Department of Business Administration
Accounting

Studying the recent situation of information and communication technology industry

The subject of the Master's thesis was approved by the council of Business Administration on the 13th of August 2002.

Supervisors: Professor Antero Tervonen,
Professor Ulla Kotonen

Valkeala, 23th of September 2003.

Karoliina Kanerva
Sienipolku 13
45360 Valkeala, Finland
phone: +358 (0)40 512 3732

ABSTRACT

Author: Kanerva, Karoliina
Title: Studying the recent situation of information and communication technology industry
Department: Business Administration
Year: 2003
Master's thesis. Lappeenranta University of Technology.
85 pages, 15 tables, 17 figures and 7 appendixes.
Supervisors: Professor Antero Tervonen
Professor Ulla Kotonen

Keywords: information and communication technology (ICT) industry, main business model, competitive strategy, partnership, key figures

Global business environment is changing quickly. The radical new technology transforms our landscape and the rules of commerce are changing rapidly. New business models are needed. The objective of this study was to analyze information and communication technology (ICT) industry recent situation from the strategic and competitive analyzed perspective and to create a view of ICT industry and it's big players in Europe and USA. The study analyzed five big ICT companies. The methodology of the study was both qualitative and quantitative research. Companies were analyzed by using both numerical and qualitative material. The study was based on literature, articles, preexisting research reports, companies homepages and annual reports. As a result of the study, it was found out similarities and differences between company's business models and economic success.

TIIVISTELMÄ

Tekijä: Kanerva, Karoliina
Työn nimi: ICT-alan viimeaikaisen tilanteen tutkiminen
Osasto: Kauppatieteiden osasto
Vuosi: 2003
Pro gradu -tutkielma. Lappeenrannan teknillinen yliopisto.
85 sivua, 15 taulukkoa, 17 kuvaa ja 7 liitettä.
Tarkastajat: Professori Antero Tervonen
Professori Ulla Kotonen

Hakusanat: tieto- ja viestintäteollisuus (ICT-teollisuus), pääliiketoimintamalli, kilpailustrategia, kumppanuus, tunnusluvut

Globaalinen liiketoimintaympäristö on muutoksessa. Uudet teknologiat muuttavat toimintaympäristöä ja talouden säännöt muuttuvat nopeasti. Uusia liiketoimintamalleja tarvitaan. Tutkimuksen tavoitteena oli analysoida tieto- ja viestintäteollisuuden (ICT-teollisuus) nykytilannetta strategisesta ja kilpailuanalyyttisestä näkökulmasta, sekä luoda kuva ICT-teollisuudesta ja sen suurista pelureista Euroopassa ja USA:ssa. Tutkimus analysoi viittä suurta ICT-alan yritystä. Tutkimus oli luonteeltaan sekä kvalitatiivinen että kvantitatiivinen. Yrityksiä analysoitiin käyttäen numeerista ja laadullista materiaalia. Tutkimus perustui kirjallisuuteen, artikkeleihin, tutkimusraportteihin, yritysten internet-kotisivuihin ja vuosikertomuksiin. Tutkimuksen tuloksena voitiin löytää sekä yhtäläisyyksiä että eroavaisuuksia yritysten liiketoimintamallien ja taloudellisen menestymisen väliltä.

FOREWORD

I am very happy, because finally my studies in Master of Economic Sciences are ending. Student days in Lappeenranta University of Technology have been rich and educational.

I want to thank professor Antero Tervonen for his patience, enthusiasm and good advice. I also want to thank the project team for the support in the thesis project. My parents and husband also deserve big compliments for their support during my studying years.

TABLE OF CONTENTS

LISTS OF TABLES AND FIGURES

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

1.1 Background of the study

“We sit on the edge of a cliff, where radical new technology is rinsing up to us with a force so powerful that it will transform our landscape. The rules of commerce are shifting rapidly, with explosive new business models taking shape by the minute. Almost every day we are astounded by the latest innovations in communications, computers, and biotech. Technology is behind key transitions in the every foundations of our society.” (Myburgh 2002, 36)

Global business environment is changing quickly. The main characters of the change are fast development of technology, global competition, focusing and consolidation. The future is not at all predictable because of the fast technology development (TEKES 2001, 1). Big companies are leading the application of E-Business. They are pushing the smaller companies with accelerating speed into operating with them via electronic means.

Mobility brings totally new dimension into development of the industries by opening up completely new business opportunities. The introduction of wireless applications is about to begin. USA and Europe, who are the major lead markets, are going on different routes. The American way is to commercialize new business ideas hastily based on existing building blocks, i.e. technology and services. The European way is to move with technology standards, which easily slow down the development, but creates finally larger standard platforms.

