roles and transactions between them are presented in Appendix 11. The issue was centrally involved in the company's strategic position among competitors in internationalization. The MOPO project manager saw Sonera's position as insufficient to influence the offerings because this development would happen mostly in the teleinformatics industry where the software competence resided. Also, engaging in a fierce competition to be the company with a strong balance sheet was impossible. Relatively, Sonera recognized its lack of resources, and hence speed was crucial.

The project manager considered the market capitalization of Zed important. He saw it as dependent on the size of mobile market in which Zed could get a significant foothold. This could take place by making dealing agreements with major operators, which would increase the threshold for the entrance of competitors. Mobile users would then be attracted to the portal by marketing and offering interesting services for them. These users would then put pressure on the operators to offer additional content through the portal. Thus defined, Zed's market share could be realized in revenues. Zed was first considered a horizontal portal offered to any operator utilizing any network as a medium.

5.2.4 Sonera's strategy-making and organizing the development of Zed

Sonera's corporate strategy was under intensive making at the time when the definition of Zed was underway. The strategy consisted of the relationship between existing and new businesses towards the 3G mobile system. This planning took shape in Sonera during winter 1998-1999, even though it was presented to the wider public later. The

outcome of this process is presented in Appendix 12. The strategy consisted of the distribution and service paths. The service path was based on innovations and the execution of global services, wireless Internet acquisitions, and partnerships. The distribution path was based on service distribution, increased transmission capacity of 3G and consolidation of economies of scale. The dimension of "me too" presented in Appendix 12 implied that the service path was based on knowledge imitation and diffusion from the advanced market to the less developed market. The "distinctive" dimension emphasized innovativeness in advanced markets. The network path indicated market expansion.

External experts such as consultants and academic consultants assisted or participated in this definition and strategy-making work. According to one academic consultant, a long-term vision of the strategic position (18-36 months) as well as the operative competence (3-6 moths) were needed. The two development paths identified for the corporation emphasized different kinds of organizational competences. The distribution path was evolutionary, based on the existing mobile operator's skills and knowledge. The service path was more revolutionary in nature, based on skills and knowledge related to service and media. Technology was evolving from 2G in the distribution path but more emerging and uncertain in the service path. Thus, the distribution path was definitely capital intensive from the company's point of view.

An approach similar to 'real option' thinking (Baghai, Coley and White 1999) was used to organize and support development paths, especially the service path, in the organization. These authors were referred to in the presentations of project management in the organization. According to this kind of 'real option' approach, existing organizational competences and innovativeness in the product market had given access to 2G joint ventures. At the first stage, this meant the northeast Russia and Baltic, Turkey and USA with fixed and mainly mobile operator's competences. Mobile, Internet, and Finland constituted the second wave, and as a laboratory, Finland was seen to provide an innovative home market and ensure cash flow. Zed would increase the duration of the first wave for the 2G system. The portal was perceived to increase customer loyalty, decrease churn and increase average revenue per user (ARPU). Zed together with a security service developed (later named as SmartTrust) provided the opportunity to diversify to global service market in the third wave. Assets created with

2G made it possible to pursue a role in the fourth wave's 3G through involvement in services while at the same time increasing global presence and size. Actually, when Sonera purchased a 3G license to Germany, simultaneous service provision and distribution was communicated.

Sonera organized its service and business portfolio in line with the above strategy. However, rather soon individual units began compete strongly between each other with similar long-term visions, resources and competences. These kinds of units were SoneraPlaza, Mobile Communications, Zed, and SmartTrust in terms of its technology platforms[142], as well as New Communication Services (NCS) created in 1999.

Even though the strategic paths were presented, the resulting service path was seen as being more realistic and attractive for the Sonera. The company's small balance sheet made it difficult for Sonera to progress credibly in the huge investments required by the network path. Staying with the networks would have meant getting into a rut as a regional actor, which would have meant a passive role and becoming a target for acquisitions at industry consolidation. Practically, the service path was the only realistic alternative. This was the case even though focusing on services required massive amounts of competences, which was partly unconvincing. Thus, extreme innovation was the only perceived alternative. On the other hand, this also supported the growth promise given to investors. Thus, the Sonera management devoted its attention to the service path and especially Zed. Besides forming a new business initiative, Zed also became an important and essential part of the corporate strategy. It practically emerged to the core of the new corporate strategy.

Organizing was also an issue to consider for the Zed project management. Zed meant offering a new concept for a new customer market. Potential revenue sources for Zed were several and the amounts significant. Also value chain fragmentation caused a need to learn new business models, as the project management expressed it. Even though Messi combined mobile and Internet competences, it was a mobile channel and home-market driven. Owing to Messi, competences existed in the present business units, but

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[142] SmartTrust was intended to provide public key -based encryption for mobile devices. It was launched to market in August 1999.

they were partly unexploitable for Zed. Namely, the development of Zed needed competences related to content and media, which existed in the 'Inet-keskuskatu' service, and competences related to mobility that existed in the Mobile Business Unit with the technologies they solely managed. The Zed management also saw a challenge to combine the different units' cultures and ways to move towards internationalization. In consequence, in order to ensure leeway to develop Zed, the Zed management saw it necessary to detach Zed from the home market and channel-dependent focus. They outlined a need to detach its activities further from the existing and competing company's internal structure into a separate and independent organizational unit. As one corporate director said:

> *"That responsibility could not be given either to Inet or Mobile. The Mobile Unit had provided its evidence and showed its emphasis on the home market. The resources of the Internet were also bound to business development in the Finnish market"*. (2001)

The business unit and corporate directors participated in the public offering preparations. The state had agreed to decrease its ownership to 50 % in the first offering. It was a commonly shared view on Sonera's side that at some time period, the state's ownership would decrease to zero. Sonera's management perceived this to mean that the owner's influence, with its many interest parties of political nature, would decrease along with its ownership share. Sonera's CEO was the CEO of the former PTT, a minister and a politician. He was a well-known champion in political rhetoric and knew the ways to take care of politicians and used that knowledge also at PTT and Sonera. Nonetheless, he was dismissed from Sonera's CEO position in January 1999. That was a mistake according to a member of the Administrative Board[143] of that time:

> *"Parliament members have said a number of times that it was a mistake to sack the CEO. His merits were indisputable. Everything would have happened in a different way if the CEO had not been sacked"*. (2001)

According to that same interviewee, the political situation in Finland was sensitive at that time due to the forthcoming parliament election. Potential concerns over the CEO's role in the marking and sales of shares in the IPO flustered the Finnish Coalition Party. The party could face electoral defeat because they had the Minister of Transport and

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[143] Traditionally, state-owned companies had Administrative Boards. Most of the members on these Boards was politicians.

Communications and people could thus attach all kinds of unclarities to them. They "*apparently decided to sacrifice one for all*" as a member of the Administrative Board put it. This meant that the Minister was squeezed to resign at the same time as the CEO of Sonera had to go.

In summary, this section described how the Sonera Management Group triggered the definition of Zed. After this, the section described how an opportunity was seen to exist in general and for the organization specifically, as well as participation of different organizations in this definition. Corporate strategy-making took place at the same time as the cross-functional principles and technical solution of Zed were outlined. At this stage, also the project management outlined a plan to separate Zed's development from the rest of the company.

5.3 Decision making on ZED

The project manager presented the initiative of Zed to the Management Group, Board, and Administrative Board in May 1999. The presented opportunity was considered realistic by these bodies. Some doubts and questions were presented, but no serious disagreement over the matter emerged. The presentation of the project manager was based on three principles: 1) Customer need is not necessarily a problem, instead the marketing of the portal may be. The issue was to create a market need by 'waking up' customer needs abroad. These markets would follow the Finnish market, in which value-added service needs in the Internet and mobile fields had already triggered the development of Messi project. The opportunity was seen as novel product business where a technical solution is customized horizontally to the different access modes of mobile and fixed networks. 2) Technology was not a problem, because the technical history of the company was brilliant and Messi's technical solution was just around the corner. This solution could be scaled to international customer markets. Also, the several international recognitions and awards given to Sonera proved its technology excellence. This was also recognized by outsiders, e.g., investment banks. 3) The present owner (the Finnish State) was not seen as a problem because it had communicated its will to decrease its ownership share. The owner's main interest was considered to be in the share price.

The discussion on the appropriateness of the initiative for Sonera took place, e.g., in the first meeting of the Administrative Board after the Annual General Meeting in spring 1999. The project manager presented the initiative. Generally, the development and investment speed were fast at that time in the industry. One decision maker used a metaphor from sports:

> "When an athlete starts to run at full speed, sooner or later at high
> speed, lactic acid starts to accumulate". (2001)

There was a common concern in Sonera about the availability and sufficiency of investments for product development in this field. The project manager communicated that the lack of resources and emerging competition emphasized speed and sufficient funding for the pursuit of a small opportunity window, which would be open for a short time. At that time and since 1996, the corporate dominant business had been mobile communications. Its growth limits were in sight and licenses for the 2G had been globally admitted. The next major chance was the 3G, which was also underway. The basis of investment decisions in the company at that time was the expected profitability, which had already emerged with ARP. Deregulation would increase competition and decrease growth and profitability in the home market. The mobile and fixed networks had struggled over power within Sonera since the 1970s. When the basis of the fixed business collapsed, the managers of the fixed network had tried to break up the value chain of mobile service provision. They had not, however, succeeded in these attempts. Nevertheless, the Sonera MD tried to maintain a balance in the corporate business portfolio, but according to one organization member:

> "The managing director was afraid that the Mobile Communications
> detaches from the corporation and takes all the growth with it".

This fear was well-grounded because many suggestions along these lines had been presented and plans had been made in the unit and also among Nordic PTTs. The company MD allowed different opinions in the company management group, even opposing ones. The decision unfolded was usually somewhere in the middle of that discussion. However, quite often these meetings turned so critical that according to one corporate manager:

> "The managing director gave notice of dismissal to the director of the
> Mobile Communications BU at least five times". (2001)

In the industrial field in general, discussions about convergence and consolidation had been going on for years. At that time, convergence between Telecom and the IT sectors was really believed to be forthcoming. The fight between Vodafone and Bell Atlantic of Airtouch ended in the victory of Vodafone. In Sonera, this was perceived as a starting shot for the accelerating consolidation in the business. As already discussed, the MD had personal experience of previous internationalization attempts and on this basis he knew how difficult it would be. He, among others, saw internationalization as necessary and recognized a real opportunity for it in Zed. As also mentioned above, the analysis conducted after the IPO revealed that the present businesses of the corporation were not able to provide content for the growth promise. Additionally, the project management was really committed to this initiative. Hence, the initiative would provide content for the growth promise and meet investor expectations. The Corporate and Administrative Boards of Sonera authorized further development of Zed. They also approved the foundation of a new unit in which its development could take place independently. This unit would be situated in new business unit. Appendix 5 presents the organization of this new Mobile Media BU .

In summary, this section suggests that the project management of Zed adjusted their resource allocation criterion to the existing external market criterion. This criterion was also different from that of the dominant corporate business at that time.

5.4 Further definition of ZED and providing impetus for its development

When the Zed project was approved to proceed, it was further defined and a pilot of it was launched to market in order to provide impetus for its development. This section is organized according to the stages in the development of Zed. First, I describe how Zed was further defined.

5.4.1 Defining Zed more specifically on the way to pilot it

After the project was approved, the project management started to build the organization and develop its concept further. Formal approval legitimated the project, enhanced the positions of the central persons involved, and made the story of Zed official. Hence, these actors could communicate it within the organization to recruit and

attach new people to its development. Communication was done in a low-key manner, but the interesting story offered challenging tasks for employees and caught their attention. Some of the persons who developed Messi moved to the Zed project. This number was very small because altogether only few people were involved in Messi. Nevertheless, they provided content and credibility for the story of Zed. Before going deeper into conceptualization, it is important to understand further corporate activities at that time because they partly pertain to the people involved in Zed.

Sonera management's use of time and attention for Zed intensified since the summer 1999 for the preparations of the forthcoming second share sales. 'Laws of the Internet economy' flooded to the market in books and by different actors, such as consultants. Messi had been launched to the Finnish market, which provided credibility for a technical solution for Zed. More focus was placed on creating a sharp story for Zed and the company, which could penetrate fast enough in the market. Corporate management together with external consultants concluded that major attention could be gained with an investor-aimed service story. This would also be easy to communicate. The corporate management co-operated increasingly with the investment bank organizing the forthcoming share sales. The bank assisted in making corporate management's presentations, coached and staged rehearsals and presentations to analysts and potential investors. Based on this work, the Sonera management presented the company's vision for a global Sonera by the year 2005 in the road show for the second share sales in fall 1999:

> *"Our strategy is to deliver content and services through all main forms of access, including mobile, dial-up and cable TV...In order to capture this growth, we will introduce a global mobile portal [Zed] in the near future. Our goal is to gain leadership position globally in that space. We strongly believe we have gained an early leadership position in the mobile Internet space. We were first in the world to introduce WAP services and have already introduced a mobile Internet service to our Finnish subscribers called Messi.net".*

Hence, the Sonera management presented the company's long-term expectations towards Zed. Despite of this global aim to become a service provider in the long term, the Sonera management also expressed interest in content and service aggregation roles in the end of summer 1999. The operators' value chain was fragmenting into network

operations and service and content provisions[144]. When technological development, capital market change, and deregulation were all taking place at the same time, this fragmentation of the TELCOs value chain was really seen to be in progress. Organizational skills developed in the existing businesses could be used in new business initiatives. As Sonera's management presented at the road show for the second share sales:

> *"We have developed strong service aggregation skills through Sonera Plaza, and we plan to use these skills to exploit the mobile portal market. This is a market that has a huge potential, but has not yet been addressed seriously by any major players".*

A business unit director communicated that Sonera would also start to produce content. This would provide more negotiation power for Zed compared to other access means/points when value moved up in the value chain. Generally, this was a novel approach for channel-dependent TELCOs. Interestingly, Sonera had also earlier communicated particularly that it did not aim to become a content provider.

Even though the Zed project was legitimated in corporate decision making, it is important to understand the competing intraorganizational view on development and conceptualization before going deeper into the concept of Zed. The national mobile portal, Messi had been implemented in the project of the Mobile Communications BU. The BU director gave a presentation in Amsterdam on 8th June 1999. He told about mobile Internet, referring to Messi:

> *"Mobile Internet is not Internet used via mobile phones, but a new communications media based on IP technology applied in mobile communications. Many of the mobile Internet applications are available already now but the new technologies such as GPRS and UMTS will boost the development".*

He emphasized the evolutionary nature of the development, thus presenting an opposing perspective to that of those who developed Zed. His opinion was significant also for the developers of Zed because of Messi's technical solution and services. The director of the Mobile Communications BU continued his presentation:

> *"Messi provides another user interface for the popular supplementary services, such as Sonera GSM infoservices, short messaging and*

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[144] This view had been consistent since the early 1990s. In addition, a similar kind of a development had occurred in the information technology industry.

> *Doris, which offers a variety of downloadable ringing tones and called group icons".*

Thus, a Messi user could create and maintain different kinds of recipient lists for a group or groups. Users could decide the time of delivery and duration of "push services", i.e., services that the customer wants to receive at a certain time. News was one example. Messi.net was the basis when Sonera launched the first WAP service in the world on 31st August 1999. The Mobile Communications BU wanted to offer Internet for a mobile customer not vice versa. As the BU director said in a presentation in October 1999: *"The www.messi.net brings the Sonera GSM subscription into the Internet".* Behind this rhetoric was the competition over the customer: who owns and control customer databases, accounting, and billing. Operators had traditionally kept this control. This was one of the central battles outside the company in the industry evolution, i.e., the service providers' relation to the network operator, and it was also topical inside Sonera. Inside Sonera, the developers of Zed saw Messi as an incremental value adding service or group of services offered to the old market and old customers. The same services that were first developed as value-adding services for the GSM customers were offer in Messi. This was not believed to be enough, and this kind of an evolutionary development of Zed was considered too slow a path for Sonera. As already told, Sonera aimed Zed as an access-independent horizontal portal. This was highlighted even more by Merrill Lynch in its report on 14th, September 1999:

> *"Sonera intends to become a global service provider – operating on any network (fixed or mobile) and any end user device".*

This access- or channel-independent portal implied, according to one company director:

> *"Business conceptualization of detached service user interface".*
> *(2001)*

This affected the technical solution of Zed. Namely, the developers of Zed interpreted access- and operator-independence as meaning that Zed would be a stand-alone solution and business. The basis was that the developers thought that operators would not sell their SMS and network capacity for outsiders such as Zed. Additionally, they thought that operators would share customer information and allow Zed to enter their market with its own brand. Sonera's management also thought that international operators would adopt the offered Zed. As Sonera's MD presented:

"A mobile operator will gladly adopt this kind of a service to improve its competitive position. It is not as easy to develop a portal or other services as external evaluators may think. They can be made for the advanced Finnish market. In other markets and by others, this may take a long time. The bottleneck is not at all the technology but the customers and their abilities and speed to exploit versatile mobile services". (Fakta 12/99)

The stand-alone solution practically meant that the technology platform of Zed was outlined to consist of all the technical components, such as service platform SMS as well as customer care and billing systems. Integration was planned to be made to the operators' GSM and Internet networks. Content for Internet was made using HTML. XML was outlined for WAP's programming language and Java for applications. Thus, the delineated technology platform was a huge monolithic entity. As the technology director of Zed at that time said:

"The technology architecture had accesses to different possible operators with different technologies at different markets". (2000)

Sonera had experience of the vendors' clammy attitude to customize and personify technology platforms for the needs of Sonera. Zed's technology challenge was perceived mainly to be economies of scale; hence the technology platform was outlined to be made mainly in-house by collaborating with newcomers to the mobile industry and the emerging industrial field. The technology partners of Zed included, e.g., Vignette StoryServer, Accipiter, Softaware.com, Nokia Netgate, and HP OpenCall. At the road show for the second share sales the Sonera management presented Zed as:

"A mobile Internet service which is network independent meaning that it can be offered to the mobile users irrespective of network operator or mobile technology".

Significant here was that the concept of Zed was focused from a general horizontal portal more towards mobile access. When the pilot was being planned, Messi's technology platform, in which SMS based services functioned, was already available. WAP did not function as planned. Consequently, it was decided to implement the pilot using Messi. This close link to Messi and the Finnish market was thought to benefit the development of Zed. Responsibility for product development was divided in a way that Messi's developers also received the main responsibility for the technology development of Zed. Its international development concentrated in London, where work started during the early autumn 1999. The employees for London were mainly recruited

from the Internet business. This related also to previously mentioned business models, where a close touch to the market was emphasized. Partnering and a relationship with operators affected the intended business model, which Sonera management presented as follows:

> *"For Global Mobile Portal [Zed], we will receive revenues directly from end-user where we are the operator, and indirectly where we partner with other operators - like @home has done in the cable business. There will be three sources of revenues: Firstly, the end-user will pay on a usage or subscription basis for services…Secondly, advertising revenues from sponsored content and thirdly, as communities aggregate around the Global Mobile Portal, this will become a source of e- and m- commerce revenue potential. In summary, the business model aims to gain the eyeballs, to build their trust for transaction handling and to aggregate the content so that customers transact across the portal…Revenue sharing arrangements as well as equity stakes will be utilized building a web of partners...The operator can become an owner in the distribution company. To the exclusive content providers we will probably need to offer equity...Sonera...seeks co-operation with network operators but can also provide services independently".* (Sonera road show 1999)

The management of Sonera was quite confident of the excellence of the initiative. Growth initiatives were legitimated and commitment shown also by major investments. Sonera management was also positive in its expectations about the financial performance and timetable in their presentation at the same road show:

> *"We will invest heavily into these initiatives over the next few years...We plan to spend up to 500 million euros during the next three years, subject to performance targets. This will be mainly in R&D and operating expenditure and will therefore affect profitability. There are already more than 500 employees in this area…We expect New Service Businesses to be EBITDA positive in 2002. The global portal is not yet available as an off the shelf product. Several components are already operational in the Finnish market. Available in the test markets in the US and Europe in November 1999. Sonera is planning to launch the Global Mobile Portal to the public before year-end 1999. We intend to have a distribution network of mobile operators in the North-America and major European countries, and a start-up in Asia by the year-end 2000".*

Thus, the story and conceptualization of Zed was aimed to the customer market but even more importantly forced to the representatives of the capital market. This kind of a story could also increase share price and its liquidity. These, in turn, would provide management more flexibility for forthcoming consolidation and increase the value of their assets. Higher valuation would make it more interesting for the Finnish State to decrease its ownership share. This would increase potential partners' interests and

further increase valuation. The top management proposed to the owner to admit authorization to decrease the state's owning to zero. The relevant owner forum, the Ministerial Committee for Economic Policy handled this issue in its meeting on 31st August 1999. The Social Democrats, closest at that time to the Minister of Trade and Industry, Erkki Tuomioja, opposed this proposal (KL 12.4.2001). The Minister's opposition was later related to a merger with German KPN, as Sonera's former CEO and Chairman of the Board Pekka Vennamo told in the newspaper *Kaleva* (October 9, 2001). There were claimed to be several merger candidates, but no concrete names were brought to this owner's forum. Merger candidates were obviously discussed in the Corporate Board. Meanwhile, for Zed, the next major stage was the pilot launch.

5.4.2 Piloting Zed in order to provide continuous impetus and support for it

In this subsection, I describe the organizational activities that unfolded when Zed was piloted in the market. At this stage important activities concerned forcing Zed to the market. Actually, the global mobile portal received the name Sonera Zed (Zed onwards) just before the pilot launch. Zed was launched to the Finnish market and presented to the international audience at the Telecom 1999 exhibition in Geneva in October. The technical platform and services of Messi were used in this pilot launch and presentation:

> *"Sonera Zed is a mobile portal service, which includes in Finland Sonera's number 400 text message services, WAP service and the Internet service launched for Sonera mobile telephone customers in June (www.messi.net)".*

The presenters told the audience that Zed offered wireless Internet-based communications, time- and knowledge management, e-commerce and search of information and services. The commercial market launch of Zed was expected in early 2000. Different kinds of estimations were presented of the market development of value-added mobile services (VAMS). Ovum, one of the market analyst firms, presented its estimation in 2000. Appendix 13 presents this estimation. Based on this and also other similar estimations, Sonera claimed that the penetration rate for VAMS like Zed would vary between 10 and 30 % in 2002. This variation increased to between 20 and 30 % in the corporate annual report published in February 2000. Revenue expectations varied between 5 to 20 euros/month/customer. According to lower penetration numbers, one billion mobile users would have meant a market potential for

VAMS revenue ranging between 500 and 2000 million euros. This was the expected 'cake' from which Zed tried to cut as big a slice as possible.