The convergence of the IT and Telecom markets creates totally new ways for companies to operate. The time window for utilizing an innovation into

a new business has contracted from two to three years varying now from six months to one and a half years. (Laaksonen 2001, 4-9)

1.2 Telecom Business Research Center and the research project

The Master's thesis is a part of broad research project "New business models arising from the convergence of the E-Business and Mobility in USA and Europe" done by Telecom Business Research Center. Telecom Business Research Center (TBRC) is a research unit of Lappeenranta University of Technology. TBRC was established in summer 1999 in association with the departments of Business Administration, Industrial Engineering, Information Technology and Electrical Engineering and Electronics.

The aim of TBRC is to connect the university researchers and the industry. The TBRC staff consists of university personnel. Research teams are usually multi-disciplinary consisting of researchers of various fields such as economics, business law, international marketing and operations, accounting, management, logistics, telecommunications and information technology.

The research project "New business models arising from the convergence of the E-Business and Mobility in USA and Europe" concentrates on strategic analyze of the existing situation and strategic trends which open new business opportunities and make possible new business models. The project also concentrates on technologies and business models and search "stumbling blocks", which might delay development. In addition the project concentrates on psychological and legal issues, which affect the diffusion of the new business models. The main partners of the project are TEKES, Stora Enso, UPM-Kymmene, Sonera and Modultek.

1.3 Research problem, objectives and scope

The research problem of this study is how global, changing environment and the fast pace of technological development affect to The Information Communication Technology (ICT) industry. The aim of the study is to analyze ICT industry recent situation from the strategic and competitive analyze perspective. In addition the study approach competitive strategy theories. The main objective is to create a view of ICT industry and it's big players. The study analyzes five ICT industry companies in Europe and USA. Analyzed companies are the big and notable players in the ICT industry playing field. The five big players are Nokia, Microsoft, Verizon, Vodafone and IBM.

Nokia has been chosen to study because it has become one of the world's leading ICT equipment companies. Nokia's home market is Europe, so Nokia represents Europe in this study. Microsoft is a powerful player in the ICT industry, maybe the most powerful. Microsoft is also ICT equipment company which home market is North America. Verizon companies are the largest providers of wireline and wireless communications in the United States. Verizon is also the largest directory publisher in the world. Verizon's home market is North America. In this study Verizon represents North American network operator. Vodafone has been chosen to study because it is the largest mobile telecommunications network company in the world. It has interests in mobile networks in 29 countries across five continents. In this study Vodafone represents European network services and digital provision company. IBM is ICT equipment company which sells services, hardware and software. IBM's home market is North America.

Study's objective is to find similarities and differences between above five companies. The study analyzes above companies main business models. The study also tries to piece to together above companies situation in the ICT industry. In addition, the study concerns above companies goals and strategies to attain and maintain competitiveness in the industry. Study's

empirical part is concentrated on financial statements analyzes and other public information, mainly annual reports.

1.4 Methodology and literature

The methodology of the study is both qualitative and quantitative research. Companies are analyzed by using both numerical and qualitative material. The intention of the study is to describe ICT business present state and elements that affect to this present state. This study is based on literature, articles and preexisting research reports. Internet sources and mobile companies homepages and annual reports are also used.

Microsoft, Nokia, Verizon, Vodafone and IBM are used as an example companies in the study's empirical part. In addition, attaching to the TBRC research project, 28 other important ICT companies were analyzed. The other 28 companies are not included to this study.

1.5 Terminology

The terminology used in this study is collected under this subchapter. Definitions are in alphabetical order.

Application performs a task to provide service for an end user. Often, an application is concisely viewed as separate software running on a server or a handset. (Andersson 2001, 10)

Business model is defined as a tool for determining the strategy of the company. Business model contain internal and external factors affecting the strategy of the company. It means the interaction of core strategy, strategic resources, value network, and customer interface. A notable factor affecting these elements is the wealth potential, which defines the value creation potential of the business model. (Hamel 2000)

Business strategy contain all about how make a profit and sustain competitive advantage in the long term. Business strategy is based on understanding of where the firm wants to go (mission, vision), what the firm need to do (objectives, goals), and what resources are needed. (Lopperi 2002, 20)

E-Business is defined as any electronic initiative – tactical or strategic – that transforms business relationships, whether those relationships be business-to business, business-to-consumer, business-to-employee or machine-to-machine (Hartman 2000, 17).

ICT term is in general use worldwide but it has different meaning country by country. In Finland the stress is on telecommunication and especially on mobile technology. (TEKES 2001, 5)

M-Business defined as any mobile initiative that adds demonstrable value, whether in directly results in the generation of profit or not. Traditional voice calls are not included, but services using voice recognition in order to enable commercial transactions belong to the definition. (Sissonen 2002, 8)

Mobile is something that can be used in any place where access is available. Mobile is something that can be transported and connected to network in different locations using wireless or wired access. (Sissonen 2002, 9)

Mobile application is defined as any application that can be used in different places. Synchronization of data happens when a connection to a network is established using wired or wireless access. (Wireless E-Business 2001)

Mobility is defined as the possibility to be connected and get access to a network using a mobile device in different locations, thus offering flexibility and transportability to the user (Wireless E-Business 2001).

Wireless is defined as an access to some network, the Internet like services, in any place wirelessly using some standard radio network or infrared light (Wireless E-Business 2001).

1.6 Structure of the study

The input-output diagram expands upon the matter of the structure of the study by defining the inputs and expected outputs of each chapter

Table 1. Input-output diagram of the study structure

INPUT	CHAPTER	OUTPUT
- background & motives - research problem, objectives, scope - structure - methodology - literature - terminology	**1. Introduction**	- creating interest - rationale for study - study overview - method - sources - definitions
- the five competitive forces - SWOT analysis - competitive advantage - sources and impediments	**2. The structural analysis within industries**	- three generic strategies - strategic dimensions - analyzing competition in global industries
- ICT cluster - business model by Hamel - business models of the operators	**3. ICT cluster and business model**	- cluster description - components of business model and analyzed companies
- coalitions - technological collaboration	**4. Partnerships**	- strategic benefits, costs and reasons
- financial statement numbers	**5. Key figures**	- key figures of the analyzed companies
- content of the study	**6. Conclusions and summary**	- conclusions - summary

The introduction chapter gives background and motives for the study. The chapter presents research project, research problem, objectives and

scope. The introduction chapter is meant to create interest. The chapter describes structure, methodology and literature. In addition, the introduction gives short look to terminology that is used in the study.

Chapter two concerns theoretically competitive forces, competitive strategies and competitive advantage issues. The chapter presents Porter's five competitive forces and three generic strategies for attain above-average performance. Chapter two also presents Kotler's SWOT analysis including external and internal environment analysis. Microsoft SWOT is introduced as an example case. In addition, chapter two deals with global competitive advantage issues.

Chapter three defines cluster and business model notions. Chapter deals with ICT cluster environment. The components of business model are presented after Hamel. The chapter studies Nokia's, Microsoft's, Verizon's, Vodafone's and IBM's business models as example cases. Above mentioned companies are shortly presented by numbers and words. New challenges of operators are also discussed in chapter three.

Chapter four deals with partnership issues. Strategic benefits and costs of coalitions are presented after Porter. Reasons for technological collaboration and different kinds of contractual forms of technological collaboration agreements are brought out after Bailey, Masson and Raeside.

Chapter five deals with key figures. The chapter represents seven key figures of analyzed companies. The seven key figures are: net sales, operating profit, return on capital employed (ROCE), equity ratio, gearing, current ratio, and personnel. Key figures are compared with between five analyzed companies.

Chapter six pull together study's content and conclusions. The chapter includes study conclusions and summary.

2 THE STRUCTURAL ANALYSIS WITHIN INDUSTRIES

The most important element of a firm's profitability is industry attractiveness. Competitive strategy should build from advanced understanding of the rules of competition that determine the industry attractiveness. The main objective of competitive strategy is to get along with those rules, and ideally even change those rules in firm's favor. (Porter 1985, 4)

2.1 The five competitive forces

In all industries the rules of competition are expressed in five competitive forces: the entry on new competitors, the threat of substitutes, bargaining power of buyers, the bargaining power of suppliers, and the rivalry among the existing competitors. (Porter 1985, 4)