Conceptualization and organizing were increasingly forced towards capital market penetration. The persons responsible for Zed did not believe in the 'walled –garden' approach but chose a stand-alone system approach. This was based on open access, where customers would be able to become subscribers freely without major commitment and access to a specific operator. Open interfaces made it possible to attach Zed rather easily to different operators' technological platforms. Thus, integration to mobile access was not a central issue. As Messi had provided the technical solution and to some extent also the product, service, and technology competence, then neither technology development or production were considered to be large challenges. Nevertheless, an issue was the creation of different services and service groups 'above' the mobile access. In addition, the number of customers was uncertain, but there were large expectations about customer numbers both within the company and outside it, e.g., among firms making market analyses. When large expectations existed, it was seen as a matter of time until the market would start to expand. Thus the cost of market share was not an issue, but rather how large a share of it Sonera would win. Market expansion could be made with the 'eyeballs for service' concept, which was an important topic[145].

In organizing, the production and sales functions were briskly internationalized. System development was mainly located in Finland where also most of the production facilities were located. It was also outlined that production would be located in London and the USA in places where similar activities would take place. The sales function was divided among three continents and it received particular attention. The story of Zed aimed more clearly towards analysts and investors, and was largely based on the forerunner and market leader position of Sonera in the advanced Finnish market. Market representatives were not able to evaluate the initiative objectively. The initiative appeared unclear and even foggy, but extremely promising and worth closer investigation.

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[145] "Eyeballs" meant that the more attention service receives among the customers the more value the provider receives, e.g., in the capital market.

At the corporate level 3G auctions emerged as an active issue during fall 1999. The Finnish State was presented as a similar owner as all the other shareholders[146]. The second share sales succeeded better than expected. The capital market and the media received the story of Sonera and Zed extremely well. Issue price had more than tripled from the IPO. Both the national and international press wrote more than ever of Sonera[147]. Sonera also went public successfully on the NASDAQ. This was significant because, as said, the major part of Sonera investors were of U.S. origin. The rise of the share rate increased the self-confidence of the Zed manager and his belief that the chosen way was the right one and that the right things were being done:

> "Sonera wants to become the Yahoo of WAP...The company makes for mobile phones a so-called "mobile portal", which aims to be the Yahoo or American Online of data services used over a mobile terminal. World wide". (HS 26.10.1999)

The success further strengthened the will of the project manager to make Sonera also a content provider (TS 26th October 1999). At that stage, there was no wide public criticism. However, when the technology director of Sonera resigned, he presented criticism towards the activities of Sonera:

> "WAP lives as an intermediary product only for an year… WAP is too slow and the customer does not want to pay for waiting time ...I don't believe that operators can be good content providers. I feel pity for Sonera when it tries to compete with real content providers such as CNN or Disney". (TS 27th October 1999)

According to that time's MD and CEO of Sonera, three major change forces compelled Sonera to grow (Fakta 12/99). These were technology, consolidation, and change of ownership. According to him, technological change especially in mobile terminals meant that they would diversify and take on a major part of the PC's tasks in the future. Second, the increase of competition would lead to the breakage of structures, collecting of forces and corporate mergers. The alternatives for a small TELCO were to be eaten or to focus on narrow niches, as Sonera did with mobile media. Third, when the state decreases its ownership share partly or completely, the aim of the company would be to increase its value continuously. Even though some criticism was presented, the second share sales got Sonera and Zed management to pay even more attention to the capital

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[146] The Finnish state aimed primarily for good earnings from Sonera (Prospectus for Sonera's second share sales 22nd September 1999).
[147] See Chapter 3 for more detailed information about printed media coverage.

market. Story-telling to that market detracted attention from the development of a single product market.

In summary, this section described the managerial activities at the time when Zed was further defined and pilot-launched to the market. Data from the definition stage suggest that the management of Sonera and Zed devoted their attention to stories. Among competing conceptualizations of the mobile portal, Zed's concept was unclear but focused on mobile access. This formed the basis for the technical solution developed. The forthcoming share sales forced activities more toward the capital market, and those presenting the company assisted the company management to provide content for the stories told in that context. At the impetus stage, a pilot of Zed was launched to market, based on the existing technical solution. The success of the second share sales increased the self-confidence of management concerning Zed, which forced activities further to the capital market.

5.5 Modifications to ZED and providing impetus for its development

The activities of Zed were redefined before the venture was launched to market in order to pursue impetus for its development. This section is organized according to these stages. I first describe how and why Zed had to be redefined.

5.5.1 Zed redefined due to surprises from the capital market

At this stage, important activities concerned penetration to the capital market, which then surprised Zed management by changing course. Change of technology, regulation, and liberalization accumulated and culminated in the second share sales in October 1999. The story of Zed met these changes and expectations in the capital market well. It also emerged as a new global business opportunity for the corporation. Hence, it became almost directly the content of the strategic intent and framework communicated at the road show for the second share sales.

The success in the capital market supported the view of the management of Zed to force activities even more to and via that market. This was also in line with the state owner's authorization to decrease state ownership to 34% from that time's 50%, which the

owner had permitted when Sonera management applied for 'zero authorization'. This also supported Zed managers' perception that challenges do not exist at the levels of ownership and technology, instead, marketing was a challenge. The most important challenge, however, was the aim for economies of scale and consolidation over the long term. The director of Zed held a presentation at the Company Management Group in which he emphasized the need to continue with the capital market leveraging tactic. The most important topic in this tactic was 'eyeballs' in the customer market, which would determine the value of providers, while the market would determine the value of each customer. These would then create pressure and leverage for operators to make deals with Zed.

Additionally, the shares of Zed could be used as financial instruments for Zed either via a IPO to acquire more funding resources in order to produce services and activities, or by using them in mergers and acquisitions. These would also keep Zed an active player and increase entry barriers, e.g., by acquiring a competitor to decrease competition or by allying with a company with relevant competence in order to improve the services.

2G operations were at that time like financial investments, which could be used for service development, 3G licenses, or other emerging opportunities. When the 2G had provided economies of scale, Zed would turn attention back to economies of scope and from there back to economies of scale as services or networks matured. However, the behavior of the capital market representatives surprised the management of Zed by their valuation of new business initiatives. The chief financial officer (CFO) of that time recalled:

> "A number of IT experts gave value to the company, not revenue, cash flow, or returns". (2002)

The capital market emphasized the employees' head number at Zed rather than business development measured, e.g., in financial terms. Consequently, Zed started to recruit new employees. On the other hand, Zed needed to recruit persons with international business experience because the lack of them was so obvious. Without a viable incentive system this was difficult. New external recruits could also provide confidence for detaching activities from the former monopoly and non-risk taking ways of action. Additionally, he recalled the existence of two different markets:

> *"Analysts and investors forming the capital market as well as the media and public market".*

The pursuit of an opportunity required forcing of the corporation and Zed to these different markets and the corresponding strategic flexibility. The management of Sonera continued its preparations to incorporate all the units pursuing new businesses. As a member of the Management Group told:

> *"It is good that these companies reap a little distance to the corporation…With new subsidiaries, Sonera may sell value-added services hygienically to other operators...I want also to emphasize that even though we do it this way and the industry is this hot, the issue is only about our decision to incorporate one business initiative [Zed]. Not any bigger issue. He wants to calm down the market".* (KL 20th December 1999)

In addition, the project management, assisted by investment bankers, saw that resourcing from the capital market for an independent company was easier and more flexible, particularly when the shares of the parent company had a lock-up period. This was also a partial solution for the lack of the parent company's resources. This could also increase the liquidity and price of its shares. Additionally, by this far negotiations with operators had revealed their suspicion when offered a product that was completely owned by Sonera, organized as its business unit, and Sonera's name was in its brand. Incorporation would ease the making of distribution contracts. Despite these doubts, the operators were curious about the new business concept. They were positive towards it and wanted more information on what Zed was all about. Incorporation and making it public would also provide the Zed management an opportunity to increase their personal property. Zed was incorporated on 1st January 2000.

Divided responsibility for product development between Messi and Zed had not worked out as desired. Also, when the issue turned out to be the number of employees at Zed, it reflected on the management of service development projects. The Zed management perceived that the projects needed competence and capacity. The service development capacity would also increase Zed's diversification towards economies of scope. The solution was that the value chain of mobile service provision was broken down from the beginning of 2000. The unit responsible for managing and developing services was moved to report to the venture manager of Zed. The management of Zed perceived this also as legitimating the new venture and providing quantity for development. Thus, it

would meet the expectations of the capital market. The Sonera management gave a number of presentations at different intraorganizational forums about the necessity to commit to these new initiatives, innovations and ways of thinking.

5.5.2 Venture market launch for providing evidence for the impetus of Zed's development

This subsection describes the managerial activities when the venture started as an independent affiliated company. Activities at this stage concentrated on market development but customer behavior required a change in the conceptualization of Zed. As told in Chapter 3, the market capitalization of Zed was 104 BFIM in January 2000[148]. The press presented several stories that this valuation was huge for a company about which it was only known that it had about one hundred employees. A member of Sonera Management Group commented on the capitalization:

> "The basis of the estimate by Merrill Lynch is that Sonera is able to break up the value chains of different kinds of services such as banking and pastime…If we succeed in choosing the industries right, the penetration of mobile phones supports large subscriber numbers. The logic here is the same as in the Internet, and the markets apply its logic in valuation…Sonera has started to search for organic growth in areas that grow also globally. That is why we are liked, why we have credibility and why we are assessed in a different way than the other operators". (KL 3rd February 2000)

When Zed became a Sonera subsidiary, the capital market started to question its possible forthcoming share offering. At that time, the valuation of Sonera's potential companies for IPOs was over 190 BFIM. The same member of the Management Group commented on the potential IPOs of Zed and SmartTrust by cooling down the expectations, on the one hand, but supporting them too, on the other:

> "At this time companies are turned public just for the sake of becoming public. Our way of action is more conservative…Neither of the companies have yet enough business to become public. However, both are on the right track. If everything goes well, a public offering of one or the other is still possible during this year…The accuracy of investment banks can be doubted but incredible evidence of success like Zed, portal companies taking their first steps, exists in the world. For example, last fall Telefonica took public a portal called Terra aimed for Spanish and Portuguese people. Its market capitalization is now above two hundred billion marks". (KL 28th February 2000)

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[148] Sonera's market capitalization was altogether about 300 BFIM.

Preliminary evidence of the customer market development

Zed was organized as an independent venture, even though its business development was still at the pilot stage. Its customers were operators, whose subscribers in the consumer segment were the end-customers for Zed. Thus, the operators were gatekeepers in the selling process. Zed made the first operator deal with Powertel from the USA. The deal was made based on a *"slide drill power point show"* as its presenters described it. Sonera published the first operator deals at the Cebit exhibition in spring 2000:

> *"Sonera Zed snatched significant partners. American Powertel, Turkish Turkcell, German Hutchison Telecom, Philippine Smart Communications as well as Dutch KPN Mobile and Libertel have signed co-operation agreements with Sonera Zed in order to offer Zed mobile services for their subscribers. Additionally, Sonera Zed has made several content co-operation agreements"*. (KL 25th February 2000)

Even though the above-mentioned deals were made, customer numbers were based on potential, not real user numbers. This was partly because there was no service or system available yet. The real customer market evidence came from Messi in the Finnish market. Sonera presented the development of the usage of mobile value added services (MVAS) at the 1999 AR publishing conference on 14th February 2000. Appendix 14 presents these numbers. 30 000 users had registered to Messi by August, about 60 000 by September, 75 000 by October and 125 000 by the end of December. Sonera estimated that 20-30% of the registered users actually used the SMS content services each month. They did not tell how many really used them. However, if we assume 1 SMS/customer/month would use them, this would generate a revenue of 78 000 euros, 5 SMS/customers/month generate a revenue of 174 000 euros. Let us compare these numbers to the estimations of potential data revenue growth that the managers of Zed presented in the 2000 road show. Namely, these growth percentages were in the yearly order from the year 2000: 400, 200, 73, and 38. Practically, Zed had the same revenue growth percentages in its first months calculated from the above numbers: 100, 25, 33, and 25. Thus, in the end of 1999, growth was on average 45,75 %. Hence, the market was growing in much lower numbers than the Sonera management or any other party had expected. Of course, internationally, the system was in the pilot stage, launched only in Finland and not advertised very much at that stage, but the economic media

drummed up these stories almost daily. Additionally, as one Sonera business controller said:

> *"Almost all the active users using the service were corporate employees".*

On the other hand, it was typical that corporate employees piloted new services, but this meant practically that most revenue was based on internal transfer pricing. Company personnel did not pay for those services but the business units and the company did. Most importantly, at this time the management of Zed could outline the first signs that the mobile portal market was not developing as fast as thought previously[149]. Sonera's CFO at the time remembered:

> *"In the spring 2000 it was discovered that the service strategy was developing slower than expected. Value still existed in the networks. It was necessary to consider the network path more carefully. In order to follow consolidation and the role of an active player credibly, it was decided to get involved in some populated market in Europe. This need further increased when the market situation changed".* (2002)

Surprises affected Zed's concept and Sonera's strategic paths

Even though the marketing of Zed was first considered a problem, it unexpectedly turned out not to be one. The second surprise was that operators did not behave in the way they were expected to, but delayed the completion of the technical solution. Third, the technology development favored the evolution of 2G. I consider these issues next. The capital market surprised the management of Zed in a way that business journalists' news and stories of Zed and Sonera were mostly based on analyst and investor interviews. These increased common knowledge of Zed among operators, consultants, and customers. Hence, there was no need for separate media marketing, as believed in advance. Second, operators did not behave as the Zed project had expected. Operators were critical of what they linked to their brand and they did not allow the names of Sonera Zed or even merely Zed in their own market. Operators also wanted to integrate Zed more tightly into their own systems and the outlined stand-alone solution did not please them. Additionally, the operators offered SMS and GSM capacity, which surprised the management of Zed, too. Still, WAP did not meet its great expectations. As Sonera's MD described:

> *"WAP did not have pull. The number of telephones and service use are low".* (KL 27th April 2000)

Third, the technology platform for the stand-alone solution was mainly made in Sonera. The main organizational body working on it was the Sonera Software Solution unit, the former corporate R&D unit. The solution developed there was once again monolithic, according to the technology director of Zed at that time:

> *"We got off with a story directing from a generic to a specific opportunity. The architecture was a big "lump" in fall 2000 consisting of all the functions from all the markets. It surprised us that operators decided to sell network and SMS capacity. This forced us to remake the entire technology architecture. On the other hand, this market change had the effect that integration to the operators' systems made the business and technology architecture of Zed even bigger and more demanding. Significantly more functions had to be produced".*(2000)

Complementary technologies also provided more capacity for the 2G network evolution, as already told above. The most significant of these was the data services providing GPRS. It made it possible to implement 3G services in 2G networks. This also meant a threat to the offered added value that Zed promised for operators and its use as an option towards 3G in the corporate strategy. Thus, incumbents and existing 2G operators had many advantages against new entrants such as Zed. At the same time, all the relevant operators searching for a significant position in Europe and for consolidation were participating in 3G auctions. Sonera management perceived the U.S. market as less interesting than the European market because of the undeveloped mobile market. Hence, the Sonera management decided to give up its shares in Voicestream (VSTR). Germany was the slowest developing market in Europe at that time. This was due to bad network quality, few available brand names, and still a voice service. The auction in Germany began on 28th April 2000. A member of Sonera's Administrative Board described the decision making then:

> *"Experience proved that new techniques…had produced more value all the time and this was seen to go on. The value of the license was seen to remain or rather increase. We had 'our backs to the wall' in the decision making, either to participate or not. The situation was calculated and observed from multiple perspectives. The sales of the Voicestream shares provided so much money that it alone covered the license for Germany, and its finance was not a problem then. A*

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[149] This was not communicated publicly or within the organization.

The capital market valued high-tech companies aloft in the spring of 2000. Plenty of such companies went public and this market appreciated growth promises. The turnaround of the capital market, which happened in spring 2000, changed this development. The press told of a "mini collapse" in early April 2000, and at the end of that month that "the worst is over". In the summer of 2000, it was a common belief in the market that the worst really was over. One consulting company reported, "the bubble just burst". Many different actors and organizations supposed that the decline of the Sonera share had ended. The management of Zed believed these signals. However, the capital market gradually changed to appreciate profitability.

Generally, Zed meant for the organization a move from the world of specified service environment into the world of software product environment. This was a challenge because the learned ways of action could not be directly applied and competence development took longer than expected. Still, there was not plenty of experience of international operations and co-operation with multiple operators took time in order to find out solutions inside functions, at interfaces between them, and to find the right physical locations for functions.

In summary, this section described managerial activities when Zed was redefined before the venture was launched to market in order to pursue impetus for its development. The capital market surprised the management of Zed and Sonera at the redefinition stage in a way that Zed's valuation was based on the volume of activities. This led to recruitments, strengthened the service development capacity as well as Zed's further impetus via the capital market. In addition, the management of Zed saw a need to provide structural independence and flexibility for Zed. Then at the impetus stage, the management of Zed and Sonera were surprised by Zed's slow customer market development. Additionally, operators did not adopt the concept that Zed offered, which caused a need to redefine the technical solution. These developments also partly revised the corporate strategy.

5.6 Further modifications for ZED and providing impetus for its development

Zed was again defined before customer market launch took place to pursue further impetus for its development. This section is organized according to these stages. I first describe how and why Zed was again redefined. At this stage, Zed's employees started to outline the use of adjunct names.

5.6.1 The concept of Zed was redefined due to customer market surprises

At this stage, central activities concentrated on the customer market. The customer market launch had to wait until the technical solution would be ready. This also meant change for the cross-functional principles of Zed. The capital market representatives believed the collapse of capital market gone, which was also partly the reason that the management of Zed did not pay too much attention to the technical solution. The management waited for this solution and was ready to invest in marketing, still perceiving it as a bottleneck in the development. On the other hand, their attention went to administrative discussions at corporate forums, which I describe at the next stage.

The unexpected behavior of the operators meant that the monolithic technical solution had to be changed into a modular one, which also made it bigger. Integration to the mobile operators' systems required deeper control and expertise of mobile network technologies at Zed. At that time, that expertise was organized into the mobile-Internet network service group in the parent company. This unit was moved under the control of Zed's director. Almost two thousand new employees were recruited to Sonera during the year 2000, most of them to new businesses such as Zed[150]. The salaries of the employees were seldom based on the task definitions because not too many had time to plan them. Recruiting was rather based on the person's suitability to find out his or her own tasks. This increased the costs and led to a miscellany of tasks. In many topics, the 'wheel was reinvented' while the existing knowledge, e.g., in the parent company, was not taken into use.

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[150] Total employee number of the Sonera increased by about 25 percent during that year.

Zed started to give up making an in-house technical solution and started deeper co-operation with vendors that had abilities to deliver larger and more standardized technological platforms. In fact, this meant co-operation with technology vendors who had standardization capacity:

> "Concern for mobile-Internet constructors has emerged…system-integration or how to get operators, vendors and third parties such as service providers to work fast and smoothly. Sonera started to co-operate with Nokia Networks in September in order to solve system integration problems". (T&T 26th October 2000)

Delay of the technical solution caused delays in timetables and the promise of fast service launch was taken 'under the lenses' in the market. In addition, investors, information technology firms and other TELCOs were able to 'catch up' on what Zed was about. They were able and had time to compare how different Zed really was. They noticed that at first sight and from further away it seemed novel, but when the experts of their companies had time to look at it, they noticed that the novelty could be debatable. From Sonera's point of view, Sonera was the leader in a market in which usage increase came less from a bulk telephone service. Thus, when time was lost it became more difficult to combine speed, timing, and content of the story. Operators were not willing to cooperate with Zed coming to their market, offering its own brand and taking their customers. The concept changed; according to a Management Group member of that time:

> "The operators took Zed as a technology business. That was, if somebody brings this concept to me, then it is fine. If Sonera produces such a concept, which is useful for them, it conceptualizes and brands it in a way that it is neither the operator's Zed or Zed. Finland was perhaps the only country where Zed was profiled completely independently". (2002)

Anyhow, Zed's management saw that efficient marketing could create a customer need to place pressure on operators to offer Zed's services. However, Zed management had to move forward from the original promise of market launch in early 2000. Management did not, however, lose its belief in Zed. They presented their views for it at the Annual General Meeting in March 2000. The changes to previously presented figures were that the penetration number in this presentation was increased from the previous 20 % to 30 %, EBITDA break-even was moved one year forward to the year 2003, the potential customer number was increased and Zed aimed for a revenue of 10

million euros in 2000. The expenditure focus was intended to move from the infrastructure development to marketing.

The administration bodies of Sonera were strengthened in the spring 2000. The Chair of the Corporate Board was nominated from a part- to a full-time position at the Annual General Meeting in March 2000. The corporate MD announced in April his retirement at the end of that year. The deputy managing director was nominated, which meant that he was going to be the next MD of corporation. He recalled:

> "I got the operative responsibility for the corporation, however without jurisdiction". (2001)

Pressure to launch Zed to the customer market increased all the time, especially pressure from the capital market. The capital market representatives wanted to have customer market evidence to evaluate Zed's business. The management of Sonera and Zed were compelled to answer more critical questions about Zed's customer market development. At the same time, the Finnish government authorized a decrease in state ownership in Sonera to zero on 21st June 2000.