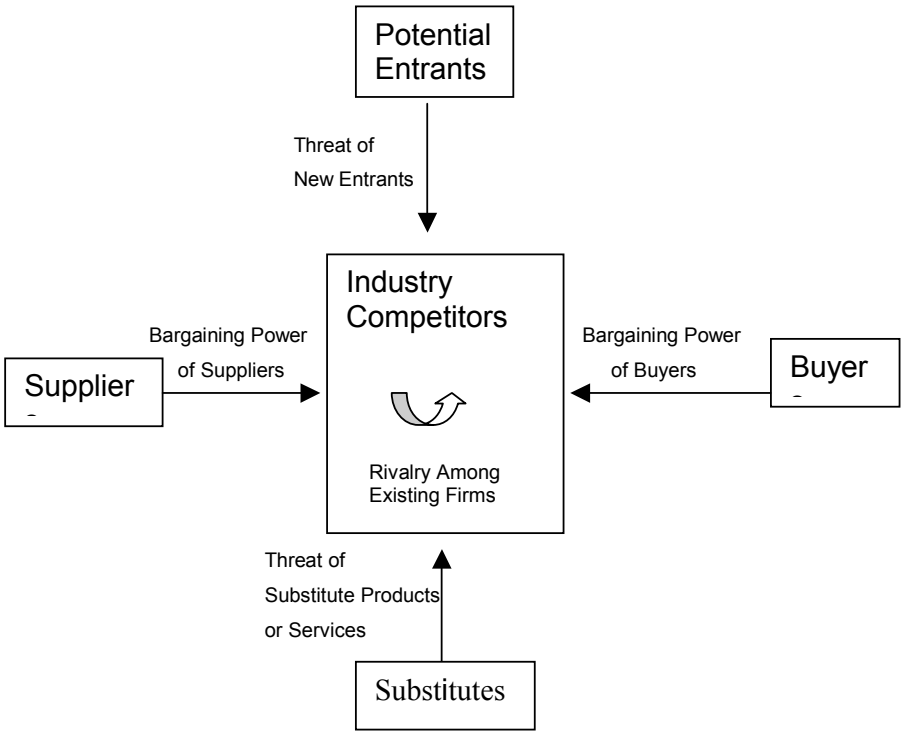

Figure 1. The Five Competitive Forces that Determine Industry Profitability (Porter 1985, 5)

The collective power of these five competitive forces determines firms` capability in an industry to earn, on average, rates of return on investment in excess of the cost of capital. The power of the five forces differs from industry to industry, and can change when an industry develops.

The five forces determine industry profitability by influencing the elements of return on investment, such as the prices, costs, and required investments of firms in an industry. Buyer power influences the prices that firms can invoice. Powerful buyers may also influence cost and investments by demanding costly services. The bargaining power of suppliers controls the costs of raw materials and other inputs. The rivalry among existing firms influences prices as well as the costs of competing in fields such as plant, product development, advertising, and sales force. The threat of entry locates a limit on prices, and forms the investment required to frighten new entrants. (Porter 1985, 4-5)

2.2 Competitive strategies

An important aspect in competitive strategy is a firm's relative position within its industry. Positioning defines whether a firm's profitability is above or below the industry average. If a firm's position within industry is good, a firm may earn high rates of return even though industry structure is adverse and the average profitability of the industry is therefore modest.

The basis of above-average performance in the long run is sustainable competitive advantage. A firm can have two basic types of competitive advantage: low cost or differentiation. The importance of any strength or weakness a firm has is finally a function of its impact on relative cost or differentiation. Cost advantage and differentiation arise from industry structure, and they derive from a firm's capability to cope with the five forces better than its rivals. (Porter 1985, 11)

2.2.1 Three generic strategies

The three generic strategies for attain above-average performance in industry are cost leadership, differentiation, and focus. The focus strategy can be divided to two versions: cost focus and differentiation focus.

	COMPETITIVE ADVANTAGE	
	Lower Cost	*Differentiation*
COMPETITIVE SCOPE *Broad Target*	1.Cost Leadership	2. Differentation
Narrow Target	3A.Cost Focus	3B.Differentiation Focus

Figure 2. Three Generic Strategies (Porter 1985, 12)

The *cost leadership* strategy means that the company works hard to achieve the lowest production and distribution costs. Lower costs make possible lower prices than competitors and help attain a big market share. A company with the cost leadership strategy needs to be good at engineering, purchasing, manufacturing, and physical distribution, but they need less competent in marketing.

The *differentiation* strategy means that the company concentrates on achieving better performance in an important customer benefit area valued by a big market area. The company can attain to be for example the service leader, the quality leader, the style leader, or the technology leader. The company develops those strengths that will give it a competitive advantage in one or more benefits.

The *focus* strategy means that the company focuses on one or more narrow market segment. The company achieves to get know these segments' needs and seeks either cost leadership or differentiation within the chosen segment. (Kotler 1997, 84-85)

Each of three generic strategies means totally different way to competitive advantage. The cost leadership and differentiation strategies try to reach competitive advantage in wide range of industry segments. Meanwhile focus strategies try to reach competitive advantage in narrow segment.

The essential point of generic strategies is that a firm should make a choice about the type of competitive advantage. Effective implementing of selected strategy usually requires total commitment and support of organization (Porter 1980, 35). If a firm does not make a choice between strategies, it usually has not competitive advantage at all. Being "all strategies firm" often means below-average performance. (Porter 1985, 11-12)

2.2.2 Strategic dimensions of competitive strategy

The five broad competitive forces provide a connection in which all firms in an industry compete. In an industry competition some firms manage to be more profitable than others and this is related to their strategic postures, differing competencies in marketing, cost cutting, management, organization, and to their ultimate performance. (Porter 1980, 127)

Companies´ strategies for competing in an industry may differ in a broad variety of ways. Porter (1980, 127-129) lists strategic dimensions, which usually capture the possible differences among a company's strategic options in a given industry:

- *specialization*: the degree to which it focuses its ambitions in terms of the width of its line, the target customer segments, and the geographic markets served;
- *brand identification*: the degree to which it strives brand identification rather than competition based mainly on price or variables. Brand identification can be attained via advertising, sales force, or a variety of other means;
- *push versus pull*: the degree to which it strives to develop brand identification with the end-consumer directly versus the support of distribution channels in selling its product;
- *channel selection*: the choice of distribution channels ranging from company- owned channels to specialty outlets to expansive-outlets;
- *product quality*: its level of product quality (raw materials, specifications, adherence to tolerances, features, and so on)
- *technological leadership*: the degree of which it strives technological leadership versus following imitation. A firm may be a technological leader but intentionally not a leader in quality.
- *vertical integration*: the extent of value added as reflected in the level of forward and backward integration adopted (whether the firm has captive distribution, exclusive or owned retail outlets, an in-house service network, and so on);
- *cost position*: the extent to which it strives the low-cost position in manufacturing and distribution through investment in cost-minimizing facilities and equipment;
- *service*: the degree to which it provides accessory services with its product line (engineering assistance, an in-house service network, credit, and so on);
- *price policy*: firms relative price position in the market;
- *leverage*: the amount of financial leverage and operating leverage that firm bears;
- *relationship with parent company*: requirements on the behavior of the unit grounded on the relationship between a unit and its parent

company. The character of the relationship with the parent influences the aims with which the firm is managed, the resources which are available to it, and even determine some operations and functions that firm shares with other units;

- *relationship to home and host government*: in international industries, the relationship the firm has created or is subject to with its home government as well as host governments in foreign countries where it is acting. Home governments can supply resources or other assistance to the firm, or conversely can control the firm or otherwise influence firms´ aims.

All these dimensions provide an overall picture of the firm's position. The industry affects on what kind is the scope for strategic differences along a particular dimension.

2.3 SWOT analysis

Kotler (1997, 80-84) handles the structural analysis within industries by using SWOT analysis. The overall evaluation of company's strengths, weaknesses, opportunities, and threats is SWOT analysis. Every company must define its specific mission within industry. A company has to monitor key external macroenvironment forces and important microenvironment actors that have an affect to its capability to earn profits. Macroenvironment forces are demographic, economic, technological, political, legal, social, and cultural issues. Microenvironment actors are customers, competitors, distribution channels, and suppliers.

2.3.1 External environment analysis

Some developments in the external environment represent *opportunities* and some represents *threats*. A main purpose of environmental monitoring is to find new market opportunities. Kotler (1997, 81) defines that "A marketing opportunity is an area of buyer need in which a company can

perform profitability. Opportunities can be classified according to their attractiveness and their success probability. The company's success probability depends on whether its business strengths not only match the key success requirements for operating in the target market but also exceed those of its competitors. Mere competence does not constitute a competitive advantage. The performing company will be the one that generate the greatest customer value and sustain it over time."

Kotler (1997, 81) defines that " An environmental threat is a challenge posed by an unfavorable trend or development that would lead, in the absence of defensive marketing action, to deterioration in sales or profit. Threats should be classified according to their seriousness and probability of occurrence."

2.3.2 Internal environment analysis

Internal environment analysis includes *strengths* and *weaknesses* analysis. Kotler (1997, 82) argues that every company needs to evaluate its internal strengths and weaknesses periodically. "The business does not have to correct all its weaknesses, nor should it gloat about all its strengths. The big question is whether the business should limit itself to those opportunities where it possesses the required strengths or should consider better opportunities where it might have to acquire or develop certain strengths."

2.3.3 Microsoft SWOT

Microsoft is a powerful player in the ICT industry, and that is why it is a good example case for SWOT analysis. Microsoft has been approached more detailed in the chapter 4.6 Microsoft business model. Laaksonen et al. (2002, 5) have analyzed Microsoft SWOT.