5.6.2 Customer market launch for providing evidence for impetus of Zed's development

In this subsection, I describe what happened after Zed's customer market launch until when Zed was sold and the Finnish Fonecta bought Zed Finland. At this stage, important activities were related to the development of the customer market and corporate strategy. Zed was launched to the customer market on 15th August 2000. Then, the Dutch KPN offered Zed services for its customers in the Netherlands. After this launch, Zed's MD confirmed the company's belief in the market development and provided the concrete information that Zed management had preliminary budgeted 200 million euros on the brand building. The global organizing of Zed quickly followed this first customer market launch:

> "The mobile portal Zed constructs productive machinery in the Netherlands, Belgium and Singapore…These three centers employed about 40 persons in February. They now amount to 200 [autumn 2000] and their number will soon increase with one hundred more…"The production equipment is rather complicated. The equipment adapts according to user numbers and functions with multiple languages", describes the MD of Zed …The company has

concept creators in multiple countries. They garner ideas to localize services and completely new products. The idea then shapes into technical requirements, coding, content contracts, and applications for different kinds of terminals. Then this packet proceeds to the production factory and marketing". (TE 28/2000)

After the KPN launch, the following operator deals and service market launches were published during the winter 2000-2001:

Table 5.1 Operator deals and market launches of Zed

Country	Operator	Deal Published	Service launched to market
Germany	E-Plus	Dec. 7th, 2000 (Press rel.)	1st quarter of 2001
	D1	-"-	-"-
	D2	-"-	-"-
Singapore	M1	Dec. 15th, 2000 (KL)	not known
Italy	TIM	Jan. 31st, 2001 (Press rel.)	2nd quarter of 2001
Turkey	Turkcell	Feb. 20th, 2001 (KL)	Feb. 20th, 2001
UK	Vodafone	March 19th 2001 (Press rel.)	March 19th, 2001
USA	Powertel		March 21st,2001 (Nasdaq news)

In the end of 2000, more than 700 000 mobile phone users accessed Zed every month[151]. However, the evidence of customer market development concentrated still on customer potentiality:

> *"Zed's global customer potential reached nearly 90 million in February 2001"*. (Sonera AR 2000)

Even though Zed's management communicated that operators would commit to Zed, only three days after KPN launched Zed for their customers, it also launched NTT Docomo's Imode for their customers. Additionally, new mobile portals were launched continuously to the market:

> *"Swedish Telia mobile has three mobile portals, My Dof, Hale-bob, and Speedy Tomato. Oracle is also in on Hale-bob. Operators such as Vodafone, BT [British Telecom]…AOL and Lycos have their own. In Finland, Radiolinja is in alliance with Yahoo and media companies Alma Media, and Sanoma-WSOY to construct their own mobile portals"*. (T&T 26th October 2000)

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[151] Sonera press release 6th November, .2000

Zed tried to increase its credibility by making partnering contracts in content production. For example, in the German market Sonera announced partnering deals with iPublish (an event and restaurant guide), Tomorrow Internet AG (a TV and cinema guide), Reuters (stock news), Sportslink (sport news), and Sandstone (a dictionary)[152]. However, the overall criticality towards Zed increased in the capital market and the media. The concept of Zed was clearer and opinions about the good marketing and excellent use of the publicity gained in the stock market started to appear in fall 2000. In this publicity the entry to NASDAQ was considered the most important. The criticism focused on the lack of customer market evidence. When Sonera published its Interim Report in February 2001, further doubts were raised. The daily newspaper *Helsingin Sanomat* wrote on the next day[153]:

> *"Zed sank as WAP was revealed a flop…Zed is the horse on which Sonera bets its ante. Zed finished last year with a 60 million [mark] revenue, a 636 million mark operating loss…According to the investment bank Credit Suisse First Boston's recent report, the operator contracts of Zed are not outstandingly superior…Zed services have not yet appeared in the KPN's portal, nor is Zed marketed in the Netherlands at all. The same may happen in Germany. Italian TIM offers Zed services via its own portal".*

Zed was also offered for business-to-business needs. This solution was called Zed for Business and was launched first to the UK market in March 2001[154].

Competition between businesses in the company

The Sonera corporate business portfolio and responsibility distribution, which were created during the fall and winter 1999, caused puzzles inside the company. Especially, long-term intentions faced approximately in the same direction and created competition between the different businesses. As if this was not enough, management extended the

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[152] Sonera press release 6th November, 2000

[153] Data from some interviews revealed that reporting of this particular newspaper could not necessarily be separated from the business interests of the corporation that owns the newspaper. Namely, indications are that the corporation considered Sonera as its major competitor in the forthcoming cross-media competition.

[154] Zed for Business provided employees real time access to corporate applications, such as email, calendar and contact databases, via any WAP-compatible device such as mobile phones or other hand-held wireless units. It provided also content such as a translation dictionary, residential and business address searching, SMS messaging, business news and weather (Sonera press release 29th March, 2001).

competition to the employee level. Their competence was emphasized instead of trust and long-term commitment to work. Middle managers commonly interpreted that they had to search for solutions, instead of trust in the top management's support for them. The top management indicated that a motivation emerged from the content of work and opportunities to learn, not from job security. This change was quite dramatic and made employees feel insecure. Management, assisted by consultants, brought up a metaphor of "winner takes it all" in the spring of 2000. According to this, relatively small differences in an organization's performance led to enormous differences in rewards, and in order to win you had to be the best in the world. Thus, if you were not a big winner, you would probably be a loser. This supported the top management's perception of urgency, kept people's focus on Zed and was commonly used to legitimate new businesses. A member of the Sonera Management Group commented on the organizing and competition:

> "Now we have such a structure in which units have been given rather much independence in order to break into a market in which we intend to exist more effectively. This is likely to lead to a situation that units must be joined in one way or another. That is a management not a juridical issue of structure". (Internal bulletin 15th November 2000)

Competition between corporate businesses meant also competition for resources and competences. This diverged different organizational managers' perceptions of their business and personal opportunities. Tensions were created between different organizational management levels and managers at the same level. Exceptional here was that even though intraorganizational competition had always existed, until that time the company management had not previously talked about or commented on it. A member of the Company Management Group commented on the competition:

> "I don't encourage internal competition if it distracts organizational resources from what should be done. That is to get customers and a company to carry out its duties towards all its stakeholders. Some moderate competition is good in a sense that it usually creates a more efficient atmosphere…Over the medium term, the aim is not at all that this kind of phenomenon would increase, on the contrary, it is that we can control it…I am aware of this and in the short term it is completely purposeful. In no way a phenomenon that Sonera can stand for a long time". (Internal bulletin 25th October 2000)

Thus, the increasing competition had been intentional but there was a need to decrease it so that people would concentrate on work, not politics. Later this person emphasized co-operation over business and unit boundaries in the company in order to force new global

service businesses from the beginning of January 2001. Nevertheless, the business unit directors whose units or resources met this competition were not very happy about it.

Corporate governance and change of strategy

In the corporate administrative bodies, incentives and corporate strategy caused disputes. The incentive discussion emerged especially when Zed and SmartTrust were incorporated. Incentives appeared concretely on agenda when Sonera bought two companies to complement SmartTrust. According to one Administrative Board member:

> "The question culminated especially when Smart[Trust] bought the companies Swedish Across Wireless and iD2 in the spring of 2000. Then Sonera's system could be compared to the Swedish one. The difference was enormous. Individuals were valuated for hundreds of millions. Friction emerged because similar incentives had been promised to the Swedes also after this acquisition". (2002)

Corporate strategy also caused disputes in the corporate administrative bodies. The slow customer market development of Zed revised Sonera's strategy. At that time, inside and outside Sonera there were doubts that the company had changed its basic strategy of becoming a globally operating service provider, which did not substantially depend on network ownership. The issue emerged especially after Sonera got a license for Germany in autumn 2000. One company executive responded to this issue as follows:

> "The strategy has not changed. Emphasis is on wireless services...we shall continue with Zed and other new services as planned". (KL 6.9.2000)

Services were confirmed as the basic business a number of times during autumn 2000. However, Sonera practically changed its strategy into a more cautious one considering mobile networks when it published its Interim Report in October 2000. The company concentrated on 3G licenses in Germany, Spain and the Baltic Sea area. This more careful line, according to the MD, was based on a "change of business environment, which is political and related to finance". The strategy was changed again on 30th December 2000. Then, the emphasis was set more on 2G and 3G operations, expansion of fixed network operations in the Baltic Sea area, and exercising service businesses in selected global markets. This practically meant returning partly to Finland and recognizing the evolving nature of the development. Thus, Sonera revised its strategy

and withdrew from expansive global growth. The press asked for comments on Sonera's strategy from an external expert who had participated in Sonera's strategy process:

> *"The founder of Strategos company N.N has consulted the top management of Sonera for two years. Director N.N, there are lots of discussions in Finland about Sonera and whether it has a strategy. Does it? Yes, but a completely different thing is whether it is a good one. Sonera should not be considered alone but as one among other TELCOs. It is also doubtful to evaluate it only from the investor perspective…The stock rate of Sonera reflected enormous expectations. The technological lead was believed to provide success in the global markets".* (KL 14.2.2001)

Strategy and incentives were also dealt with unofficially, e.g., in the press and anonymous books, and officially, e.g., in several memorandums of the Ministry of Traffic and Communications. *Helsingin Sanomat* was the first newspaper that made the company-internal incentive discussions public on 2nd November 2000:*" Open quarrel about options going on in Sonera. Confrontation between N.N [Board member] and the acting management at the Corporate Board".* The Finnish Prime Minister even explained Sonera's ownership policy to the Finnish Parliament[155]. Also, several legal proceedings against the company started. The largest one concerned whether Sonera's employees had misused teleinformation. The case was unique globally[156]. The press story quoted above woke up the company management to the issue of whether information leaks had occurred from the corporate administration bodies and whether their members acted in a proper way. A member of an administrative body depicted the situation:

> *"Individual members of the decision-making bodies were in publicity in a way that did not serve the company benefit", [the Chairman of the Board] rumbles now discreetly. The role of an elected official of a public company was forgotten especially by the Board member N.N…Administrative Board member N.N., the Union Secretary of the Metal Union did not necessarily ever understand his role. Telemechanic N.N behaved as if representing the trade union on the Board, not the personnel of Sonera. A change in an option policy got the politicians involved. Sonera was a suitable weapon for both the inter- and intra-political party fights".* (TE 15/2001)

One corporate administration member recalled in 2002 that the resistance and information leaks came mostly from those who were close to the labor unions. As a

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[155]The Chancellor of Justice also studied whether the decision-making of Sonera considering the 3G license for Germany followed juridical procedure.

[156] Doubts concern whether these employees had infringed on privacy rights protected by law.

reason this person saw that *"the largest part of their members were in the fixed network side and the ideas of the Sonera management about the Mobile-Internet meant that their membership and hence their power would decrease… by leaking topics to the media they could throw a spanner in the works. Big difficulties were caused also when some Board members bypassed the MD making direct contact with the operative management"*. Nevertheless, challenges in the corporate administrative bodies absorbed plenty of the time and attention of the corporate management, as one member of the Corporate Management Group recalled:

> *"About 30 to 40 Board or Administrative Board meetings occurred during 2000. You can try to do something else than prepare material for these meetings"*. (2001)

The division of labor between the MD and the chairman of the board was also one source of confusion, at least from the politicians' point of view. These persons themselves perceived this division as being clear. The MD took care of the operative side, and the chairman took care of the owners. Based on this, e.g., the MD did not participate in the latter tasks. This led to a perception that the politicians considered him arrogant. However, in spring 2001 Sonera "pushed the brakes strongly":

> *"Now we have to be humble when you can't know what lies ahead. If customers do not consume as assumed, you have to reef...In fact, he has broken the organization already since last fall, which has disappointed many directors attracted to the company by growth promises"*. (TE 15/2001)

Moody's took Sonera's credits onto its surveillance list in March 2001[157]. Zed and SmartTrust were practically valueless by the end of March that year. Then, according to analysts, the valuation of Sonera would have increased if Zed and SmartTrust had been closed down. Zed started to fire its employees in early May. It announced it would decrease its employees by 70 out of 400 by the end of 2001[158]. In the middle of May, Zed considered closing down altogether four subsidiaries in the USA, Turkey, the Netherlands and Singapore. The MD of Sonera commented on the company's new business development:

> *"ST [SmartTrust] and Zed are not yet ready to go public …He sees two kinds of risks in the industry. Another is attached to timing and*

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[157] KL 28th March, 2001.
[158] KL 2nd May, 2001.

the other to rhythm. There has been arrhythmia in Zed, which has invested money too early in multiple countries. Only in Finland and the Philippines have mobile value added services started to 'move'...'The service sector is coming but I have to admit that in 1997 we were more optimistic about service sector growth'. Also, customer growth of new networks and commercialization of new technologies takes place slower than usually expected. Technology delays, which are typical for this industry, increase the timing risk. It is usual to predict that technologies come faster. In fact, they come later but grow faster than expected". (HS 23rd May 2001)

In early 2001, market rumors considered that the state was looking for a new MD for Sonera. The state as the largest shareowner disbanded Sonera's Administrative Board at the Annual General Meeting in March 2001. The state also discharged the chairman of the board and almost all the board members. The MD kept his position. Zed's countdown from the corporation started when Sonera's MD suddenly resigned on 11th June 2001. The terrorist attack on September 11th, 2001 rapidly increased the interest rates. This started speculations of corporate cash crises and the probability of a bankruptcy. A new corporate strategy was published in October 2001. It focused on rehabilitation of the existing businesses and paying off the corporate loans. An essential part of the strategy was a share issue in which the Finnish State also participated. The Minister of Transport and Communications resigned in the fall of 2001. Swedish Telia acquired Sonera in spring 2002[159]. The Swedish State became the major owner in the new TeliaSonera and the Finnish State a minor one. After this, Zed for Business was reintegrated in the parent company in the end of May 2002. Group 3G closed down its activities in Germany in July of that year. Sonera wrote down a loss of 4,3 billion euros for 3G investments. This started an unforeseen hunt in Finland to find out a guilty party for this. In early August, Sonera sold to venture capitalists the majority of SmartTrust at a price of about one percent of its all-time peak value. At the same relative valuation, Sonera sold 15 percent of Zed to Yahoo. Yahoo received an option to buy the rest of the shares at that same valuation during the next two years, or give up the shares they had already bought. The MD of Zed moved on to Yahoo as Vice President of Yahoo Europe and MD of Yahoo Mobile in the end of August 2002. Several European 3G companies announced market delays in 3G services. In the end of January 2004, Yahoo gave up its

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[159] Multiple discussions have taken place on the reasons why the Finnish Government sold Sonera. Some data of this study suggest that a frustration among political parties was the main reason for this divestment. During fall 2006, the Finnish State still owned about ten percent of the company.

ownership in Zed. On 18th August 2004, TeliaSonera sold Zed to Spanish Wisdom Entertainment Corporation at the price of 30 million euros. Finally, the Finnish directory service company, Fonecta, bought Zed Finland on 6th February 2006.

In summary, this section described the managerial activities when Zed was redefined before the customer market launch took place to pursue impetus for its development. The evidence presented indicates that the surprising behavior of operators caused changes in the technical solution and the principles with which the concept was offered to the operators. The delay of the technical solution further forced activities to the customer market. The impetus stage is suggested to start from the customer market launch and end practically with the resignation of Sonera's MD. The evidence suggests that in spite of Zed's customer market launch, evidence of its development revised Sonera's strategy. Finally, challenges in the corporate administration bodies caused the resignation of the company MD. The result of this was that the support for Zed's development in Sonera diluted. This support finally disappeared when Zed was sold.

5.7 Summary of the development process of ZED

The presented evidence suggests that the central **bootlegging** activity in the case of Zed was the **Sonera management's search for corporate growth**. This search was due to increased market competition, deregulation, internationalization experience and technology change in the service production. Additionally, the company management gave a growth promise when the initial public offering (IPO) was announced. Against this background, it was not surprising that the Sonera management emphasized proactive action and looked for particular answers to the growth issue in the corporate strategy process in spring 1998. At the same time, initiatives aiming at a cable TV consolidation in Western Europe emerged. In this context, the Company Management Group triggered the **definition stage** of Zed in the end of summer 1998.

The managers appointed to head Zed perceived a market opportunity for Zed to exist globally. External experts supported this view. Penetration numbers of the Internet and mobile systems, technology development and other ongoing portal projects convinced the project manager that the preliminary **technical solution,** i.e., **technical linking** was already feasible to implement and that the competences to implement it were available.

It could be adjusted to a market need, which fulfills the purpose of **need linking**. This meant that an opportunity was open and considered realistic for the organization involved. The original idea was presented to several internal and external third parties. The project produced cross-functional principles, i.e., **cross functionalizing** to penetrate into the customer market. According to this, Zed was a stand-alone, open system offered by its own name and technological platforms. **Corporate strategy-making** occurred at the same time with this definition. Then Zed became the central part of the corporate strategy. External organizations participated also in the strategy-making.

The project manager presented the initiative at the **decision-making** bodies of Sonera. The presented evidence indicates that the resource allocation, i.e. the **internal selecting,** criterion was adjusted to that time's external capital market criterion. The project manager promised international growth, emphasized Sonera's relatively small size and rush to market. He outlined that in the customer market penetration, technology was not a problem but marketing was. The state owner of Sonera was not considered a problem, either.

Zed was further **defined** after the pursuit of an opportunity was approved. The project manager became the venture manager of a new unit, which was structurally separated from the existing corporate structure. Forthcoming, the second public offering directed his attention more to the organizing of this offering than to the continuous development of Zed. The roles of the organizing investment bank increased as mentor, sparring partner and content co-producer. The cross-functionalizing principles of Zed were blurred, but focused more on the mobile channel based on a market need, i.e., **need linking**. Based on these, the technical solution, i.e., **technical linking** was realized. The story of Zed became the most central business initiative for the corporate management to redeem the growth promise given in the first IPO. When the second public offering approached, the activities of Zed were further forced to the capital market in order to also resource and finance Zed's development. Hence, this would solve the problem of the small balance sheet. In order to provide **impetus** for the development of Zed, the management of Zed launched the Zed pilot to the customer market. The pilot was launched just before the second share sales. This pilot launch and share sales received plenty of positive publicity among the capital and media markets. The second public offering succeeded above expectations, which increased the self-confidence of the

venture manager and he **forced** activities even more to the capital market at the cost of the innovation in itself.

Zed was **redefined** when the capital market surprisingly valuated it in terms of quantity rather than quality of action. The presented evidence suggests that this redefinition triggered the second definition stage, i.e., the second iterative cycle. At this stage, the credibility of Zed in the capital market required it to follow the market's advice, i.e., force activities there and increase the quantity of personnel and product development, i.e., **strategy building** at the venture manager level in Zed. The Zed management saw also a need to detach the ownership of Zed from the parent company. This would increase the liquidity of the shares and provide flexibility for the Zed management. The presented evidence suggests that the launch of the subsidiary started the further search for **impetus** for Zed's development. At this stage, activities were **forced** to the customer market penetration, but preliminary evidence from the customer market pilot showed that this market developed more slowly than expected. Also, the operators did not accept the concept of cross-functionalizing offered to them.

Zed had to **redefine** its **cross-functionalizing** principles for the market penetration because of the above-mentioned operators' unenthusiastic stand. The presented evidence suggests that this redefinition triggered the third iterative cycle. At this stage, also the technical solution, i.e., **technical linking** had to be redefined. This meant moving to the technology product business in which operators were offered adjunct names and customer information. The representatives of the capital market and competitors started to see behind Zed's rhetoric and they really started to miss the evidence of the customer market. On the other hand, the change in the technical solution meant that it had to be integrated more tightly to the operators' platforms. This meant increasing Zed's mobile technology capacity by moving an existing group with technology knowledge from the parent company to the control of Zed's venture manager. The collapse of the capital market was commonly believed to be over in summer 2000. Zed's management forced its attention to the capital market and they now saw marketing as the real bottleneck. Zed's customer market launch triggered a further **impetus** stage for the development of Zed. At this stage activities were **forced** to the customer market penetration. However, it became clear that operators refused, again, to accept adjunct names or to share their customer information. Then Zed offered

them the use of the technology on new terms: the operator got the customer information and the service was offered solely by the operator's name. Operators made the preliminary delivery contracts starting in autumn 2000. However, the slow development of the customer market changed the **corporate strategy**. Bitter discussions in administrative bodies took place. Managers from different managerial levels started bypassing one another and acting 'behind their superiors' backs'. The media started to write of the challenges in the **corporate administration bodies**. These challenges culminated in spring 2001 when the state owner dismissed almost all the Corporate Board and suspended the Administrative Board. The MD got to keep his position. However, he resigned in the summer of 2001, which practically meant the dilution of the impetus for the development of Zed, and Zed was divested.

Figure 5.1 presents a summary of the previous analysis in a chronological order. Four managerial levels are identified on the left hand side. Activities are categorized into the above-described substance-based stages of bootleg, definition, decision making and impetus. The above-described iterative nature of the development means that cycles consisting of stages happen simultaneously and consequentially in a way that, e.g., the definition stage of the second cycle overlaps with the impetus stage of the first cycle. The shaded areas refer to the central managers' activities in this substance-based stage model. The central managers' activities at each stage are outlined in the figure as well as the time when the stages and cycles occurred[160].

| | I cycle | | | | | II cycle | | III cycle | |
	Bootleg	Definition	Decision making	Definition	Impetus	Definition	Impetus	Definition	Impetus
Owner									
Corporate Mgmt	searching	strategy making							strategy making
Business Unit Mger			internal selecting	forcing	forcing	forcing strategic building		forcing	
Service Unit Mger		cross-functionalizing technical& need linking		technical& need linking			forcing ma.devel. technical linking	cross-functional. technical linking	forcing ma.devel.
	Aug.1998-April 1999		Apr.-May 1999	May 1999 - Oct.1999	Oct.1999 - Dec.1999	Dec.1999	Dec.1999-Aug.2000	Ma.2000-Aug.2000	July 2000-June 2001

Figure 5.1 Stage model of the managerial activities in the development of Zed

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[160] This model is adapted from the Bower-Burgelman process model.

Thus, the development of Zed occurred in an iterative or cyclical way, as has also been presented in this summary by this far. This iterative cyclical development is illustrated in a different way in the Figure 5.2. The presented evidence suggests that the first cycle is emphasized also in this case because it was difficult to change the key activities later and fast enough. The activities at the later stages are consequences of these previous activities and choices. The key stages during the **first iterative cycle** were definition, decision making and further definition. The key managerial activities during the first cycle's definition process were cross-functionalizing as well as technical and need linking. The key managerial activity during the decision-making process was internal selecting and, during the further definition stage, activities towards the capital market. In the impetus process, activities were forced to the development of technology and customer market by launching a pilot to the market. The **project manager** was the key person during the first cycle. The capital market surprised the management of Zed and required modifications to the definition of Zed. This triggered the **second iterative cycle** of Zed's development. This cycle consisted of the stage of venture market launch, which aimed to provide **impetus** for the development of Zed. The **venture manager** from the middle level of the organization orchestrated activities at this second cycle. The customer market surprised Zed's management and required further modifications to the definition of Zed. This triggered the **third iterative cycle**. The customer market launch was realized to provide impetus for Zed's development. Then also the customer market evidence and commercial success became possible. However, a lack of customer market evidence diluted the impetus for Zed's development and caused change in the corporate strategy, finally diluting completely the organizational impetus for Zed's development. The key organizational actor at this cycle was the **corporate level management**.