Strengths

- Software development into products and software integration
- Internet skills
- Size & profitability
- Flexibility
- Microsoft's software called .NET and its strategy

Weaknesses

- Mobile (GSM-GPRS-UMTS) technology
- Mobile alliances
- European regulation
- Image

Opportunities

- Mobile market represents six times bigger market in number of devices (200 million PC's 1,0 B mobile devices)
- Reorganization of the distribution based on ASP model, reduces costs, increases agility, and brings customer nearer
- Systems management market as new product range

Threats

- Linux
- Open Office

2.4 Competition in global industries

One of the most notable forces influencing companies since World War II has been the globalization of competition. Since 1970s an increasing number of industries have become global industries, and this structural setting is still underway (Porter 1980, 276). The result of globalization can be seen that earlier several locally operating companies were sharing the market but the trend is to smaller number but globally operating key

players (TEKES 2001, 1). Transport and communication costs fall, the flow of information and technology across borders increase, national infrastructures become more alike, and trade and investment barriers ease. (Porter 1998, 309)

Porter defines: “A global industry is one in which the strategic positions of competitors in major geographic or national markets are fundamentally affected by their overall global positions”. When analyzing competition in a global industry, it is important to consider industry economics and competitors in the various geographic or national markets along rather than individually. In global industries a firm is required to compete on a worldwide, coordinated basis or face strategic disadvantages. (Porter 1980, 275)

2.4.1 Global competitive advantage

The firm’s capacity within the industry depends on its competitive advantages or disadvantages regarding its competitors. Competitive advantage is occurred either in lower costs than those of competitors or in the capability to differentiate and command a premium price that exceeds the extra cost of differentiating. Some competitive advantage may be achieved by operational effectiveness, but the most durable advantages build up occupying a unique competitive position. Companies must understand the structure of their industry, recognize their sources of competitive advantage, and analyze competitors. (Porter 1998, 312-313)

2.4.2 Sources and impediments of global competitive advantage

Porter (1980, 278) divides the sources of global advantage in four category: conventional comparative advantage, economies of scale or learning curves extending beyond the scale or cumulative volume achievable in individual national markets, advantages from product

differentiation, and the public-good character of market information and technology.

There is a diversity of impediments to attain these advantages of global competition, and they may block the industry from becoming a global industry completely. The impediments can yield viable strategic niches for national firms that do not compete globally even when the advantages of global competition beat the impediments completely. These impediments can be economic and raise the direct cost of competing globally. Transportation and storage costs, differing product needs, established distribution channels, sales force, local repair, sensitivity to lead times, complex segmentation within geographic markets, and lack of world demand are economic impediments. A second category of impediments do not necessarily affect cost directly but raise the complexity of the managerial task. Managerial impediments are differing market tasks, intensive local services, and rapidly changing technology. A third category relates to only institutional or governmental restraints that do not reflect economic circumstances. Some impediments may also relate purely to perceptual or resource limitations if industry incumbents.

In becoming established information and search costs are high. As well substantial resources can be necessary for such things as the construction of world-scale facilities or start-up investments in penetrating new national markets. These investments can be beyond the abilities of incumbents, as can be the required managerial and technical skills for global competition.

Global competition impediments are almost always present to some degree in an industry. Hence, even in industries that are generally global in their competitive character, there may be features of “localness” that remain. In some markets, or in some segments, the national firm will be preeminent over global competitors because of the attendance of certain significant impediments to global competition. (Porter 1980, 281-287)

3 PARTNERSHIPS

Nowadays, globalization and convergence are changing the information technology markets. Changes are being drive by the increasing number of global alliances, partnerships and company mergers and the growing integration of economic regions. The basic restructuring of traditional business processes into networked value-added structures is going to increasing convergence of information technology and telecommunications operations. (Deutsche Telekom 2001, 34)

The Information Communication Technology (ICT) industry has existed in a turbulent state for the past several years. There have been an unprecedented number of mergers, acquisitions, and partnerships. Companies long deliberated rivals have found each other out in order to join forces to compete in the new global business environment. (Dixon Wilcox 2001, 459)

Networks, inter-firm alliances and cooperation between companies and the research community are essential elements of present business operations. Networking means not only vertical relationships, i.e. buyer-supplier relationships, but also cooperation in manufacturing, marketing and in research and development. (TEKES 2001)

Collaboration increasingly dominates the industrial landscape. Announcements of freshly formed alliances are frequent. (Littler & Leverick 1995, 58) The fast speed of change in a global economy boosts the need for partnering. Kanter (1999) defines that “do-it-together means leveraging the strengths of a business partner to create more value and build more sales than either company could do alone. Do-it-yourself is too slow when competition and customers demand that a company sell everywhere quickly. New technology companies in software, biotechnology, or telecommunications are literally born global. They must design products to world standards, working with partners in many places.” Technology

development in collaboration has become an essential component of technology strategy for a broad range of companies, as they strive to cope with challenges like increasing R&D costs and globalization (Bailey et al. 1998, 124).