Managerial Levels

Core Processes of Internal Corporate Venturing

	Definition			Decision Making	Impetus		
	I cycle	II cycle	III cycle		I cycle	II cycle	III cycle
Owner							
Corporate Mgmt	strategy making	(I)					strategy making
Business Unit Manager	strategic injecting	strategic building		internal selecting	strategic forcing	(II)	
Service Unit Manager	cross-funct. techn&need linking	techn.linking	cross-funct	(I)		ma.devel tech.linking	

Legend:
- ●——▶ I -cycle
- ◀——▶ II -cycle
- ◀- - - ▶ III -cycle

I cycle def	II cycle def	III -cycle def		I -cycle imp	II-cycle imp	III-cycle imp
corporate need	assessing action/compet	market selection		market pilot	venture status	market launch

Figure 5.2 Iterative cyclical process of Zed

6 MANAGERIAL ACTIVITIES BUFFERING AND BRIDGING RADICAL BUSINESS INNOVATIONS

Common rhetoric and knowledge from the innovation literature indicates that innovations are fuzzy to define and that their development processes are complex. It is difficult to find a simple unidirectional causality between managerial activities and innovations. Every innovation is also to some extent unique. In this chapter, I therefore provide an explanatory perspective on the two innovations studied by paying attention to how the focal management, in a complex network of other interdependent actors, contributed to the studied innovations. It is known that to emerge and develop, innovations need both protection and collaboration. As described earlier from the managerial perspective, protection is provided by 'buffering' and collaboration by 'bridging' (cf. Scott 1992).

In this chapter, I examine the bridging and buffering activities that contributed to the two radical business innovations in question. Section one induces and explicates how the focal managers explored and operated these managerial activities in this sense. The

section emphasizes the role of the higher managers of the focal management, that is the business unit manager in the case of ARP and the top management of Sonera in the case of Zed. In section two, I show how the focal managers directly involved with the innovations exploited these activities. Section three relates these results to the Bower-Burgelman process model and presents answers to the research questions.

6.1 Buffering and bridging radical business innovations

6.1.1 Buffering and bridging ARP

In the bootlegging stage of the ARP innovation, there was collaboration between the management of the Radio Division and the actors representing Nordic and national technology forums, educational institutions and even radio amateurs. This collaboration was partly intentional, partly unintentional, and unfolded when problems emerged or the survival of the development was in danger. Participation in the Nordic co-operation and national forums concerned mainly the technology development and occurred among radio engineers who were interested in radio systems. Networking towards the Helsinki University of Technology (HUT) unfolded also around radio engineering. The division director of Sonera served as a professor at the HUT and shared knowledge of the radio systems, offered students working opportunities, and was able to hire some of them later. Actually, the division director recruited the first project manager for ARP from the Foundation of Technology Advancement. Additionally, HUT was the first meeting place for many later employees of the division. Quite a few of them were also radio amateurs. This hobby provided the natural means for collaboration also across organizational boundaries. For example, the commissioner for coordination of the Ministry of Finance founded the Radio Division in exchange for the better service coverage to exercise his radio amateur hobby. This was completely against the interests of the dominant corporate business. However, this provided a more legitimate position for the radio engineers in the organization. The hobby also provided a natural means for co-operation with telegraphers and persons in the emerging industrial field. The content of this co-operation was at first one-way, from the division to third parties, but later changed into mutual exchange.

The challenge for the Radio Division and the development of ARP in the later stages was first to secure its survival and later to gain impetus for its development. The most apparent threat for this came from the dominant business of the corporation, whose representatives wanted to abolish the division in which ARP was developed. The people at the division in general and the ARP project in particular wanted to have peace to work and wanted to keep disturbing business concerns at a distance. The Union of the Telegraphers supported the division from this stage until the evidence from the customer market became available. Common interest between the Union and the Radio Division emerged from the education of telegraphers, an issue that was already described in Chapter 4. When the Union of Telegraphers supported the development of ARP, it also promoted support from the other labor unions towards the division, which otherwise might have suffered from professional or labor tensions, i.e. social discrepancies.

When ARP was defined, advantage was gained from the co-operation that occurred in the bootlegging stage. Nordic and national technological forums were good places to discuss, test ideas and exchange information about different markets. The division director usually participated in the Nordic Country co-operation. It was at first mainly one-way, flowing from the representatives of other Nordic Countries to the Radio Division, but it later gradually became mutual. Knowledge received via the Consultative Committee for Communications Affairs, VANK, diffused to the people in the division only after that work had begun. Moreover, the first ARP project manager contributed significantly to the work in VANK, but also received knowledge in return. Thus, this collaboration was also mainly a one-way flowing from the Radio Division to the VANK. Technological experience and experience from the previous systems provided knowledge about profitability for ARP in the bootlegging stage. Profitability became an important criterion for the project and the division management in the definition stage. It also became the central cross-functional principle and in that way directed activities in the functions. Additionally, the second ARP project manager received later an education in accounting at the Helsinki School of Economics (HSE). This education provided more knowledge and confirmed the importance of profitability for ARP. Furthermore, the second project manager saw already at this stage that in order to increase the amount of resources, the people in the project needed to network with manufacturers, corporate management, teledistricts, dealers and customer.

Decision making over the ARP innovation at its first stages mainly took place at multiple preliminary meetings before the actual Corporate Collegium meeting that officially allocated resources. The focal actors in the project were both project managers and the division director. These preliminary meetings were places for these managers to sell the idea of ARP to the corporate management and get them to support the resource allocation for the project. The corporate management and the Finance Ministry approved the allocation of at least some resources to this work, even though innovation development was uncertain and the dominant business of the corporation was in contradiction with this allocation. Corporate management even took a personal career risk when doing so. Additionally, the Radio Act defined some radio tasks that had to be taken care of at the national level. When the representatives of the Radio Division took care of these tasks, they received assistance from the corporate management and the state owner to help the development of ARP. Especially, an individual civil servant (a 'telesector man') at the Ministry of Finance, as mentioned in Chapter 4, became an important person for this development but notably later than at this stage. At this stage, the collaboration started to further intensify even though this person gained importance at the later stages of the development. The division director mainly took care of this collaboration. The need to get financing for the investments was also one reason to create and maintain good relations to the corporate management. The division director also took care of this.

At the further definition and system pilot stage in the first iterative cycle, networking towards manufacturers and teledistricts started to intensify and collaboration with dealers and customers was also initiated. All the Radio Division staff motivated the Finnish manufacturers to start the development of technical equipment. From the division's point of view, competition in the mobile terminal manufacturing had to be promoted. Even more important was to promote competition in the manufacturing of mobile networks. Generally, networking with the Finnish manufacturers was mostly one-way first, from the division to the manufacturers, but it later became mutual. Manufacturers started to develop equipment, even though there was considerable uncertainty about whether they would be able to eventually manufacture them and whether the Radio Division, or especially other operators, would buy them. By doing so, the Radio Division assisted the manufacturers in their production and promised to

purchase the equipment if they fulfill their technical requirements. Furthermore, before piloting the system, a central problem was the construction of the network. That needed local area familiarity and support, especially considering the prevailing lack of personnel and resources. Then, persons from the construction function started to co-operate with the persons in the local teledistricts. The persons in the teledistricts stretched their official job descriptions by helping with the construction of the ARP network, which was not part of the corporate dominant business to which they officially belonged. Compensation for their work was also partly uncertain due to the uncertain financial outcome of ARP. Because of their commitment to ARP, they also tended not to support their superiors, who wanted to abolish the entire division. Thus, the employees in the teledistricts took significant personal risks for career development. Their superiors' interventions could have meant the end of their working in the division.

Despite these problems, the Radio Division gradually received the support of professional co-operators in the teledistrict, the expertise of local knowledge as well as local visibility. Thus, the relationship with them became mutual. Moreover, at this the stage lack of resources also meant additional networking towards independent dealers. The use of independent dealers was cheaper and they were more motivated to sell subscriptions than employees in the company's wholly owned dealer chain. Furthermore, it also meant more sales and service access points for the customers. These principles became concrete at this stage, even though they were implemented when the system was launched to the customer market. The distribution function was responsible for this collaboration at the operational level in the organization.

When the ARP system was piloted at the impetus stage in the first iterative cycle, collaboration with the persons in teledistricts deepened. A natural means for this was the inspection of base station places and base station's operations. Additionally, the operation and maintenance of the network was soon shared with the persons in teledistricts. At this stage, the attempts to abolish the Radio Division also increased. This required further facilitation of the necessary peace to work and increased the urgency of launching ARP to the customer market. Hence, this forced activities further to the customer market and moved managerial attention towards that market, even though the main emphasis was on the technology development.

When the ARP innovation was fine-tuned in the second iterative cycle, knowledge received from the Nordic country co-operation confirmed the technology development around the microelectronics. Generally, specialists from the division started to participate more in this co-operation. Additionally, information received from the U.S. market also confirmed the belief in the choices and solutions made in ARP. Additionally, the emerging principles for NMT development provided a good point of comparison, affirming that the selected principles for ARP were about in the right direction.

When the ARP system was launched to the customer market, the focal managers' attention moved a little from the technology towards the customer interface. At this stage, collaboration intensified with terminal manufacturers, dealers and customers. The terminal manufacturers provided radio terminals that were then type approved by the Inspection Section in the Radio Division. After this, the dealers delivered terminals to customers. Additionally, the customer service clerks developed instructions for the usage of the terminals and service. Even though collaboration with the manufacturers was mainly one-way in the beginning, it became mutual later. Collaboration with them related mostly to problem-solving and the development of the entire industrial field. The people at the Radio Division and the manufacturers also became discussion partners. In this collaboration, the manufacturers received knowledge of the radio systems and the Radio Division received cheaper equipment when Ericsson had to decrease its prices. Furthermore, the dealers received knowledge of forthcoming services, and the Radio Division of prospective customer behavior. The dealer solution was again a risk for the Radio Division because this deviated completely from how the dominant business delivered its service. Additionally, at this stage again, the facilitation of the necessary peace to work was really tested. Nevertheless, the division was again able to maintain its independence despite several abolition attempts mainly from the dominant business of Sonera. The division director was the key person in this work. In consequence, these attempts forced activities further to the customer market. Especially, traveling salesmen started to use the service and actively gave feedback on it, even though the service was expensive, the benefits unclear, and service usage was difficult. People at the Radio Division noticed these active users and started to respond to their feedback and take them seriously. Actually, everyone in the ARP project adopted the customer

perspective, including those working with the technology. Hence, the relationship with customers also became mutual.

When it was found out that the ARP system was profitable, the division director finally started to make an issue out of it. The profitability of ARP demonstrated the successfulness of the cross-functionalizing principles. However, the director did not communicate these principles, only the outcome. While the profitability of ARP protected and gained the final impetus for its development, it also provided continuity for the community of radio engineers in the organization[161]. Thus, the profitability of ARP then finally helped to solve the economic and social discrepancies of the radio engineers vis-à-vis the dominant group of telecommunications engineers following the cost criterion.

6.1.2 Explicating buffering and bridging in the development of ARP

This subsection specifies those third parties that participated in the facilitating of stable working conditions and that co-operated with the Radio Division. Table 6.1 explicates the buffering activities that took place in the development of ARP. In the table, the vertical axis indicates the third parties that were important in this buffering and the horizontal axis indicates time, which is organized according to the development stages. Within the table, X indicates the initiation of a relationship to a third party and I its termination. M indicates the timing when this relation became important and Bu indicates that this relation became critically important.

Table 6.1 Facilitating stable working conditions in the case of ARP and the timing of its critical effect

		I CYCLE					II CYCLE		III CYCLE	
	FOCAL MANAGER	BL	DEF	DM	DEF II	PILOT	DEF	MARKE	DEF	EVIDENCE
Corporate dominant business	Department Director	M							I	
Education at HUT and HSE	project managers	X	M					X		Bu
Union of telegraphists	All functions	X				M		M		

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[161] Radio engineers were the dominant professional group in the division but, of course, others existed too. However, radio engineering characterized more or less all the activities in the division.

Thus, the dominant business of the Sonera Corporation constituted the main threat for the development of ARP. The people at the Radio Division needed to keep it at a distance from the division's business and thus prevent it from potentially disturbing their own development. The division director was the focal actor in this. The Union of Telegraphers provided the necessary support for the development of ARP before the knowledge of profitability, recognized and disseminated by the second project manager, finally legitimated the development of ARP and buffered it from the most immediate threat. It also ensured the existence of the community of radio engineers at Sonera.

Table 6.2 explicates the third parties with whom collaboration, co-operation and networking occurred during the development of ARP. The meaning of the symbols is the same as in Table 6.1 except that Br indicates bridging. Briefly stated, collaboration mainly occurred with Nordic and national forums, educational institutions, radio amateurs, manufacturers, corporate management, the state owner, teledistricts, dealers and customers. A common feature in this collaboration was that knowledge was shared and it was mainly one-way at first[162]. However, this changed into mutual collaboration over time.

Table 6.2 Collaboration in the case of ARP and the timing of its critical effect

| | | I CYCLE | | | | | II CYCLE | | III CYCLE | |
	FOCAL ACTOR	BL	DEF	DM	DEF II	PILOT	DEF	MARKE	DEF	EVIDENCE
Radioamateurs	Multiple	X								
Radio technology at HUT	Proj.man's&Dep.Dir	X	Br							
Nordic Country	Department Director	X	Br							
VANK	1st project manager	X	M						I	
Corporate management	Proj.man's&Dep.Dir	X		Br						
Manufacturers	All functions	X			Br					
Teledistricts	Construction function	X					Br			
Dealers	Distribution function	X					Br			
Customers	All functions	X					Br			
State owner	Department Director	X							Br	

The division director and the project managers were the focal managers in the collaboration especially in the early stages of the development. The division director took care of the Nordic Country co-operation in the beginning and mostly of the co-operation with the corporate management and the state owner. The project managers' roles were emphasized in the definition stages. When the development work was shared among the functions of the division, the existing functional competence became

available to the project. This meant that collaboration responsibility and practical implementation took place and was shared in the division. For example, the persons responsible for the network construction took care of the co-operation with the teledistricts and the distribution function took care of the dealer co-operation. However, surprisingly many division employees participated in the co-operation with the manufacturers and customers. When the development proceeded, the production and distribution functions were emphasized. Table 6.2 indicates also that, in fact, all the collaboration relationships started already at the bootlegging stage. They were taken into account when the cross-functional aspects of the technical solution, production and customer interface were considered at the definition stage. This happened even though the relationships only materialized fully in the later stages. Collaboration was materialized first around the technical solution, and then it moved to the production and last to the customer interface. Therefore, collaboration changed, was emphasized and was implemented in this order. I consider this in more detail in subsection 6.2.1. Next, I examine the buffering and bridging activities in the case of Zed.

6.1.3 Buffering and bridging Zed

In the bootlegging stage in the case of Zed, co-operation in the international markets provided knowledge of the strengthening privatization and liberalization trend for the corporate management of Sonera. Similarly, co-operation in the joint ventures provided knowledge of the challenges in internationalization. The forthcoming initial public offering of the company directed the work of the corporate management toward networking with investment banks and the bodies organizing this offering.

When Zed was defined, the people in the Zed development project collaborated with corporate management, consultants, academics, corporate employees, technology developing companies and investment bankers. First, collaboration of the Zed project with the corporate management emerged naturally when the latter recognized the increasing pressures for the corporation to grow. In fact, the Corporate Management Group had triggered the definition of Zed. This collaboration rapidly became mutual where the corporate management gained product-market information and the project

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[162] Knowledge exchange did not unfold with VANK.

gained access to the third parties that were able to assist in the definition of the innovation initiative. This collaboration was especially important in the definition and decision-making stages of Zed. Second, consultants communicated mainly to the corporate and project management about the customer market opportunities and presented the stock market valuations for different company strategies in different sectors and industries. Consultants also assisted in the corporate strategy-making. They offered such descriptive tools as the 'real options' concept. Additionally, they provided general global views of the industry development and convergence, and translated examples, competitive logics and value chain fragmentation from other industries to the telecommunications operator business. Consultants received from the Sonera and Zed a reference from the market leader in the most developed market and knowledge from that market. If they got an assignment, they were paid well. Moreover, they could transfer and translate local knowledge to global markets. Their views supported the marketing of Sonera and Zed, highlighting the importance of internationalization and its challenges to all managerial levels as well as the better position of Sonera compared to the other incumbent operators. Hence, the collaboration with consultants was mainly one-way from them to the management of Sonera.

Third, collaboration with persons and organizations with academic backgrounds concerned mainly problem-solving in organizing descriptive empirical data into different kinds of categories. These academic consultants also commercialized academic knowledge and organized discussion opportunities for the company representatives with other companies from other industries facing similar kinds of challenges. This collaboration took place at multiple managerial levels, but the project management was the most important managerial level in this. Sonera and Zed received from this collaboration an outline of the opportunities and especially assistance in the corporate strategic paths towards 3G. In addition, the management of Zed perceived the importance of adopting a long-term strategic position concerning the existing operational competences in the future competition. One academic consultant scanned the company for potential initiatives and evaluated the existing competence of the corporation for the future competition. These academic consultants received knowledge from the sector, the market and the company. Sonera also directly funded some professorships at academic institutions. Hence, the collaboration was mutual. Collaboration was particularly significant in the first definition stage and the stages

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before the pilot launch. Fourth, company employees received an opportunity to participate, e.g., in the internal education program for the development of the Zed initiative. This could also promote their personal careers. Through the employees' participation in this training, the company management received and tested ideas. The corporate sponsor and the project manager acted as tutors in these training packages and reflected on the results of the exercises.

Fifth, the collaboration with the major manufacturers concerned mostly technology development and the future industry trends. This previously open mutual assistance had changed to information delivery mainly from the manufacturers to the operators. The management of Zed was especially interested in terminal development supporting data and multimedia services and applications. After the first definition stage, disappointment with the major manufacturers urged the technology management of Zed to collaborate with the minor technology development companies. Additionally, the Zed management networked their technology activities towards technology experts in the organization. Sixth, the co-operation with investment bankers and investors occurred among a group of people valuating firms based on capital and especially knowledge of finance. At this stage, one investment bank also scanned the company thoroughly looking for business initiatives. The corporate and Zed management received from this collaboration knowledge of the capital market and an efficient marketing channel when the banks promoted the company and Zed before the second share sales. Investment bankers received sector-specific knowledge from Sonera. Their common aim with the corporate management was a success in the capital market.

Decision making over Zed, as in the case of ARP, took place at multiple preliminary meetings before the actual Corporate Board meeting that officially allocated the resources. These preliminary meetings were places for the Zed project manager to sell the idea of the mobile portal to the corporate management and the representatives of the owner. The collaboration that occurred in the previous stages provided the project manager with a better and more credible mobile portal story to tell at these decision-making events, using it to buffer the development. After this, the corporate management facilitated the necessary peace to work for the development of Zed by structural means. Namely, a new independent unit was founded in which Zed could be developed. Their common interest in the project emerged from the search for growth and value creation.

This solution provided the necessary peace to work and relieved the social tensions towards that time's corporate dominant business, which had its own mobile portal and a different approach to internationalization. The dominant business did not support the development of Zed or share resources or knowledge with it. Moreover, the structural separation provided credibility and flexibility for the development. This was because the project management thought that the competences in this stand-alone business differed considerably from the competences in the dominant business. Furthermore, the state owner was eager to increase shareholder value. The corporate management took care of the collaboration with the state owners mainly via the Corporate Board. This collaboration concerned management's permission to pursue the opportunity despite the internal competition and unclear concept. This also created a social risk towards the competing corporate dominant business and the third parties associated to it. When the representatives of the state owner allocated resources while being, at least partly, aware of the uncertainty of the outcome, they took quite a large economic risk too. The management of Zed and Sonera provided the owner representatives with service-market knowledge that was otherwise unreachable for them. This collaboration was mostly one-way, taking place mainly from the corporate management towards the representatives of the owner.

When Zed was further defined, collaboration intensified considerably with the investment bank that organized the second share sales as told in Chapter 5. They also centrally affected the conceptualization and especially the story of Zed. Additionally, the development project outlined the way the initiative as a stand-alone system would be sold to the mobile operators and with whom collaboration would take place. Following this definition, the project made the technical linking. The Zed management communicated clearly that the operators would buy the intended mobile portal, even though they could not know that and were even ignorant about the needs of operators. In the development project, the sales function carried out the responsibility and practical implementation of the activities towards operators.

When the pilot of Zed was launched, its activities were networked and further intensified with the representatives of capital market. However, they surprised the managers of Zed by emphasizing the amount of activities rather than performance measures. In consequence, the activities of Zed were redefined and organized according

the recommendations of the capital market. Zed recruited employees and service development projects were moved to the control of Zed management. Thus, the strategic building activities of Zed started. Partly as a result of this, the development of Zed was further isolated from the structure of the parent company by providing it an independent status as a venture. The corporate sponsor and venture manager were the key organizational actors here. When the venture was launched to market, collaboration with the operators intensified, forcing the development of the customer market. However, the operators then surprised the managers of Zed when they did not adopt the conceptualization that Zed offered. Hence, the collaboration with operators lacked mutual assistance. The common intent was growth creation, but the lack of the mobile access background among Zed actors and in its concept were evident. Additionally, the operators to whom the concept was sold were unaware of its benefits and practical significance for their business. When the operators made preliminary contracts with Zed, they faced the economic discrepancy of an uncertain outcome. They also faced partly social discrepancy towards their own R&D units, which were outlining, starting or continuing their own mobile portal projects. Thus, collaboration was mainly one-way from Zed to the operators. When the operators did not take the offered concept, Zed had to change it and start to humbly co-operate with them. This unfolded just before the intended customer market launch. In addition, the evidence from the Messi service in the Finnish market became available. It showed that the customer market development was slower than the Zed management estimated. This also had an effect on the corporate strategy.

Consequently, the technology management of Zed had to modify the original technical solution. Additionally, it was evident that major manufacturers with standardization capacity were needed to support Zed, as the minor technology vendors were not able to standardize technical solutions or develop and implement large technology development projects. Consequently, the technology function of Zed networked its technology development activities towards major manufacturers. Hence, the collaboration with minor manufacturers lasted for a short period only and it did not become mutual. Furthermore, the management of Zed still networked activities toward the capital market, but its support started to dissolve partly because the stock rates of the ICT sector collapsed, partly because more information became available to the market about mobile portals. The capital market's support for Zed disappeared completely after its

customer market launch. Additionally, the co-operation of Zed and corporate management with the representatives of the state owner culminated at the Annual General Meeting in spring 2001. Then, the Corporate Administration Board was disbanded and the Corporate Board discharged. Besides, the venture needed support from the operators. The management of Zed hardly participated at all in seeking this support. The revenue-sharing terms in the contracts concluded were worse than expected. Networking towards consumers by efficient marketing was unseen because the capital market and the organization lost their support for the development of Zed already before that. Consequently, this further decreased the abilities of Zed management to facilitate peaceful working conditions and dissolved the impetus towards Zed's development. Furthermore, this caused a change in the corporate strategy and affected, at least partly, the resignation of the corporate managing director and Sonera's later desire to divest Zed.

6.1.4 Explicating buffering and bridging in the development of Zed

Buffering and bridging as well as their timing in the case of Zed are presented in the Tables 6.3 and 6.4. With respect to buffering, it is important to keep in mind that the dominant business of Sonera Corporation was a threat for the development of Zed. The corporate management buffered Zed by first founding an organizational unit to promote Zed and later transforming it into an independent venture. The collaboration with consultants and academics that fuelled the development of Zed continued until the impetus for Zed's development in Sonera finally dissolved.

Table 6.3 Facilitating stable working conditions in the case of Zed and the timing of its critical effect

		I CYCLE					II CYCLE		III CYCLE	
	FOCAL MANAGER	BL	DEF	DM	DEF II	PILOT	DEF	MARKE	DEF	EVIDENCE
Corporate dominant business	Corp.&proj. Managers	X	M							
Consultants	Corp.&proj. Managers	X	Bu							I
Academic consultants	Corp.&proj. Managers	X	Bu							I
Investment bankers	Corp.&proj. Managers	X	Bu							

Table 6.4 presents the third parties with whom collaboration, co-operation and networking of the development of Zed occurred. That is, collaboration and other related activities especially occurred with the corporate management, investment bankers and investors, consultants, academic consultants, state owner, manufacturers, operators and

consumers. However, knowledge sharing occurred in a different direction with different collaboration parties. Mutual collaboration unfolded with the corporate management, investment banks and academic consultants. Knowledge was mainly one-way from the development project to the representatives of state owner, operators and consumers. Additionally, knowledge was mainly one-way from the consultants and major manufacturers to the development project.

The corporate and project management were the focal actors in the collaboration, especially in the early stages of Zed's development. They took care of the co-operation with the investment bankers, consultants and academic consultants. Additionally, the corporate and project managers essentially affected when the opportunity and initiative were defined. Functional competence had to be purchased into the project until the development work could be shared in the project. After this, collaboration responsibility and practical implementation occurred at the functional level. Those responsible for the production and technology functions took care of the co-operation with manufacturers, and the marketing and sales function took care of the operators and consumers. Table 6.4 additionally reveals that the most of the collaboration relationships started already in the bootlegging stage but the collaboration with manufacturers, operators and consumers started later. Collaboration materialized in a completely different order than in the case of ARP. Namely, it first materialized as a story about the technical solution to the representatives of capital market. After this, collaboration emphasis moved to the production function. However, after surprises in the capital and customer markets, the redesigned technical solution became implemented reality and collaboration was materialized at the customer interface. Thus, collaboration changed, was emphasized and was implemented in this order. In spite of this, the managers considered the technical solution, production, and customer interface at the same time in the definition stage.

Table 6.4 Collaboration in the case of Zed and the timing of its critical effect

	FOCAL MANAGER	I CYCLE					II CYCLE		III CYCLE	
		BL	DEF	DM	DEF II	PILOT	DEF	VENTU	DEF	MARKET
Corporate mgmt	Project Manager	M	Br	M						
Investment bank	Corp.&proj. Managers	X	Br		M		M		M	
Consultants	Corp.&proj. Managers	X	Br		M					
Academic consultants	Corp.&proj. Managers	X	Br		M					
State owner	Corporate Manager	X	M							
Manufacturers	Technology function		X						M	
Operators	Sales function					X			M	
Consumers	Marketing function					X				

6.2 Materialization of buffering and bridging in the development of ARP and ZED

In this section, I deepen the previously developed understanding on how the above-described buffering and bridging activities, mainly explored and operated by the middle and corporate management, were exploited and materialized by the focal project level actors of the ARP and Zed innovations. This means that the managerial activities are considered in terms of implemented reality at the project level.

6.2.1 Focal managers and managerial activities in the development of ARP

Based on the analysis above, it has become clear that the experience and motivation of the focal project managers affected the development of radical business innovation ARP and the related managerial activities. Briefly stated, the crucial importance of the bridging and buffering activities by middle and operational management as focal actors was in their ability to protect and fuel this work. Among these focal actors, the two project managers did most of the definition work in ARP. Moreover, they also found out relevant ideas from different places around the world. The organizational sponsor for their work was the division director. These identified project managers had personal knowledge and skills gained in the planning and construction of previous technological systems. For example, the second project manager had constructed equipment and was an expert in that time's MF and HF mobile technologies. Likewise, the other division employees had knowledge of the mobile technology and customer market. Availability of this kind of knowledge made technical linking more realistic and directed action to the development of technology and the customer market.

Actually, the first project manager was central in the technical and need linking, and the second project manager had equal experience and knowledge, which clearly urged them

to emphasize economies of scale, low costs, and the importance of profitability. These cross-functionalizing principles were 'hazy' for the project managers in the definition process, but importantly, they were defined then. The cross-functionalizing principles took into account important discrepancies in the development at the levels of funding, the technical solution, production and the customer interface. These principles also implied that the system had to be simple and cheap to use and implement. Motivation of these managers to define an initiative emerged, on the one hand, from a need to legitimate and provide a long-term survival for the division's position in the company. On the other hand, motivation emerged from a technological curiosity to find out whether the technical linking was possible. The major part of the personnel were radio engineers, which also had a crucial influence. The first project manager wanted to define the technical solution. The second project manager was unwilling to do so, but during and after the first project manager defined it, she pursued the opportunity. The business unit manager was interested in the opinions of both these managers about whether they wanted to pursue the opportunity. Thus, the above suggests that the project champions' experience, motivation and technological knowledge affected the activities of cross-functionalizing, technical and need linking as well as bridging. Consequently, these managers and the principles they defined forced activities toward technology and customer market development and bridged activities to those third parties who could assist in that kind of a development.

There were several discrepancies between the qualities of ARP, the market and the technical demands that it had to meet. The first discrepancy related to the technical linking. The first project manager was able to define technical solution for ARP already at the first definition stage despite the technical competition with the fixed telephone network[163]. Collaboration with the HUT especially provided the project and the division with skillful persons. The second project manager's experience from the previous technological system and later motivation to study at the HSE had a central influence on the adoption of the profitability principle. Knowledge received from the Nordic collaboration affected the start of the definition but also provided an opportunity to compare the project's own opinions and choices to those of the other Nordic operators. In addition, a challenge for the project was to get equipment and construct the network

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[163] Direct competition did not exist instead if the technical solution can be made.

before the market pilot. Dividing work and knowledge with the manufacturers meant a cheaper network for ARP. Collaboration with the teledistricts meant efficiency in the construction, and the project was able to construct cheaper network of better quality when local knowledge became available. In addition, using the connections of the fixed telephone network made the ARP network also faster to construct. On the other hand, this work sharing diluted the opposition of the dominant business towards the development. Especially, as the work was shared at the expert level but not at the director level, this meant that the competing directors did not get their experts' support for the competing technical issues. Additionally, because persons in the ARP development project were interested in the technical problem solving, this made inventions in the functions possible.

The second discrepancy related to the funding of ARP's development. Namely, the ARP project competed for investment money with the dominant business. The organizational sponsor used a lot of effort and time to obtain this funding. Collaboration with the corporate management became essential and later with the 'telesector man' in the Ministry of Finance. Consequently, the project and division succeeded in gaining funding for its investments from the corporate and state owner, even though the other divisions opposed this. Additionally, the existence of the Radio Division as an independent unit was uncertain. Despite the numerous abolition attempts, the division survived. This was first accomplished with the influence of the Union of Telegraphers and then with the emerging profitability of ARP.

The impetus process started with the pilot launch of the ARP system. The focal managers forced activities to the customer market penetration in order to collect evidence of the development. Even though the customer was important, the attention was in the technology development. The typical mode of action was 'technology push'. When preparing for the customer market launch, the project champion still concentrated on the development of technology and production, but also adjusted the cross-functionalizing within functions. However, attention started to move towards the customer interface. Practically, this meant that the service and terminals were delivered via independent dealers. These both deviated from the way the dominant business operated and also from the ways applied in the other Nordic Countries. The Radio Division kept the service and terminals distinct. In addition, the customers were taken as

co-producers in the service production, even though 'a state authority attitude' dominated the company at that time – i.e., customers were ' recipients' and had to abide by what the division 'mercifully offered'. Yet, in the beginning the customer got many tasks, in contrast to how Telia in Sweden organized the service. The Radio Division chose this mode of operation for the sake of profitability. The consumer collaboration started with small steps and led to a disengagement from the state authority attitude. Surprisingly, the Ministry of Finance increased the service prices meaning that the project had to further force activities to the customer market. Surprisingly again, the price increase did not have a major impact on customer growth. On the contrary, it shortened the time to the financial break-even point. Consequently, ARP was able to show its profitability sooner, which then provided the final impetus for its development.

In summary, the interplay of bridging and buffering activities significantly contributed to the development of ARP. The development was possible because persons were available for the project who had created knowledge and competence collaborating and acting with the division's previous technological systems in the bootlegging process. In the definition process, the project champion defined the principles for the technical and need linking as well as for the cross-functionalizing. In this process, the focal managers started to protect and close the development of ARP more to the business unit level. Hence, buffering started to protect the technical core of the innovation development, closing it horizontally off from the competing business unit. The Union of Telegraphers protected the work first. Since the impetus process, the collaboration intensified with third parties who could assist in the development of technology and customer market. This collaboration opened the development around the technology and customer market at the operational level of the organization but it did not dilute the buffering at the middle managerial level in organization. When the customer market evidence of profitability became available in the impetus process, this closed the development of ARP completely to the division level. Figure 6.1 illustrates this. Consequently, impetus made the innovation emerge from the division level to the corporate level. Additionally, since the definition process, the cross-functionalizing principles remained practically the same and they could be incrementally added when the project management forced activities to the development of technology, and from there gradually to the customer market penetration. The increasing number of customers moved the managers' attention towards the customer interface also because dealers and customers made more contacts

with the division. Especially, the billing and accounting function and the customer service function requested the development of new organizational practices. Additionally, also the technical personnel developed a serious orientation towards customers. Thus, the development of ARP followed an incremental path where only a few issues had to be modified but nothing radically changed. Hence, the 'center of gravity' between the development activities changed from the technical solution in the definition process to the customer interface in the impetus process.
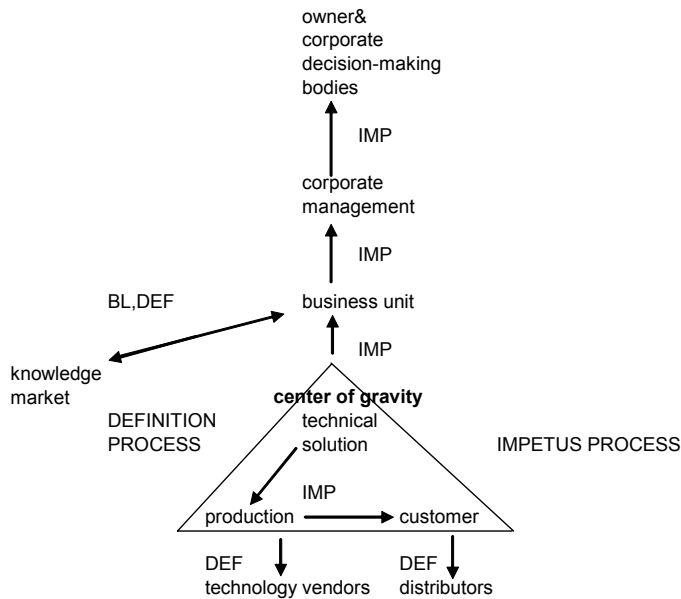
Figure 6.1 Bridging and the center of gravity in the development of ARP

6.2.2 Focal managers and managerial activities in the development of Zed

In the case of Zed, preparations for the initial public offering made the corporate management and the representatives of the state owner proactive in increasing the capitalization of the corporation. Importantly, a growth promise that the corporate management gave in the IPO triggered collaboration activities with third parties such as consultants, academics and investment bankers. Consequently, these parties had the influence that the focal managers' attention started to detach from the operational level activities aimed toward the development of technology and customer market. One reason for this was a sense of urgency, but also the experience and motivation of the

focal managers. These aspects had an influence on the kinds of managerial activities undertaken. However, the project group established, based on the experience from the Finnish market, the following cross-functional principles: "a stand-alone business is possible, operators will adopt Zed, and growth dominates profitability and creates value." Then the BU level manager became the project manager. The project group collected outputs of different internal and external forums and made the most of the definition work. In addition, ideas of similar initiatives were discovered globally. The organizational sponsor here was a corporate executive.

The knowledge of the focal managers was related to their education in international business economics and practical experience in venture capital activities. They did not have deep technological knowledge or experience of mobile or Internet technologies or systems. Motivation for the definition of Zed emerged from a need of the corporate management to legitimate and provide survival for the company's position among converging industries over the long term. In contrast to the ARP case, motivation did not emerge so extensively from the lower managerial levels. The main sources of motivation for the focal managers were the interesting opportunity, and even personal career and wealth development. Availability of this kind of knowledge and focal managers reinforced the organizational activities and collaboration with third parties who had similar kinds of knowledge and experience. Thus the primary interest of the focal managers was not to understand and estimate the realism of cross-functionalizing or technical linking aimed for the technology and customer market development. Especially when the primary challenge was the company share sales, the defined technical linking and cross-functionalizing provided adequate confidence for the focal managers. Even though the focal managers did not pay extensive attention to the operational level issues, they were able to define the cross-functionalizing principles. In addition, new technology vendors were used in the production and marketing was seen as the means to gain customers.

There were also several discrepancies between the qualities of Zed, the market, and demands that Zed had to meet. The first discrepancy related to the funding of the development. A major obstacle to Zed's development was the company's small balance sheet. The project competed for investment money with the dominant business and did not do very well in that. The managers had to invent something else. The focal

managers bridged activities to the capital market to provide more funding in order to resource the technology and customer market development. This bridging was made based on the themes of 'eyeballs', market value and fast internationalization. The management of Zed adopted the view that value-creating growth was possible and growth dominated over the profitability, which the competing business followed. The management succeeded in this. Additionally, the focal managers claimed that the rules had changed and they were even partly ignorant of technological knowledge and customer market development. That left time for them to collaborate with the representatives of knowledge and capital markets. Under these conditions, the environment, especially the representatives of the capital market, were able to affect the focal managers.

The second discrepancy related, as in the case of ARP, to the technical solution. Based on the bridging accomplished, the project manager was able to present a consistent story of the technical solution of Zed to the decision makers and the representatives of the capital market. Nonetheless, the concept of Zed was unclear. The issue was whether it was a product, service or system, and whether it was a mobile-Internet or an Internet-mobile portal[164]. The competing initiative offered incremental internationalization, but the story of Zed promised internationalization right away. As a result, the corporate management buffered the development. Most importantly, the influence on the project of the investment bank that organized the second share sales increased. The project manager forced activities to the capital market and the development of Zed emerged to the center of the corporate strategy.

The impetus process started with the pilot launch of Zed. The public took the story surprisingly well in the pilot, and the representatives of the capital market even took the story and the promise of the technology and customer market development as given in the share sales. The development was forced to the capital market and the project followed the recommendations of its representatives. The capital market even 'tore out' the story from the focal managers. This success increased the self-confidence of the

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[164] A horizontal portal changed into a network-independent wireless Internet portal in the beginning of autumn 1999. After that, the concept changed to a mobile access-independent mobile portal.

project manager and he kept on drumming the story, but the organizational sponsor started to have doubts. Anyhow, expectations of the forthcoming performance increased, and the project manager used this to gain impetus for the development. Then suddenly, the representatives of the capital market emphasized the quantity of employees and activities. The management of Zed followed. A liquidation of Sonera share was important and that created the need to provide more strategic flexibility for the managers of Sonera and Zed. When, as a consequence, Zed was detached from the corporate structure into an independent company, the use of the subsidiary's shares would evade the lock-up period of the Sonera shares, e.g., in case of consolidation. This would also dilute the state's share owning and create better incentive preconditions for forthcoming recruitments and activities. As a result, Zed was an independent subsidiary and its focal managers were able to force activities at the same time in the capital and customer markets, even though its technical solution was still under way and all the evidence derived from the capital market. During the spring of 2000, Zed managers realized that the operators did not behave as they expected but as their competitor in the organization had argued. Consequently, the cross-functionalizing and especially the technical solution had to be radically changed towards the 'walled garden' approach. Despite these changes, the collapse of the stock market turned the focal managers' attention only briefly towards cross-functionalizing and the technical solution. They still followed the representatives of capital market. Consequently, they kept their attention in that market, forced activities there and planned to use marketing as a means in the customer market penetration.

The focal managers were able to buffer the development of Zed as long as the evidence from the capital market was available. The surprising behavior of the operators diluted the buffering and impetus even though corporate management still supported the development. As a result of the operators' behavior, bridging was made to third parties that could assist in the technology development. Additionally, bridging was made to the corporate decision-making bodies in order to provide further impetus for the development. However, the dissolution of the capital market support together with the missing customer market evidence started to divest the impetus seriously. When Zed was launched to the customer market, the activities of Zed were forced to that market by publishing a significant marketing budget. The Zed project also strongly internationalized its organization. At the same time, the support of the capital market

disappeared completely. This happened only after one year since these same investors had valued Zed as being worth 100 BFIM. Moreover, challenges in Zed's technical solution, customer and capital markets together with other disputes described in Chapter 5 increased nervousness in the corporate administrative bodies. In consequence, the corporate strategy was changed but the management of Zed still believed strongly in the growth of that business initiative.

The corporate management thought that the influence and interest of the state owner in the company would decrease when its ownership in the company decreased. However, the reverse happened. The corporate decision-making bodies had meetings almost weekly and the interest of the media increased the attention and interest of the politicians toward the company[165]. Moreover, the role of institutional owners increased when the support of the capital market disappeared. The representatives of the institutions had a desire to highlight structures and positions, rather than searching for new stabilizing variables. Besides, the ambiguous situation created opportunities for intraorganizational disputes and competition. As a result, the responsible Minister abolished the Administrative Board and dismissed almost the entire Company Board. After this, Zed started to rationalize its operations and rather soon after that, the managing director of company, who was also the chairman of Zed's Board, resigned. Practically, this meant the end of the organizational impetus for the development of Zed.

In summary, the interplay of bridging and buffering activities contributed significantly also to the development of Zed. The development was in part possible because the corporate management was active, and suitable persons were available for the project who had created knowledge by co-operating in the bootlegging process and were motivated to pursue an opportunity. In the beginning of the definition process, the corporate management facilitated the definition of the initiative. Hence, this facilitation started to close a technical core horizontally against the competing business unit and

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[165] Uncertainty of politicians' careers and their dependence on publicity is a challenge for the management of a state-owned company. In addition, political power concentrates to the parties in the government and in the parties to the party leaders in the Finnish system. On the other hand, this makes it easier to communicate with them but on the other hand this is a challenge for their commitment, especially before elections, on topics that are related to a wider audience or a national property such as Sonera could be considered.

vertically downwards in the value chain. However, at the same time, in this process, the project management collaborated with third parties that could provide assistance to create growth and force activities to the capital market penetration both at the corporate and project levels. These third parties were the representatives of capital and knowledge markets. Hence, the focal managers started to close the development to the business unit level, but loosened it through collaborating activities around the development of capital and customer markets already in this process. Figure 6.2 illustrates this. Interestingly, the technology development was closed but the growth issue and customer market interface were opened. Then especially the representatives of the capital market were able to affect these different activities. This bridging to the capital market enabled the development of Zed and the project manager used that evidence to provide impetus for the development. The focal management buffered the development further and bridged activities to the customer and especially to the capital market. Surprises from those markets and more information generally available in the market diluted the support of the capital market for the project. Then the venture management bridged to those third parties that were able to assist in the technology development. When the customer market evidence became visible for the capital market, it withdrew its support completely. Because of this information, together with disputes in the corporate administrative bodies, the corporate management was no longer able to provide impetus for the development. Finally, many elements at different managerial levels changed at the same time and the focal managers lost control over the development.
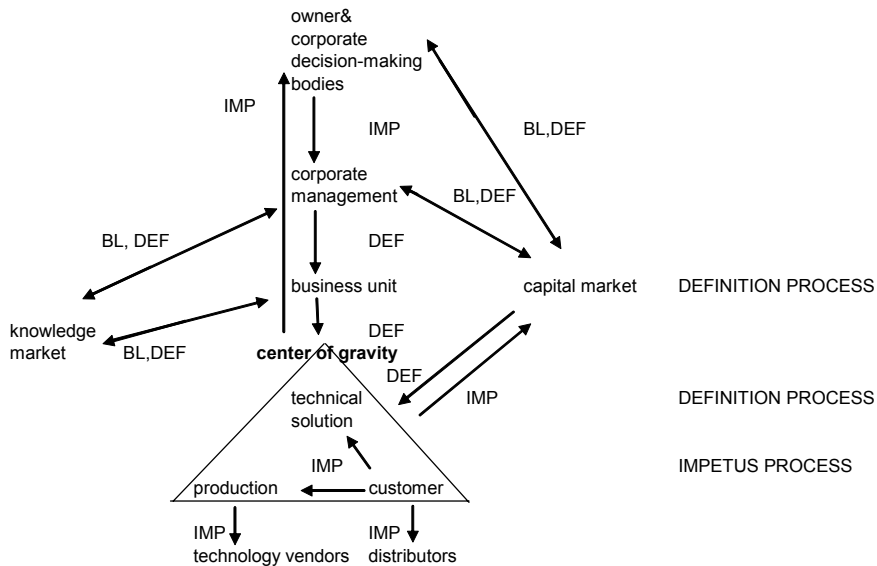
Figure 6.2 Bridging and the center of gravity in the development of Zed

6.2.3 Elaborating managerial activities

In this subsection, I elaborate on the managerial activities identified above and generalize them. I first consider how the ARP innovation would have fared in the conditions prevailing at the period when Zed emerged, and then vice versa. I suggest that active knowledge and capital markets would have certainly activated ARP's corporate management and owner. Then buffering of the development to the business unit level would have been more difficult. Also, the relatively slow development and change of attention from the technical solution to the customer interface would not have been possible, or at least, would have required major buffering. In addition, adjustment of cross-functionalizing as well as technical and need linking only for the customer market would have been challenging. Moreover, market competition would have been more severe and customers would not necessarily have taken on additional tasks from the operator as happened in the case of ARP. Hence, market competition is likely to emphasize customer- and market-driven development. Thus, an active knowledge and capital market would have activated the corporate management and owner. Moreover, together with increased competition in product, capital, knowledge and technology markets would have increased the need to buffer the development of the innovation

even more in the organization. However, under the conditions in which Zed emerged, it would not have been that easy to find a focal actor in the organization with a motivation to share information with third parties, receiving very little back in the beginning of this collaboration. Moreover, it would not have been that easy to find patient third parties with whom mutual assistance could emerge over the long term.