The concept of partnering is being broadly support by both business-to-business and consumer-marketing companies. For example relationships are such essential assets in software companies like Lotus that they devoted senior executives and departments only to the management of alliances and partnerships. (Kanter 1997, 26) Also Sonera's chief executive Koponen thinks that partnering is essential in present changing business environment. Koponen has commented that collaboration between Sonera and Hewlett Packard-Compaq is very important. Sonera and Hewlett Packard-Compaq co-operate in sales, research, product development, and production to support each other customers in integrating ICT markets. (Sonera 2002)

3.1 Coalitions

Porter (1986) has defined a coalition as a long-term agreement linking firms but falling short of merger. Term coalition is used to consist a whole variety of arrangements that include joint ventures, licensing agreements, supply agreements, marketing agreements, and a variety of other arrangements.

Coalition formation seems especially related to the development of industry and firm globalization. Coalitions are not new in international competition, but their nature has been shifting more strategic. Strategic coalitions link major competitors together to compete worldwide. For firms coalitions are as among the strategic alternatives in competing internationally. (Porter 1986, 315-316)

3.1.1 Strategic benefits of coalitions

Coalitions will be preferred when a firm attains benefits that cannot be obtained either by internal development, merger, or arm's length transactions. Porter (1986, 322-325) divides benefits with coalitions into the four classes. The first class of benefit of coalition is gaining economies of scale or learning by concentrating the activity within one entity to serve both firms. Pooling volume make higher the scale of the activity or the grade of learning about how to perform it compared to that of each firm working separately.

The second class of benefit of coalitions is in acquiring, pooling, or selling access to the knowledge or ability to execute an activity where there are asymmetries between firms; one firm has already incurred the cost of developing the ability, enjoys a better capacity in the activity, or has preferred resources. Coalitions for access pursue such things as distribution channels, local legitimacy, technology or innovative competence, specialized know-how, and capital. Coalitions for access commonly grow out of either first-mover effects, comparative advantage effects, desire for local ownership, or a combination of the three. Coalitions for access lower the cost or cut down the time required to achieve competence in the activity.

The third class of benefit of coalitions is reducing risk. Company's size is related to its ability to bear risk. Product development typically needs R&D investments with uncertain future revenues. The smaller the company is, the riskier the investment is. (Paija 2001, 57) Because neither partner bears the full risk and cost of the coalition activity, coalitions are an alluring system for reduce risk. For example, firms form coalitions to spread risk where the absolute size of the variance of return from some activity is very large and in relation to optimal firm size in other activities.

The fourth class of benefit of coalitions is shaping competition by influencing for a firm competes with and the basis of competition. A firm may advantage coalitions to facilitate entry of other firms into an industry in order to develop a technology, to bias its competitors´ cost structure by influencing key costs or securing that competitors apply a particular technology, and to adapt competition in its favor in a variety of other ways.

3.1.2 Strategic costs of coalition

Potential costs of coalitions must be compared to their benefits. According to Porter (1986, 326-327) the costs of coalitions can be grouped into three categories: coordination, erosion of competitive position, and creation of an adverse bargaining position. Coalitions need constant coordination between the partners that involves management time and money. In addition, different kind of interests between coalition partners may make difficult the execution of a global strategy. Usually both partners want to play a bigger role, and that may complicate the partners` agreement on the best way to configure an activity worldwide. As well coordination among disconnected units may be hindered if different units have different ownership. Coalitions may also complicate to attain linkages among separate activities in the value chain because linkages need system optimization that crosses activity boundaries and may inflate the cost of the coalition activity.

The degree of similarity of partners´ interests and the extent to which the coalition is part of global or country-centered strategy affect the extent of coordination costs. Global strategic coalitions contain higher costs if great levels of ongoing coordination are needed. The similarity of partners` interests will expand if both partners are doing global strategies that if other one is not. Then they will both attain advantage from connecting the coalition’s activities to others within their organizations. For this reason coalitions involving two multinational firms may well be less costly, as opposed to coalitions involving a multinational and a domestic firm. The

competitive costs of coalitions boom of their chance to dissipate sources of competitive advantage and decrease industry structure. Coalitions may built a competitor or make a present competitor more frightening through the transfer of expertise and market access. In addition coalitions may lower entry barriers into an industry and impair other elements of industry structure.

In the coalitions the firm divide the benefits with the partner. Coalitions may disclose one or both partners to elimination of profits by the other because it is in an unfavorable bargaining position. One partner may be able to capture an asymmetric share of the value created by the coalitions, because the other partner has made specialized and unrepeatable investments or the charge of the partner would be hard to replace. These circumstances may eliminate the possibility of attain an agreement to form the coalition in the first place.