Furthermore, in the closed technical core the intentional or purposive manager (Bower 1970) faces a dilemma between buffering and bridging. Especially and generally, this emerges over the long term, as in the case of ARP presented in Chapter 4, when the cumulative break-even point occurred after 10 to 15 years from the beginning of the development (see also Biggadike 1979). The dilemma for the manager is the creation of a knowledge network. Namely, in the case of ARP, bridging produced a social and in a short term non-competing, network, a community of radio engineers. In this bridging, action was based on knowledge, not only on risk taking (March 1997). This meant that the common interest was to accumulate knowledge, create aspects for the development of the innovation and industrial field, and provide together meanings for them. As a result, common and distributed intentions were outlined. Inside the organization, more generally, this bridging enabled the project managers to share, identify, participate, and contribute to the corporate and process-level interests and intentions. Thus, the intentions of the project, the third parties and the corporation were close to each other. However, within the organization in the case of ARP, the knowledge base, practices and community were dramatically different on the project and corporation levels, owing to buffering and the specialization in radio technique. Hence, the dilemma can be concretized. Namely, buffering is required for the knowledge creation in the organization. At the same time, bridging to third parties is needed to create knowledge and common intentions in the bridged network. Excessive bridging takes time and attention from the knowledge creation in the organization, which then on its part, dilutes the influence of buffering. Exactly this can be seen in the development of Zed. Namely, the intentions and knowledge base, practices and community at the corporate and project levels were almost the same. They were even too close to each other, which diluted the buffering of the development. Actually, the project management was not able to create a technical core because the capital market diluted, in fact opened, this technical core. Thus no community with shared intentions emerged inside the company or with the bridged ecology of organizations. On the other hand, a unified community

and intentions between the company and the project meant that the management drew the whole organization into the bridging and exploration mode of action (cf. March 1991). Therefore, the above indicates that the corporate and project management could keep the intentions of the corporation and the strategic process close to each other, while allowing the emerging communities to be different and far enough from each other. Such communities are not necessarily only professional groups but could emerge heterogeneously around common issues such as radio engineering (see Scott 1992). Moreover, if the relevant managerial arenas are multiple, then this dilemma is present in all those arenas at the same time. Then challenges multiply in the development, as happened in the Zed case.

Second, if we consider Zed in the context of technology-driven ARP, we may conclude that the emphasis would have been more on the technology development and the state owner. This would have required more active operational level managers and a more institutionalized corporate management. At the time of ARP, it would have been out of the question for the corporate management to detach itself from the owner. Nor would the top management positions in the organization have opened as fast and as easily as in the case of Zed. The organizational culture and competitive context would have affected the development of Zed so that the basic technique would have been an issue. Consequently, not many persons in the organization would have believed that the customer could be captured solely by means of marketing. Thus, the development would have emphasized an incremental development path starting from the technology and a single business. In addition, organizing at the time of ARP would not have allowed detaching the technology development from the basic technology platforms and competence. Thus, strategy building in which persons and units are moved from the control of one director to that of another director would not have been as easy.

Both cases indicate the need for active organizational managers especially at the corporate and operational levels of an organization. However, as the Zed case indicates, if the innovation development is too strongly driven by corporate management, the process is likely to divert the attention of operational managers away from activities that aim for the technology and customer market development. The operational level issues require availability and ability from operational managers. Consequently, this means that the skills, knowledge, experience, and motives of the focal managers centrally

affect the managerial activities. Namely, the second project managers in the case of ARP were technology specialists and they later became, at least the second one, a cross-functional generalist. In consequence, these project managers could take care of functional and cross-functional issues. In contrast to ARP, in the case of Zed, the project manager was a business generalist and the development lacked functional specialists and cross-functional generalists. Thus, a technology specialist is able to evaluate and define the realistic technical and need linking, while this is unreachable for a business generalist. Additionally, a specialist is able to evaluate the relevance of information received from collaboration, which can form the basis for cross-functionalizing, as happened in ARP and was lacking in the case of Zed. Thus, the corporate management may affect the market adaptation of an innovation in the short term, whereas an operational level manager affects adaptation over the long term. Interplay between these two managerial levels is needed in order to synchronize the content of the innovation initiative, the timing of the initiative in the managerial arena as well as the speed of the development.

Furthermore, the studied cases indicate that the perceived size of an opportunity varies depending on who believes in it and what kind of experience the involved actors have. In fact, the experience of the project manager may even decrease the perceived size of an opportunity and the belief in it. Namely, the project manager in the case of ARP regarded the opportunity as small and was even skeptical about it. This was contrary to the Zed case, where inexperienced internal and external actors depicted the existence of a major opportunity. Thus, it may be that managers' experience from the customer market and technology makes organizational actors aware of uncertainties and difficulties in the development. Consequently, experienced organizational actors do not necessarily communicate strongly about customer demand or the size of an opportunity. By doing so, they keep performance expectations low. However, in both cases, the knowledge and competence of the focal managers complemented the knowledge of the other persons in the project. Furthermore, we can assume that in the world of global information, external experts are able to see opportunities for an organization but not to evaluate their realism for that particular company. This is because cross-functional and functional levels are unreachable for them.

6.3 Process model of radical business innovations

In this final section of this chapter, I connect the present study to the Bower-Burgelman process model. This section is organized according to the research questions presented at the end of Chapter 2 and presents answers to those questions following the elements of the Bower-Burgelman process model, which was also used in the analysis of the two innovations in Chapters 4 and 5.

6.3.1 Bootlegging process of radical business innovations

Research question 1) presented in Chapter 2 addressed the bootlegging process. When interpreting the ARP and Zed innovations from the perspective of the Bower-Burgelman model, we first notice that bridging to the third parties started and the necessary knowledge accumulation began already in the bootlegging process. However, these activities were not materialized before the definition process. The evidence in both cases indicates that the opportunity definition is preceded by successful activities in the market with technology systems outside the business domain of the corporation at that time. The evidence also suggests that when the bootlegging activities occurred, they could not be clearly connected to some particular radical business innovation of the future. They were necessary steps towards these innovations even though never becoming such on their own. Furthermore, the evidence indicates that in neither of the cases did the corporate management know exactly what the experts were doing. Moreover, even though bootlegging activities took place in the existing organizational structure as in the case of ARP, even the division director did not see the future relevance of that work. Thus, bootlegging activities may exceed activities related to one particular or individual innovation. The evidence from both cases supports the finding in previous literature that bootlegging activities belong to the periphery when viewed from the existing strategic context of the corporation. In spite of this, this kind of action is needed in the organization.

6.3.2 Definition process of radical business innovations

Research question 2) presented in Chapter 2 addressed the definition process. In both cases under study here, the definition process consisted of two sub-stages. The first of these concentrated on the opportunity emergence and the estimation of its realism. After

this, the pursuit of an opportunity occurred. Thus, the definition process observed here conforms to the definition process of Burgelman (1980). Buffering and bridging helped this process to materialize. The experience and motivation of focal managers influenced with whom bridging was done and how buffering was accomplished. However, facilitating stable working conditions meant a lack of resources and caused further bridging to the selected managerial arena.

Technical and need linking

Commonly, need perception activities occur in the definition process. Definition of technical linking follows that. Finally, these activities lead to the implementation of the technical and need linking. On these points, evidence from the cases conforms with the conceptualization of the existing literature. Thus, at the prescriptive level Burgelman's conceptualizations for technical and need linking are recognized to be adequate. Nevertheless, need perception and the definition of technical linking need to be made more explicit.

The evidence presented above suggests that an opportunity for an innovation may emerge from many different sources. In the case of ARP, the opportunity emerged from the existing customer need and national activities. In the Zed case, the opportunity emerged from the combination of planning and evaluations in the Finnish market, and even from a perception by the corporate management of the compulsion to innovate. The middle manager triggered the definition in the case of ARP, while this was done by the corporate management in the Zed case. These were also partly that the reasons why central managerial activities occurred at different managerial levels in the cases. In the ARP case, they occurred at the service and business unit levels, and in the case of Zed, at the business unit and corporate levels. In both of the cases, these managerial levels perceived a pressure to grow and survive. This indicates that competition triggers the pursuit of radical business innovation. In the case of ARP, competition was about resources and position in the company portfolio of businesses, as well as about a threat that the other participant in the distributed monopoly would receive permission to define and implement the system. In the case of Zed, the competition was in the product-market but also in the context of mergers and acquisitions of companies.

Next, the opportunity became realistic for the organization when someone in the organization estimated its realism based on whether a technical solution can be made, whether the organization has the required competences available, and whether there are external competences to access or mobilize in order to make the technical solution. This supports Burgelman's observation in his ICV study that an opportunity opens for the organization only via the technical solution. In the case of ARP, the first project champion outlined the realism of an opportunity and also later defined the technical solution. In the case of Zed, a team led by the middle manager did these evaluations. In the both studied cases, the strategic initiative had its basis in the existing technical solution and technological knowledge rather than in a completely novel technical solution. The existing technological knowledge was discovered and combined in a complementary ways into the existing technical solution, and inventions were made during this process. Then this solution was offered to a market need, as also Burgelman (1983) observed. Hence, customer need recognition is important but not as sufficient in itself, as Von Hippel (1973) suggests. Actually, customer need is only one factor among the others. This has also been recognized by McGrath and MacMillan (1995), who have suggested that opportunities are realized in different ways for technological forerunners and laggards.

In other words at the descriptive level, need-linking takes place first as an estimation of an opportunity followed by the technical linking if that opportunity is realistic, i.e., if technological knowledge and success of the previous technology systems exist. Thus, in the first sub-stage of the definition process, *need perception activities involved the matching of a new or recognized, but poorly served, market need to the market success of technological knowledge, a service, or a system.* After this, *technical linking activities led to the discovery or collection of external and/or internal pieces of technological knowledge to define solutions for new, or known but unsolved, technical knowledge*[166]. Technical and need linking became implemented reality only in the pilot or market launch stages at the descriptive level.

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[166] These are applied from the definitions of Burgelman (1983).

Pursuit of an opportunity

The presented evidence suggests that cross-functionalizing occurs in the definition process. The second project champion defined these principles in the case of ARP while a project team led by middle manager made these definitions in the case of Zed. In the ARP case, the first project champion did the technical linking and the second champion defined the cross-functional principles to force activities to the customer market.

In relation to the Bower-Burgelman process model, the main novelty of the present study at the descriptive level can be found in the relation between the focal managers' use of time and attention for activities aiming to penetrate into different markets. Additionally, bridging occurred toward those third parties who could assist in forcing activities to these different managerial arenas. In the development of ARP, resources were mobilized for the development of the technology and customer market and activities were bridged to the third parties that could assist in these developments. In the development of Zed, resources were mobilized also for the development of the capital market and activities were bridged to third parties who could assist in that market penetration, as described in Chapters 4 and 5. Thus, cross-functionalizing and bridging directed activities to different arenas in the studied cases. Based on this, I suggest that *cross-functionalizing takes place at the service unit level and involves commercially oriented activities directed by the cross-functional principles to get a strong foothold in the customer market with the concept defined by the 'project champion'*. Hence, the search for commercial market success for an individual business is suggested to also involve cross-functionalizing. This is suggested to complement Burgelman's strategic forcing at the descriptive level. He suggested that activity unfolds in the impetus process. Burgelman defined (1980, 260) strategic forcing thus: "Strategic forcing takes places at the venture manager level and involves intensive commercially oriented activities to get a strong foothold in the market with the product, process, or system developed by the "product champion".

Decision making on radical business innovations

Research question 3) presented in Chapter 2 addressed decision making. In the innovations examined, decision making was found to be a relevant and necessary stage

for the development of innovations largely because the project manager must pay attention to the story, the internal selection and evaluation of the development in order to pass this stage and receive permission to go on with the pursuit an opportunity. However, Bower (1970) found out that all the projects that reached corporate decision making passed it and were funded. This was also the case in ARP and Zed. Both studied cases indicate that the opinion of the project manager is more significant than the opinion of the business unit manager in terms of whether an opportunity will be pursued. Additionally, if the managers presenting a story are persuasive and consistent, the capacity of decision makers is not enough to evaluate that story. Consequently, the corporate management is not able to choose and actually, choice of innovation takes place at multiple stages and levels in the organization (see e.g. MacMillan 1987; Fligstein 1990; Pettigrew 1990; Pantzar 1991; Hart 1996). A dilemma exists here. Namely, the project management can choose in the early stages of the development, but not in the later stages when corporate management can choose. Commonly, this is because in the beginning of the development, the circumstances for choice are more simple or straightforward than in the later stages. As also the previous literature has discovered, when multiple stages take place, resource mobilization and allocation face an increased number of challenges, political activities increase and divergent interests emerge. Thus the circumstances for choice become more complex and multiple choices have to be made. When innovation reaches the higher managerial levels and the radicality of the initiative is diluted, then corporate management can choose. Thus, at the prescriptive level, decision making is not a significant process in the early stages in a process of radical business innovation.

A story for the innovation initiative was developed in the definition process in both studied cases. This story must be easy to communicate inside and outside the organization. The project management took the story to the decision-making bodies when the technical solution, market penetration, cross-functional and resource allocation principles were outlined to some extent. The evidence from both cases indicates that only one theme or aspect can be provided as the main content of the story. In the cases, this theme was the factor that differentiated the initiative in the industrial field. In the case of ARP, it was technology, while in Zed, it was the capital market. This observation conforms to Burgelman's indication that entrepreneurial activities during the definition process are evaluated based on quality, especially on how clear the

intention is (1980, 256). It may be that in a complex environment actors do not know which of many topics they should pick up, or are able to pick up, or do not want to pick up. Perhaps they do not know what to do with the topics or do not have the competence to make anything out of them. Additionally, this may be due to bounded rationality as well as attention, time, communication, or the diffusion and management purposes of a story (March 1994a; Grove 1999). Bounded rationality may also emphasize consecutive instead of simultaneous action (Cyert and March 1963). However, I suggest that the factor that is emphasized depends on the industry, organization and situation (Burgelman and Grove 1996).

Resource allocation in both cases occurred based on the corporate investment criterion of that time (Hart 1996). However, in the case of ARP, this was more rhetorical because the focal managers intended to follow the profitability criterion but they did not reveal this. Thus, this 'hidden or tacit internal criterion' was clearly different from the cost criterion that the corporation and owner followed. Moreover, the external market criterion was costs as defined by the representatives of the state owner. This external criterion changed to profitability after the mid-1980s. In contrast to the ARP case, in the case of Zed, the external market selection was capital market driven growth. Zed's project management adjusted the internal resource allocation to this external selection criterion. When the market selection changed, the project management had to change the internal selection, too. Therefore, an internal criterion that the project champion adjusts to the emerged external criterion provides an even better precondition for the further development of innovation. This also places pressure on the project managers concerning what they tell and promise, i.e., what is the criterion by which the story is and will be evaluated and the period during which this evaluation will take place.

The capacity of managers who pursue an innovation and the capacity of decision makers evaluating this pursuit is an issue to consider generally. This refers to their availability and ability to evaluate the content of an initiative, appropriate timing, and the ways and arenas in which innovations will be pursued. The presented evidence suggests that a realistic estimation of an opportunity and an initiative takes place at the operational level in an organization. Timing is hard to predict because development without action is impossible. Consequently, the timing is never optimal. When an innovation meets the institutional-level arenas, then higher organizational levels are

needed (Laurila and Lilja 2002). Moreover, the development is full of surprises and unintended consequences. Then the competences and experiences of intrapreneurs and decision makers provide a good starting point for the development, not necessarily more. Especially, when the development is full of hard work and surprises, then experience accumulated in the history, especially of technology, is likely to decrease the ability of decision makers to evaluate an innovation initiative 'open mindedly'. However, it may be even more harmful for the development if the management levels with no previous experience expect the development to take place in a linear way.

6.3.3 Impetus process of radical business innovations

Research question 4) presented in Chapter 2 addressed the impetus process. The presented evidence suggests that the evidence of market development is an important basis for impetus for the radical business innovation process. Over the long term, the evidence from the customer market provides the most certain impetus for the development compared to the evidence from other markets. Technical and need linking, cross-functionalizing and strategic forcing are tested, developed and adjusted with the evidence from the development of the technology and the customer market. Market pilot triggers the search for this evidence of an innovation development as a single business. Market launch provides further impetus for the development. Modifications to an initiative may make the incremental development path more obviously than if major changes have to be made. If radical change to an initiative is not needed, then an innovation may develop as a single business longer or move to the multi-business stage faster. Consequently, strategic building takes place after single business development and then the focal managers may pay attention to these more abstract issues. This is in line with what Burgelman (1980) identified in his study. Moreover, in neither of the cases, acquisitions took place but they are seen as completely possible.

7 CONCLUSIONS

7.1 Summary of the study

This study has focused on two radical business innovations of the major Finnish telecommunications company Sonera. The main interest in the study has been to describe how these two radical innovations emerged and developed in the specific and different corporate environments in which they were embedded. Particular attention was paid to explore and specify managerial activities during these innovation processes and their contribution to the innovations[167]. The managerial activities were studied using a longitudinal comparative research design[168], which served to challenge existing concepts and generate new ones based on original field-study data.

I first present three general points that the study suggests to warrant. First, the study reminds us that innovations are strongly related to the situational circumstances in which they emerge. This is the case simply because the innovation needs to be adjusted to the organizational and competitive context of its time. Moreover, the processes of their development are complex and locally adjusted. It is thus seldom possible to identify unidirectional or universal forces that determine their fate. Second, in contrast to the previously common belief that an organization can develop an innovation all by itself, this study confirms that the development of innovations is embedded in the ecology of interdependent actors involved. This co-operation must be sustained for a relatively long period because the development of feasible technological solutions and markets take time. These aspects are especially crucial for innovations in the telecommunications industry, which are characterized by a complex technology infrastructure. Third, the study suggests that Finnish telecommunications operators have traditionally searched for new businesses through technological innovations, which they have adopted and implemented in the Finnish market. In this context, Sonera's organizational culture favored technical experiments that resulted in novel

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[167] The more explicit research questions of the study are presented in Chapter 2.
[168] Chapter 3 describes the methodology of the study.

telecommunications technology, which was, however, only seldom commercially successful. Furthermore, despite the fact that Sonera was a state-owned company, it proved capable of producing major innovations in its field. In general, this is an indication of the intrapreneurial capacity of the Sonera Corporation and the central role that the Finnish State has had in the birth of the Finnish telecommunications sector, as has also been the case in other industrial sectors (cf. e.g. Särkikoski 1999).

When viewed from the perspective of previous innovation management literature the study warrants several further points. Most importantly, the study indicates that the managerial activities that have been labelled buffering and bridging in this study shed new light on the strategic activities identified already in the widely known Bower-Burgelman process model (Bower 1970; Burgelman 1983, Burgelman and Sayles 1986). Buffering and bridging are also used as an explanatory perspective on the studied innovations in the Sonera Corporation. This study especially calls for a balance between these buffering and bridging activities. For example, the evidence presented above suggests that bridging is more critical in the bootlegging process and buffering in the definition process of the innovation development. Besides, both of them are critical in the impetus process. Buffering creates and closes a technical core in which focal managers are able to define principles for the managerial activities needed to bring the innovation in focus into fruition. In this technical core, bridging activities are required to create a group or community of persons with sufficiently similar or congruent sources of motivation, experience or intentions. This allows them to reciprocally assist one another in developing the market and providing further impetus for the innovation in question.

These general claims were supported by the observations on the two innovations presented in Chapter 6. For example, the development of ARP was possible because the operational and middle managers involved buffered it from the immediate requirements arising from the business unit level. In this technical core, buffered to the operational level of the organization, the operational managers bridged the development to those third parties that were able to assist in the development of the technology and the corresponding customer market. We found that a single operational-level project manager was able to accomplish the technical- and need-linking activities on the basis of the existing organizational competences and motivation in the business unit. A single

manager also had the ability to cross-functionalize and begin to force the innovation development gradually from the technology to the customer market penetration. In contrast, the development of Zed was shown to be possible in the early stages of development especially because active individuals in the corporate management buffered the development of this innovation from external interference by forming a separate business unit with sufficient autonomy. In this technical core, the middle and corporate managers bridged the development of the innovation with third parties that were able to assist its growth with the resources from the capital market interests of that time. More explicitly, the management opened the capital and customer market development but closed the development of technology market. However, as told in Chapter 5, then the representatives of capital market surprised the focal management of Zed, who then followed and increased Zed's structural autonomy. The focal management bridged activities at the same time in the capital and customer markets, even though its technical solution was still under way. Then the customer market surprised the focal management. Consequently, the cross-functionalizing principles and especially the technical solution had to be radically changed. Only then were the activities bridged to third parties with the capacity to assist in the technology development. Despite the collapse of the stock market, focal managers followed the representatives of the capital market and failed to turn their attention towards cross-functionalizing or the technical solution. The customer market launch was delayed and the market did not develop as expected. The delivered performance did not meet the high expectations of the bridged capital market. Their support and assistance to the development disappeared. As a result, the corporate management was not able to provide impetus for the development of Zed. Finally, Zed was divested.

Considering the balance between buffering and bridging in the emergence and development of innovations, it seems that bridging to third parties is especially crucial in the bootlegging process of the innovation development. There are multiple relevant forums, and the flow of information in this process is mainly one-way: from the external sources towards organization. This is because such bridging increases the capacity of the future project management at the operational level of the organization. When an opportunity for a radical business innovation involves several sources, many organizational actors may recognize it but an individual active operational level manager is needed to define an initiative and the principles for mobilizing resources in

the different operational functions and among third parties. Moreover, the definition process needs to deal with principles for technology, production and customer development. Furthermore, at this point, it is advantageous for focal managers to have peace to develop the definition and to present a sufficiently simple and communicative story of the initiative for the decision makers. This kind of a story contains only one theme or aspect as its main message. If the presentation is sufficiently persuasive and consistent, the capacity of the decision makers may not be enough to allow systematic evaluation of the initiative. As far as buffering activities are concerned, they were also found to allow forcing and building the innovation on the additional resources and knowledge provided by the third parties and to provide more impetus for the innovation development. However, gaining impetus presumes that managerial attention is divided among only a limited number of managerial arenas. In the impetus process, the balance between buffering and bridging is emphasized, because it is essential to open the buffered technical core in order to shift from a one-way flow of information from the focal organization toward mutual knowledge exchange. Moreover, opening makes it possible to create the innovation development group or community.

7.2 Extensions of the study to the innovation process literature

As already noted, the contribution of the present study lies especially in the fact that it focuses on the emergence and development of radical business innovations as an interplay between managerial buffering and bridging activities. These activities have been examined here in the form of a detailed empirical research on two innovations that have been initiated within the same company. As acknowledged in Chapter 2, buffering and bridging are not novel concepts. Nevertheless, as also discussed there, literature largely lacks studies that, like the present study, explicate how the processes that these concepts refer to affect the process of radical business innovations. Thus, by empirical studies such as this one it is possible to illustrate and further extend our understanding of these managerial activities and the concepts with which they are addressed. Additionally, the study describes how buffering and bridging materialized during the development, and how the 'center of gravity', as it was called in Chapter 6, moved during the development of the innovations. Buffering and bridging not only explain the objects studied, but also illustrate the role of the interplay between the two activities. This interplay can be seen as a combination of, rather than as a choice between,

reducing the need for information processing in an organization or increasing the organization's capacity to process it (Galbraith 1973). It can also be viewed as engaging in boundary setting and boundary spanning at the same time (Thompson 1967).

As examples of the more specific contributions of the study, I would like to bring up the illustration of the iterative cyclical development in which the simultaneous and consequential processes of definition and impetus of the radical business innovations take place. Additionally, this study indicates that the operational-level cross-functionalizing performed by the project or service champion is a value-adding managerial activity in radical business innovation that has not been sufficiently addressed in the previous substance-based literature. This finding sheds more light on the role of the operational level management in the innovation process. It also emphasizes the project manager's role in joining functional specialists and cross-functional generalists at the operational management level. The operational level can be considered the most important one for the innovation development, especially as the study indicates that the development activities in the early stages of the innovation continue longer than the existing literature has recognized (cf. Kanter 1983). At the same time, the study confirms the usefulness of the Bower-Burgelman model and other related studies as a perspective, which serves especially to conceptualize innovation as a joint activity of actors representing different management levels and functions.

The present study can also be linked to the variation, selection and retention framework that is commonly used in the study of development processes of and in organizations over time. For example, the study indicates that in the early development stages of innovations, organizational actors may be able to formulate and select the principles on the basis of which they may pursue the opportunity that the innovation has offered[169]. Strategic activities in the definition process create variation, many persons at different

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[169]In the discussion of the development over time, as told in the Chapter 2, one central issue is an evolving relationship between organization and its environment (Hannan and Freeman 1984; March 1994b; Barnett and Burgelman 1996; Van den Ven et al. 2000). The environment determinism concept in population ecology and the organizational memory concept in organizational learning call into question organizational actor's ability to select or change environment. This is in line with the argument of Van de Ven et al. (2000) that neither learning (based only on people's awareness) nor punctuation (environment-based adaptation) function sufficiently well as organizational adaptation mechanisms.

development stages select, and the iterative process unfolding at the impetus process provides retention for the development. Thus, the issue in the development process is neither one of natural selection nor a completely rational selection, but instead a process in which imperfect humans with imperfect information may come to produce more from less. Hence, the study somewhat contradicts, for example, the argument by Barnett, Greve, and Park (1994) that a successful innovation is likely to result in more hierarchical structures, which then slow down learning and the development of new practices in organizations. The evidence in the present study suggests that buffering and bridging activities may provide sustained fuelling and sheltering for innovation development. Hence, it is the balancing between these activities that may provide a means to hinder the accumulation of hierarchy and inertia in the organization over the long term.

7.3 Avenues for further research

In general, the present study should be taken as an indication of a need for more research on managerial activities in innovation processes. In particular, more field-based studies should be made that apply longitudinal and comparative research designs. Such designs are especially helpful in the further conceptualization of buffering and bridging activities involved in innovation processes. These activities could then be studied at multiple levels and units of analysis, both in corporate and other contexts such as SMEs and start-ups. These kinds of studies could provide surprising similarities among managerial activities in different contexts, even though common knowledge presumes differences (see Van de Ven at al. 1999; Sine, Mitsuhashi, and Kirsch 2006). For example, Sykes and Block (1989) have found out that the application of mature companies' practices to the management of new corporate ventures is not only inappropriate, but breeds failure. However, this may not be the case if the managerial practices of radical business innovations are applied. Furthermore, propositions produced in qualitative studies could even be quantitatively tested. Besides, as this study indicated that the center of gravity within the organization that materialized the innovation changed during the development. This change also affected the direction and content of knowledge flows in bridging. These are also issues that could be studied more also in the other contexts.

As far as the buffering and bridging activities are concerned, we may expect that they can and will be connected to several other areas that were beyond the scope of the present study. Most importantly, buffering and bridging could be studied more as mechanisms involved not only innovation but also more generally in the organizational adaptation against different kinds of competitive forces during different kinds of development processes. Then it could be recognized that these mechanisms may provide means for an organization to increase or decrease the immediate and even potentially harmful effects of competition on different managerial levels. For example, Lamberg and Laurila (2005) interestingly found that the protected conditions of the Finnish paper industry firms encouraged their management to take risks, prefer growth, and overall to adapt to long-term strategic goals instead of market-driven short-term objectives. Additionally, as identified in this study, the capital market may have surprisingly vital effects on innovation processes. However, managers in an organization cannot avoid taking seriously the issue of competence development over the long term. Thus, organizational adaptation can be perceived as "two sides of the same coin" with different kinds of consequences. This means that an organization can be perceived as a unit for either capital accumulation or competence development. The first view emphasizes that owners and investors should take the entire organization to the bridging mode of action especially when the external market favors growth. The second view encourages corporate management at lower organizational levels to organize situations and time for competence development with buffering. This idea is in line with the argument by March (1988) that if an organization has the courage to select slow adaptation when others select fast adaptation, then that organization has an advantage over other organizations. As a result, the premise is that knowledge-intensive companies should stay in the knowledge-based competition, rather than plunge into time- and risk-based competition (March 1988). Then, in terms of this study, an interest should be to produce knowledge through an interplay of buffering and bridging in different kinds of projects with different aims over different times. For instance, the way in which managers create variation for organizational product-market knowledge may later be used to discover competences that can be combined with the knowledge of the capital market.

One avenue for further research is to use buffering and bridging as processes to increase managerial capacity for the long-term strategy-making issues in organizations. These

processes could be used to combine induced and autonomous strategic activities for incremental and radical innovations in organizations. Buffering and bridging could also provide some other ways for a corporation to increase its absorptive capacity (Cohen and Levinthal 1990)[170] than by locating it in a corporate R&D function. These managerial mechanisms could be useful to balance between the uncertainty of the environment and the requisite variety of the organization. For example, when uncertainty exceeds requisite variety, then decentralized buffering to lower organizational levels and smaller units that have better possibilities to bridge may increase the absorptive capacity of the organization to balance with the environment uncertainty (see Lynn 2005). Buffering and bridging could also be used to combine the conceptualization capabilities of intrapreneurial talent, which usually reside in the R&D function, with the implementation and execution of competences, which are usually found in the operational part of the organization. Nevertheless, more field-based longitudinal studies of these kinds of processes are needed. Deeper understanding could also create companies that really have the capacity to change their strategy and move towards becoming competence-based flexible organizations.

With respect to previous research on intra-organizational ecology (e.g. Burgelman 1991; Lovas and Ghoshal 2000) several further can also be expected in future research. For example, previous strategy-making and exit studies have argued that it is important for managers to adjust the internal selection to the external selection environment in different cycles of innovation (e.g. Burgelman and Välikangas 2005). The present study suggests more studies also in the relation to the emerging external selection environment. Moreover, this study suggests that more substance-based studies of decision makers' capacity to actually handle these processes are needed. Official and unofficial meetings are moments when decision makers are able to make interventions

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[170] Cohen and Levinthal (1990) studied the effects of organizational characteristics on the ability of organizations to generate innovations and technological change in a turbulent environment. They see R&D expenditure as an investment in the absorptive capacity of an organization. They argue that an organization's ability to evaluate and utilize external knowledge is related to prior knowledge and expertise. This prior knowledge is driven by prior R&D investment. Thus, even when R&D investment leads to spillover of knowledge into the environment, it may still be functional, as this investment leads to an enhanced ability to absorb and learn. Thus, absorptive capacity is a path dependent. This means that if a company is missing the knowledge base derived from a prior R&D investment, it may get locked out of critical capabilities in turbulent environments.

either to push forward or prevent the pursuit of an innovation[171]. In fact, a multistage parallel and simultaneous process view of radical business innovations highlights the importance of combining information with action at all management levels, including also the corporate level. This requires that all decision makers have some extent of 'hands-on' involvement in a development project in allowing them to distinguish between knowledge from information. These processes, however, have not at this point been exhaustively studied. Studies such as the present emphasize the necessity for researchers to build close contacts to the organizations in focus in order to make observations of such occasions.

Finally, studies of technological discontinuities (Abernathy and Utterback 1975) argue that the development of an innovation takes place in the form of several consecutive life cycles or S–curves. Accordingly, the take-off of an innovation occurs from the previous curve to the next one. The present study suggests that there are also similar take-off points within the life cycle of individual technological system such as ARP. Thus, a single S-curve is suggested to contain multiple iterative cyclical processes. Besides, the research process indicates that several consequential technological life cycles or systems may follow each other before an individual innovation joins the core of the corporate strategy. This is only one example of the kinds of development processes that deserve attention in future research.

7.4 Implications for the management of radical business innovations

This study suggests that a flexible organization has managers who are able to manage radical business innovations. They explore growth opportunities for radical business innovations to materialize them over the long term, and they develop and exploit new sets of organizational practices in the short term by continuous buffering and bridging activities. Hence, managers in a flexible organization balance between these two kinds of managerial activities. More explicitly, this study indicates two central managerial challenges for the management of a radical business innovation development.

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[171] Among others, Christensen and Bower (1996) have searched for opportunities for managerial interventions in the organization during an innovation process.

1) Buffering and bridging the development of radical business innovations

2) Forming administrative principles addressing iterative cyclical processes of radical business innovations.

Next, I outline what kinds of managerial implications this study provides for these two challenges at different managerial levels in the different processes of the innovation development.

7.4.1 Bootlegging process

Bootlegging activities are necessary steps towards radical business innovations. Thus, organizational managers need to launch and sustain different kinds of exploratory activities, even though they do not know exactly where these activities might lead in the future. Collaboration with internal or external third parties is the core managerial activity in this process. Organizational managers need to collaborate with third parties, who can assist the organization in the later processes. In fact, collaboration combines market, technological and administrative knowledge. In both the cases studied here, an opportunity emerged from the market, technology development was based on the existing technical solution and the knowledge used in cross-functionalizing was emerged in this process. It is thus important to develop the organization's absorptive capacity and knowledge base in order for organizational actors to be able to realistically estimate opportunities and initiatives and to be able to pursue innovation opportunities. Furthermore, this is the process for educating the future project and organizational champions needed to implement activities in the forthcoming processes of radical business innovations.

7.4.2 Definition process

The definition process of innovations refers to the organizational capacity of the project champions and their abilities and capabilities to define and pursue an opportunity for an innovation. In this study, this capacity was found to be crucial for the emergence and development of the innovations in focus. At the corporate management level, a critical management task identified was the use of time and attention for uncertain opportunities and initiatives and hence for understanding and allowing search at different managerial

levels in the organization.. Additionally, a major concern for the actors at the corporate management level is to identify intrapreneurial talent in the organization and develop their knowledge, skills and attitudes for the innovations of the future (see, e.g., Quinn, Anderson and Finkelstein 1996). At the business unit level, the above means that middle management needs to allow flexibility for the lower-level managers' work in relation to the emerging opportunities and initiatives. The difficult task for middle management is to evaluate and integrate the present practice and competence development with the future opportunities. At the operational management level, this means at the same time the development of skills in techno-economical problem solving and also the formation of administrative principles for pursuing opportunities, which are more political in nature.

Buffering turned out to be the core managerial activity in the definition process, which emphasizes intraorganizational knowledge creation. Then the management should find means to provide peace to work and identify who are the most essential third parties with whom to collaborate. When cross-functional principles are developed in the process, also issues of the content of an initiative, the timing of its market launch and the speed of market development can be considered in a way that enables the materialization of an incremental development path.

Decision making

This study provides further evidence of official decision making not being the most critical process for the development of radical business innovation. However, this study indicates that buffering and bridging may provide a means for top management to manage radical business innovation. Moreover, there are issues that management should consider when making choices at multiple levels and occasions in the organization during an innovation process. This study especially suggests that adjusting internal selection to the emerging external selection criteria provides time and legitimates the development of the innovation at their early stages. Practically, this means that actors at corporate management levels should evaluate and study different internal innovation selection criteria and consider their adjustment to different external markets over the short and especially over the long term.

This study also indicates that actors at the different managerial levels face a challenge to estimate what is a reasonable technical solution and what are appropriate cross-functionalizing principles for an emerging business opportunity, also considering the capacity of the managers pursuing this opportunity. These are aspects that those who have the power should consider when choosing members for corporate boards and managers for top and middle management positions. People in such positions are especially challenged as the business initiatives based on specific technological knowledge are communicated to them in the form of 'stories' when they cannot be discussed with the specific technical terms. Additionally, if an initiative for an innovation has already received the approval of middle management and if the managers present the innovation story consistently and persistently, it is highly difficult for the ultimate decision makers to challenge them.

7.4.3 Impetus Process

The present study confirms the previous finding that the project management of an innovation has difficulties to gain support for such a long process that a radical business innovation development requires. In the early development stages, project management follows a quality-based criterion while searching for the economies of scope for a single business. In the later stages of development, venture management follows size in all of its forms, as the previous literature (Burgelman 1983) suggests, when searching turns to economies of scale for multi-business. The present study found that evidence from the customer market facilitates such sustained long-term support. This then provides grounds to suggest that in order to enable emerging innovations to develop, management should especially rely on buffering and bridging activities at the company, business, service, and process levels of their organization. In contrast to the short-term measures, such activities can eventually lead to the accumulation of capabilities and competences in and between the functions of R&D, production and marketing and the individual business units over the long term. Such development could also be complemented by competence acquisitions especially when the company in question is in a need of, e.g., precise technological knowledge. For example, Nokia Corporation conducted these kinds of operations in the late 1970s when it was in need of new competences in the businesses of mobile terminals and networks.

This study also indicates that the innovation process will go through multiple cyclical process over the course of an innovation. However, it is difficult to know in advance the exact affects and outcomes of this process. This applies especially in turbulent environments (McGrath and MacMillan 2000; Chesbrough 2000; Liebeskind 2000). Then, different kinds of innovation cycles that offer different kinds of opportunities should take place in an organization all the time. These cycles can be attached to processes, services, products or systems. Some of them have operational, some strategic relevance. Especially, ideas originating from the top management are seldom strategically important. In contrast, ideas originating from the corporate 'periphery' are more likely to be the ones that provide a competitive advantage for the company over the long term. This is largely because in such processes many different actors think, act, and reflect on the necessary activities and their results. Thus, the management of the innovation and operational systems of the corporation should prepare to go through and participate in multiple parallel and consecutive cycles of innovation.

Hence, the complementary nature of the competences needed to produce radical business innovation indicates that it may be advantageous for the company to have several business units operating in specific domains. Other similar units are important reference points with which managers pursuing a specific innovation can compare innovation principles[172]. On the other hand, this provides for the corporation a business portfolio in which each business spurs the other. Furthermore, in such companies, as this study indicates, one managerial tactic for the development of radical business innovation may be to create a common intention promoted by separate development groups across formal managerial levels. Moreover, the corporate management may close the organization or a part of it at some point in time, and within this closed core open it towards third parties. Additionally, at some other point in time, this closed part can be opened to diffuse the created knowledge or to create new closed cores in the organization.

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[172] At least three almost as strong businesses have existed in the Sonera Corporation since the 1960s. In those early days, the businesses were long distance telephone, telegraph and radio communications. In the late 1990s, the businesses were mobile communications, data and media communications and fixed telephone.

7.5 Final remarks

In its entirety, the present study should be taken as an indication of corporations being embedded in the techno-socio-political environments in which they operate. The past, present and the future of the corporation may create opportunities for it but they also create practices and competences that may hinder the building on these opportunities. Despite the fact that some corporations, or even the environments in which corporations are embedded, have better resources, cultures and positions for such innovation, the study reminds us that 'the spirit of an intrapreneur' remains a critical driver towards radical business innovations in a corporation. The study also reminds us that administrative systems to promote innovations can be built in the corporation but it depends on the balance between the overall operational and innovation systems whether these innovations will develop over time. This means that a corporate management acting like an investment banker and cutting the leaves of the corporation only to the operational system will not succeed over the long-term and is eventually doomed to put 'its hands on the mud' with radical business innovations. It cannot, however, be too much emphasized that even though this study has outlined some aspects relevant in building such innovation systems within corporations, there are limitations to such an endeavor. Every organization faces continuous uncertainty. The only means for a company to survive over the long term is to create organizational capacity in managing radical business innovations. That kind of an organization has an ability to flexibly adapt to autonomous and induced innovation processes, incremental and radical innovation initiatives, adopting and adapting activities, being market driven and technology pushing as well as acting as focused and diversified. As a result, uncertainty always has a role also in these processes. The main management challenge, therefore, is to work for innovations keeping in mind that innovations are impossible without luck. However, if a manager only waits for such luck, the inherent uncertainties never turn into certainty. I hope that this study, together with the previous studies in the same domain, provides a good starting point for the building of further understanding of radical business innovations and the building of capacity for such innovations in organizations.

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APPENDICES

Appendix 1 Name history of the Sonera Corporation

Sonera Corporation	Name used in this report
The Telegraph Office of Finland	1917 - 1927, State organization
Posts and Telegraphs of Finland, later Posts and Telecommunications of Finland	1928 - 1989, State organization
Posts and Telecommunications of Finland	1990 - 1993, Uncorporated state-owned enterprise
PT Finland	1994 - June 1998, Ltd., with two main subsidiaries Finland Post and Telecom Finland
Telecom Finland Group plc	July 1998 - Jan.1999, Demerger, telecommunications and postal functions separated
Sonera Group plc	Jan.1999 - Sep.1999, Name change
Sonera Corporation	Oct. 1999, Merger with subsidiary, name change after this
TeliaSonera Finland	Spring 2002 Name change, after Telia acquired Sonera

Adapted from the Ministry of Transport and Communications Finland, 2003

Appendix 2 The Finnish TELCO market in the end of the 1990s

The Finnish telecommunications operator (TELCO) market consisted mainly of Sonera, Elisa, Finnet and Saunalahti in the end of the 1990s. Sonera was a state-owned company. Elisa was a public company operating basically in the Helsinki region. Other local telephone companies in Finland formed the Finnet Group. Elisa owned Radiolinja and Finnet DNA, which both operated 2G mobile networks. The biggest privately-owned mobile service provider in the early 2000s was Saunalahti. Elisa acquired it in 2005. The total gross revenue of the Finnish TELCO market was about 4719 million euros in 2001 (MINTC 2003, 9). Sonera alone had almost 50 % of this market. Elisa had one third, Finnet one seventh, and all the entrants together 7 %. Figure 1 shows market share by sector[173].

Big differences existed in the mobile and national fixed sectors. In the mobile communications, the market share of Sonera was over 60 %. For example, on 2nd December 1997, Sonera had 66,5% of the users and Radiolinja 33,5%. However, this was not the case when competition started and GSM was launched to market in 1992. Radiolinja's market share was almost 70 % then, but dropped to 45 % already in 1993. Elisa and Finnet were like the 'Baby Bells' in the US market, which practically had monopolies in their regions around the local fixed network. Sonera's growth had been mainly organic. Sonera focused on the mobile communications and was the market leader in that sector in Finland. Elisa's growth was a combination of organic growth and takeovers. The Finnet group had grown, but also diminished due to takeovers. New entrants had mainly started from scratch.
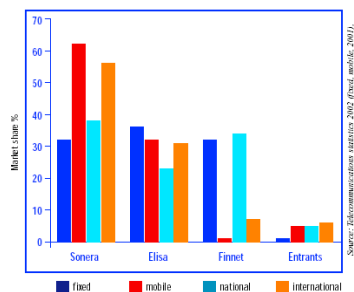
Figure 1 Market share by sector (MINTC 2003, 9)

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[173] Market share for fixed and mobile is based on connections, market share for national and international long distance traffic is based on traffic distribution between fully competitive camps (anybody can use the service without contract in advance). Revenue based market shares are not published.

Figure 1 reveals that there was no incumbent in the Finnish TELCO market. Usually, the state-owned companies such as Sonera had monopoly in all the above sectors, but not in Finland. The Finnish TELCO market was the second among European TELCO markets in terms of market competition in 2003. This was based on the evaluation presented by the Ministry of Transport and Communication

Appendix 3 Description of the advanced Finnish TELCO market

The advancement of the Finnish TELCO market can be estimated from the penetration numbers of the mobile and internet technologies. Tables 1 and 2 present these numbers. They present evidence that the Finnish TELCO market was definitely the most advanced user market in the world since the early 1990s. As a telecommunications director of a multinational corporation said in 1997:

> "Commonly, in the TELCO activities, Finland is in the front compared to other countries. This is based on our user experiences and price comparisons. As well, a Finnish TELCO is more competent and offers services of better quality".

Table 1 Mobile penetration (Subscriptions/100 inhabitants) in some countries between 1991 and 1997 (MINTC 1998, 89; Sonera AR 2000)

	1991	1993	1995	1997	2000
Finland	6,4	9,6	20,4	42,3	73
Sweden	6,6	9,0	22,8	36,1	70
Norway	5,3	8,5	22,5	38,6	70
USA	3,0	6,2	12,8	20,9	39
Italy	1,0	2,1	6,7	20,1	70,5
UK	2,1	3,8	9,7	14,3	68
Belgium	0,5	0,7	2,3	9,7	na

Table 2 Internet penetration in some countries between 1994 and 1997. Measured as the number of personal computers (host/1000 inhabitants) connected to the Internet. (Statistics of telecommunications 1998, 92).

	1994	1995	1996	1997
Finland	13,97	41,34	56,23	88,11
Norway	11,40	20,62	40,06	65,67
USA	4,25	17,47	29,38	58,69
Sweden	8,78	17,27	26,84	36,13
UK	4,14	7,81	10,23	16,95
Belgium	1,85	3,05	6,46	8,70
Italy	0,54	1,29	2,63	4,25

Appendix 4 Posts and Telegraphs of Finland and Radio Division in the early 1970s (Lätti, 1978)

CEO

Chief Director of Technology

Chief Director of Administration and Accouting

Collegium of Directors at PTA

Department Directors

Office Managers of Property and Foreign Offices

Divisions

| Post | Telegraph | Radio |

| Administration | Accounting | Procurement | Property | Foreign |
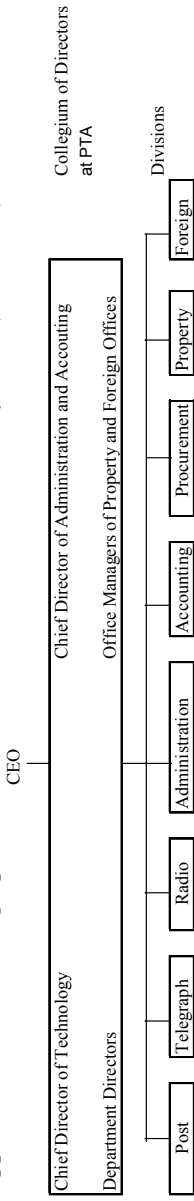
Radio Division was further divided into following sections with following tasks (Radio Division)

Radio Division

General Section — Administration, Law and accounting

Radio Station Section
*Car phone service
*Paging service
*Planning and construction of radio networks

Radio Link Section
*Radio link technology
*Transport of intnl broadcasting

Inspection Section
*Orders of technical matters
*Inspections of radio equipments
*Inspections of radios in boats and airplanes
*Examinations of radio users
*Radio disturbances

General Radio Affairs Section
*Inspection of network planning
*Radio frequency admitting
*User permissions
*Monitoring radio usage

Research Section
*Radio wave propagation
*Radio prediction
*Space communication
* Development research of radio activities

System Section
*Basic planning of radio systems for moveable traffic

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Appendix 5 Sonera Corporation and Mobile Media Communications in the end of the 1990s (Sonera)

Sonera Corporation at 1st January 1997

Board of Directors

Managing Director

Headquarter

Sales and Marketing

Intnl operations

Mobile Communications

Special Businesses

Data and Media communications

Telephone Services

Production and Network Business

Mobile Media Communications in 2000

Executive Vice president

Mobile Operator Business

- Domestic Mobile Networks
- Intnl Mobile Operations
- Intnl Business Development
- Operator Competence Center
- Interconnection, regulatory and ind structure
- Mobile IP comp center

Services

- Mobile Services
- On-line Services
- Zed
- New Communication Services
- Info Communications

Enabling Technologies

- SmartTrust

Appendix 6 Descriptions of the radical innovations omitted from the study at the Sonera Corporation

After the ARP, the second radical innovation in the corporation took place around the data network. The project started in the late 1970s and the service was launched to market in the 1980s. The system was called Telesampo[174]. Multiple services were provided, e.g., email (Telebox), news, information and bank services. The service was used through a Mosaic interface provided by its own terminals and servers developed only for this service[175]. A graphic user interface was planned first[176]. After plenty of problems. a text-based user interface was implemented. The open system interconnection (OSI) standard based protocol was used in the service creation[177]. The specification became ready in the early 1980s. The telecommunications access point (TAP) was developed as a access independent service creation platform[178]. VTT participated in the development of the network management system (NMS) taking care of billing and customer care. Telesampo was a radical innovation with new technology offered mainly to corporate customers in Finland.

The third radical innovation activities at Sonera took place around a service group called New Services, but this time centering on the fixed telephone network. The group consisted of 0600, 0700 and 0800 service numbers[179]. Innovations in 0600 and 0700 numbers were numerous. For example, content providers were involved in the service development and marketing, for which they also took responsibility[180]. The value of the content provision was divided in a new way[181]. This value division was and still is unique in the world[182]. The philosophy of service provision was also changed into direction that "every user could be a content provider"[183]. This meant considering what is the real added value a caller receives when using a service. For example, new services offered users an alternative to going to bar to meet people, as a Senior Vice President said in June 2000: "*Instead of going to restaurant, a user participated in a mediator-guided date-making discussion by conference call. The mediator got users talking and kept unsuitable, e.g., intoxicated participants, off the lines. This same model was applied in guided chats, but much later*".

The billing of New Services was based on number changes made in the intelligent network. This new technology was used to provide new services for local consumers. This solution was

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[174] Minitel in France was a similar kind of a system.

[175] PC was not yet available.

[176] At that time Steve Jobs had not yet visited the Palo Alto research center, so Telesampo's pioneers were not able to imitate the work that produced Apple.

[177] Internet's TCP/IP protocol substituted OSI along with Internet's success in the late 1990s.

[178] This was developed together with the VTT Technical Research Centre of Finland. It was a contract research organization involved in many national and international assignments.

[179] Companies' 0800 customer service numbers were launched first to market in the late 1980s. They were free of charge for customers. This service had been in the market in the USA for several years since then. Later chargeable 0600 advice numbers and 0700 entertainment numbers were launched to the market first in the world. The best-known services received from the 0600 numbers are for companies, offering e.g. secretary services. The 0700 numbers offer entertainment services.

[180] Content providers were able to select from several offered payment classes.

[181] The pricing model followed was principally such that if a service cost 18 FIM for the consumer, the content provider received 12 FIM and Sonera 6 FIM.

[182] Imode's content provision cash -division was a little bit similar, but NTT controlled strictly the content providers they approved to their system.

[183] This was a general idea of Intelligent Networks. This direction was opposite compared to that of 0800 numbers.

novel at that time, as the Sonera SVP said in June 2000: "*Competitors were years behind*". While Telesampo separated service content provision in the data network, New Services separated them in the fixed network. Intelligent networks were considered as the most potential platform for service creation and maintenance[184]. Next, intelligent network technology was transferred to the mobile network in the development of Privatel.

The fourth radical innovation called Privatel was a company 'switchboard', which enabled a calling mobile customer to use a four-digit internal company phone numbers in a similar way a caller does in the fixed intracompany call. Privatel was implemented from bit and pieces first, and later intelligent network technology was used[185]. An incremental innovation to Privatel in technology terms was Mobicentrex, which intended to provide full mobility for SME-company's telephones, substituting these companies' fixed telephone centers. Its development started in the early 1990s[186]. Privatel would have opened an opportunity for radical innovation if it had been taken to global markets. Market need emerged later when the second GSM operators in their countries started operating their networks. A similar opportunity opened for a network planning system called Monica. Monica was a network-planning system for the mobile operator's network planners. The system assisted network planners in providing estimations for given parameters of network coverage, capacity, and frequencies. The development started in the end of the 1980s supporting operations in Finland. The technology 'brick' was mainly software and needed basic scientific knowledge of the propagation, delay and reflections of radio waves.

The next radical innovation was triggered from a convergence of mobile and Internet technologies. The development of Sonera Messi started in the autumn 1997. This project developed a technical platform, which was later implemented in Zed in 1999. Messi's development is presented more explicitly in Chapter 4. Shortly, Messi started when a service unit manager noticed that sub-communities around different topics emerged in Internet. The manager saw mobility management in the present market, i.e. Finland, as an opportunity to provide new services for the existing mobile customers by combining Internet and mobile systems, service creation platforms, user interface, billing and customer information[187]. Internet or mobile systems were not able to provide these services on their own, but both of them were needed.

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[184] Internet substituted this development

[185] Privatel was implemented to a Finnish corporation as the first in the world in the late 1980s. Service idea diffused via manufacturers also to other TELCOs. Manufacturers and other TELCOs were years behind again.

[186] In the early 2000 manufacturers e.g. Nokia have set up new divisions (enterprise) intending to provide similar kinds of products for companies.

[187] To put this simply, that was service, channel, billing and customer.

Appendix 7 Participants in interviews and respondent validations

Interviews

Corporate management (I) — Persons 11, Interviews 14

Role	ARP	Zed
CEO	2	1
Chairman of Board		2
MD	3	3
Senior Vice president		1
EVP-Finance	1	
Director Compt based plan		1
HRD	1	
Corporate Development Director	1	1
CSO		1

Business Unit management (II) — 6, 8

Role	ARP	Zed
BU director	7	1
MD		2
SVP		2
Vice president		2

Service unit management (III) — 8, 9

Role	ARP	Zed
SVP		1
Vice president		3
Director		
BU Development Director	4	4

Product/Project managers (V) — 7, 7

Role	ARP	Zed
Product manager	3	4

Functional management (IV) — 9, 10

Role	ARP	Zed
Director, mobile networks	2	2
Sales Director	1	
Director in administration	1	1
HR manager	1	
R&D director		1
Development Director		4
Business Controller	1	

Group management - functional areas (V) — 9, 15

Role	ARP	Zed
Group manager	6	2
Cellular planning manager	1	
Development manager	2	4
Project manager	1	1
Product Development manager		1
Manager-Finance	1	

Experts in Functional Areas — 4, 4

Role	ARP	Zed
Technical engineer	2	
Development engineer	1	
Sales man	1	

Interest parties — 14, 15

Role	ARP	Zed
Senior vice president	1	1
Parliament member		1
Department director		1
Main analyst		2
Board member	1	1
MD	4	
Director	1	
Market Operations Director	1	
Telecommunications Manager	1	
Debuty Department Director	1	
Sectoral man	1	
secretary of Standing committee of		
Secretary of state	1	1

Resp. validations

Corporate management (I) — Persons 5, Resp. validations 6

Role	ARP	Zed
CEO	1	
Chairman of board		3
MD	2	3
CSO		1
Director Compt based plan		1

Business Unit management (II) — 2, 2

Role	ARP	Zed
BU director	2	

Service unit management (III) — 4, 5

Role	ARP	Zed
Vice President		3
Director		1
Development Director	1	
Vice President	1	1

Product/Project managers (V) — 1, 1

Role	ARP	Zed
Product manager	1	1

Functional management (IV) — 3, 4

Role	ARP	Zed
HR manager	1	
R&D director	1	
Development Director	1	1

Group management - functional areas (V) — 2, 3

Role	ARP	Zed
Group manager	2	1

Interest parties — 1, 1

Role	ARP	Zed
Senior vice president	1	1

Interviewed Persons	Number of Interviews	Persons in Resp. validations	Number of Resp. validations
68	82	18	22

Total number of interviews and respondent validations
104

Appendix 8 Secondary data sources

Annual Reports:

Post and Telecommunications Finland 1984 – 1997

Telecom Finland 1984 - 1997

Sonera 1998-2002

TeliaSonera 2002-2005

Intraorganizational documents

Construction of automatic mobile telephone network, attachment of the PTA's Collegium session, 14.4.1977.

Corporate Collegium list of matters: construction of ARP network.

Kangasluoma & Merontausta (1975). Public manual mobile telephone network in Finland. Helsinki: Radio Division.

Main printed public media sources

Fakta   Number 12/1999 *Credible overture*

Helsingin Sanomat (HS) 26.10.1999 *Sonera wants to become Wap's Yahoo.*

                        2.11.2000 *Open quarrel of options going on in Sonera*

                        13.2.2001 *Zed sank when Wap revealed as flop*

                        23.5.2001 *Sonera reefs the course*

                        Kaleva 7.10.2001 *State's Sonera Shares to Tekes or Sitra*

Kauppalehti (KL)   12.10.1999 *Sonera connect Internet and mobile communications with Zed -service*

                        20.12.1999 *Sonera seeks its way to the assistant of global giants with its service company*

                        3.2.2000 *Sonera wants to change into service house*

                        25.2.2000 *Sonera Zed snatched significant partners*

                        28.2.2000 *Sonera is a master of a timing*

                        27.4.2000 *Sonera's result from Mobile communications*

                        6.9.2000 *Sonera confirmed services as its basic business*

                        15.12.2000 *Sonera Zed accelerated considerably*

14.2.2001 *Does Sonera have a strategy?*

20.2.2001 *Short message services of Sonera Zed to customers' of Turkcell*

28.3.2001 *Sonera's credits to Moody's surveillance list*

12.4.2001 *Alliance of Sonera did not fall down to the limits of ownership*

2.5.2001 *Sonera Zed settles the final accounts*

Talouselämä (TE)   Number 20/2000. *Talouselämä 500.*

Number 28/2000. *House of a rising risk.*

Number 30/2000. *Sonera Roadshow – All too low numbers.*

Number 15/2001. *Now we have to be humble*

Taloussanomat (TS)   26.10.1999 *Sonera wants to become a content provider*

27.10.1999 *Wap lives as an intermediary product only for an year*

Tekniikka & Talous (T&T) 26.10.2000 *Market of Sonera Zed is packed*

Tietoviesti   2000-5 *UMTS - and open information flow based way of action as future success factors*

Sonera press releases   6.11.2000 *New deals open up content for mobile phones in Germany*

7.12.2000 *Sonera Zed Oy to Germany*

31.1.2001 *Sonera Zed to Italy*

19.3.2001 *Sonera Zed's short message services are also in service for customers of Vodafone*

29.3.2001 *Zed for business launched in UK*

Material for Public Offerings of the Sonera

Merrill Lynch (global coordinator) (1998). *Offering Memorandum for Sonera,* 9 November

Goldman Sachs (global coordinator) (1999). *Prospectus for second Sonera share sales,* 24 September.

Goldman Sachs (global coordinator) (1999). *Prospectus for Sonera at NASDAQ*, 12 October.

Sonera road show material for 1998 and 1999 offerings.

Publications of the Finnish Ministries

Chancellor of Justice of Finnish Council of State (2002). *Clarification of portion of Finnish Council of State at Sonera's UMTS decision making.* Decision at 8 October .

Finnish Council of State (2002). *The official notification of Finnish government to the Parliament of Finland of Owner policy of Finnish State and Sonera*.

Ministry of Transport and Communications Finland (2001). *Owner policy of Finnish State and Sonera (Valtion Omistajapolitiikka ja Sonera)*. The settlement of MINTC to the Parliament of Finland, 23 October.

Ministry of Transport and Communications Finland (2002). *State, Sonera and UMTS –decisions (Valtio, Sonera ja UMTS -päätökset)*. Memorandum. 4 September.

Ministry of Transport and Communications Finland (2003). *Finnish Telecom Policy*. Helsinki: Taittotalo.

Telecommunication statistics 1985-

Other published material

Pekka Peloton (pseudonym) (2002). *Where did Sonera's money disappear.*

Analysys (2000). *Mobile Portals and ASPs*. Cambridge: UK

The Strategic Group (2000). *US Wireless Portals: Strategies and forecasts*. Washington, February

Gartner (2001). *Mobile Portals in Western Europe: Business Models Compared*. Surrey: UK. 1 November
GSA (2002). *Survey of Mobile Portal Wap Services Q1 2002*. United Kingdom.

Strategy Analysis (2002). *US Mobile Internet Services: Coast-Coast Carrier Tariff perspectives*. February

Reports of investment Banks

Goldman Sachs (1999). *Telecoms Services: Sonera. Leading the Mobile Data Wave*. 14 September.

JP Morgan (1996). *Information Report. PT Finland. Bright Northern Lights*. 29 November.

Merrill Lynch (1998). *Sonera: Window on the Future*. September.

Merrill Lynch (1999). *Sonera: Beyond the Minutes Game*. 14 September.

Merrill Lynch (2000). *Sonera development*. 20 April.

Appendix 9 Market launches of applications using SMS service (source: own investigation)

PC to MT SMS launch to market	Dec 1994
SMS market launch	May 1995
Operator assisted SMS service	Sep 1995
Directory enquiries on SMS	Sep 1995
Connecting traffic btwn Sonera and Radiolinja	Dec 1995
Merita Solo SMS banking	Jan 1996
Weather by SMS	May 1996
OKO SMS banking	Sep 1996
SMS to E-mail	Oct 1996
Directory enquiries abroad by SMS	Nov 1996
SMS to fax	Apr 1997
Test SMS in Internet	Mar 1998
Telefinder: directory enquiry	Mar 1998
Special priced SMS services	Apr 1998
Bank account balance enquiry	Apr 1998

Appendix 10 Views of the Sonera management for the development of the industry and company in 1999 (presented at annual report publication on 22nd February 1999, freely translated from Finnish)
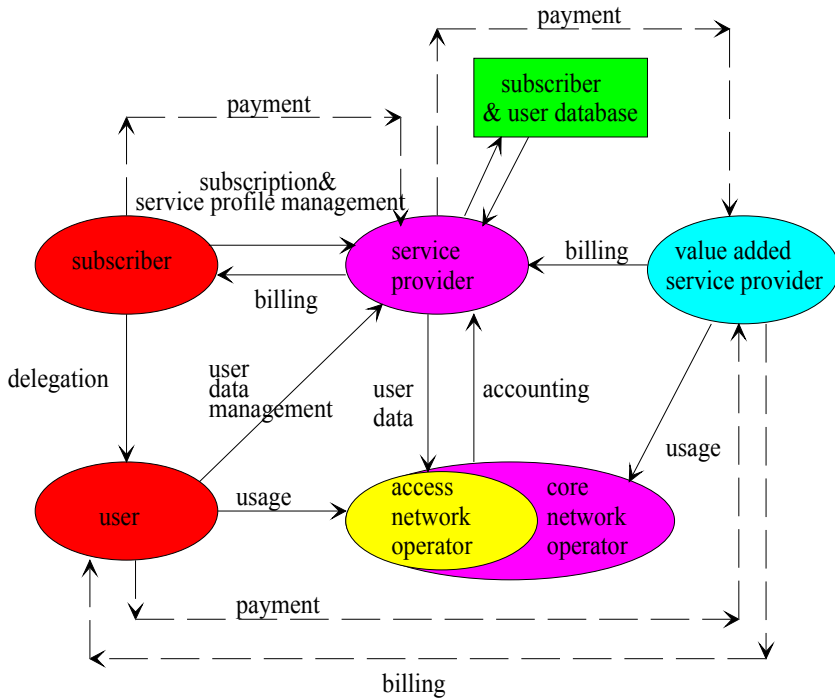
Views for the development of the teleindustry in 1999:

*Growth emphasizes mobile-, data- and media communications both in Finland and internationally

*Competition increases in all Sonera's central activity areas

*Demand of services increases somewhat more slowly than previously

*The significance of content business increases
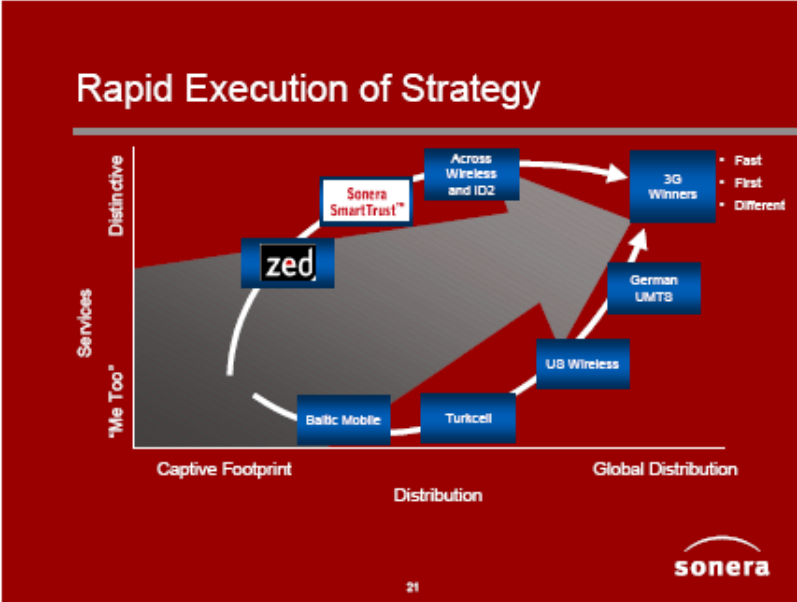
*International consolidation of the industry continues

Views for the development of Sonera in 1999:

*Revenue growth will not remain as strong as in 1998

*Significance of international business increases in the company's focus areas

*Proportion of new services of total company revenue increases

*Gross margin of the company remains at the same level as in 1998

*Proportion of profit from associated companies further increases

*Profit before extraordinary items and taxes are estimated to increase a little bit faster than revenue

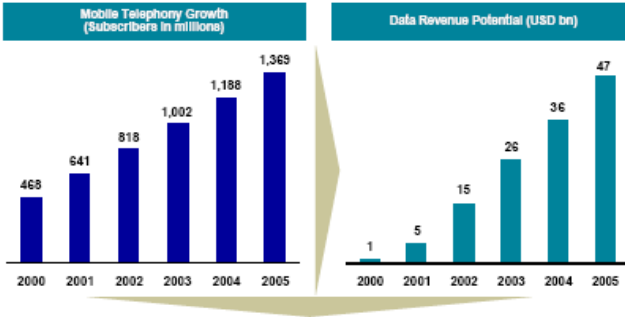**Appendix 11 Possible roles in mobile service provision and transactions between these actors (Sonera)**

payment

subscriber
& user database

payment

subscription&
service profile management

subscriber

service
provider

billing

value added
service provider

billing

delegation

user
data
management

user
data

accounting

user

usage

access
network
operator

core
network
operator

usage

payment

billing

Appendix 12 Sonera's strategy in relation to service and distribution paths (Sonera 2000)

**Appendix 13 Estimation of the market development of mobile value added services
(source: Sonera)**

Market Outlook
Huge mVAS Market Opportunity

Mobile Telephony Growth (Subscribers in millions): 468 (2000), 641 (2001), 818 (2002), 1,002 (2003), 1,188 (2004), 1,369 (2005)

Data Revenue Potential (USD bn): 1 (2000), 5 (2001), 15 (2002), 26 (2003), 36 (2004), 47 (2005)

Bandwidth capacity and speed grow as technology moves from SMS to WAP, GPRS and UMTS, turning mVAS into a mass market

Source: OVUM, 2000

% of customers
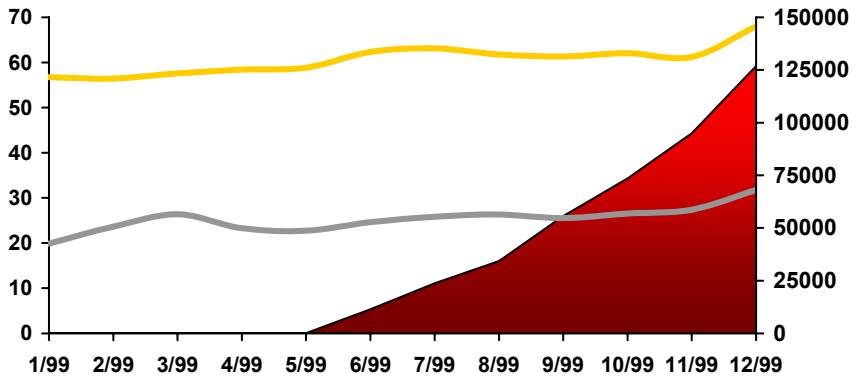
Zed's registered users

SMS used / mth

SMS-content services used / mth

234

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ISBN 951-791-904-2, ISBN 951-791-905-0 (Electronic dissertation).

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