Usually the cost of coalitions changes over the life of the coalition for many reasons. When the partners gain experience in working together and trust is established coordination costs may fall. Equally competitive costs may fall if the coalition finds mutually profitable and the probability of the partners proceeding on their own decreases. Anyhow coordination costs may rise if one or both partners` interests and aims change. Also competitive costs may rise if one partner gains much of the expertise or position in its own organization that it sought through the coalition and continuing share if the other partner falls.

3.2 Technological collaboration

In past years, collaboration with other organizations has become an essential element in companies` technology development strategies. Bailey et al. (1998, 125) define that technological collaborations are formal agreement between two or more organizations. The aim of these collaborations is to develop the firm’s technological competence.

3.2.1 Reasons for technological collaboration

Bailey et al. (1998, 125) have studied reasons for collaborating technology development. After their study they argue that these reasons include improving the efficiency of the development process through spreading costs of technological development: decrease risks by fixing standards, allowing fast access to new technology, broadening the firm's breadth of technological competence, and attaining a window for controlling technological advances. In addition by improving the development process, technological collaboration may be in the key role in implementing corporate strategy, for example in diversification, globalization, and constructing buyer-supplier linkages. Technological collaboration may also help a company in capturing trade barriers. As well public policy initiatives are reason for companies to collaborate.

3.2.2 Contractual forms of technological collaboration agreements

Technological collaboration agreements can be divided in different kinds of contractual forms. Bailey et al. (1998, 125) categorize these agreements as follow:

- Operating joint venture: two or more organizations create a third, independent company, with assets contributed and equity held by all collaborators.
- University or research institute agreements: companies finance research in university departments or research institutes.
- Collaborative R&D agreements: two or more companies create agreements to pool their resources to advance technology, with access to the results being defined in the contract.
- Research consortia: large groups of companies form collaborative agreements, usually with government or EC funding.

4 ICT CLUSTER AND BUSINESS MODELS OF THE ANALYZED COMPANIES

4.1 Defining cluster

Paija defines that cluster is a network of organizations in which competitive advantage grows from dynamic interaction between actors, both public and private. Cluster relations encourage innovation and upgrading through diffusions and knowledge transfers. (TEKES 2001, 5)

Porter defines that “a cluster is a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities”. The geographic area of a cluster can vary from a single city to a country or even a network of countries. Most clusters include end-product or service companies, suppliers of specialized inputs, components, machinery, and services, financial institutions, and firms in related industries. In addition, clusters often include firms in downstream industries, producers of complementary products, specialized infrastructure providers, government and other institutions providing specialized training, education, information, research, and technical support. (Porter 1998, 199)

In a knowledge-intensive environment companies are dependent on the knowledge and resources of the other companies. Companies do inter-firm contracts, i.e. networking. Networks can develop a cluster. Clusters across traditional industry limits by connecting customers, suppliers, related industries and even the research sector. In the co-operative relationships knowledge transfers and technology spill-over make new abilities and innovations. Interaction between companies strengthens the competitive advantage of the entity, and finally the economy in which it acts. “A cluster is thus more than the sum of its components.” (Ali-Yrkkö 2001, 16)

Clusters have a long history as been part of the economic landscape. The role of clusters has changed during centuries. The depth and breadth of clusters have increased as competition has evolved and as modern economies have grown in complexity. Globalization and growing knowledge intensity have changed the role of clusters in competition. (Porter 1998, 206)

Different environmental determinants influence the competitiveness of the cluster. These determinants include factor conditions; demand conditions; related and supporting industries; and firm strategy, market structure and rivalry. Clusters are vulnerable to external forces, such as government actions and change, including changes in firms` global operational environment. (TEKES 2001, 5)

4.2 The ICT cluster environment

The network environment of the firms related to the information and telecommunications technology (ICT) is described in figure 3. The ICT infrastructure, terminals and services compose a complex regarded as the key industries, whose interactions with other industries differ in their dimensions. There are vertical relationships with suppliers in the supporting industries and with customers. Horizontal linkages are between competitors within the key industries. There are also diagonal interfaces with third-party sectors or related industries.

Lately the cluster portrait has become more formless because of three trends: convergence of networks, terminals and services; digitalization; and deregulation. The actors of the cluster are penetrating new, and to a broad extent one another business areas. Vertical mergers across traditional sector borders are used to strengthen new competitive positions.

Because of the common nature of the ICT, the cluster has countless interfaces with other industrial clusters. Representative crossing points are found in the related industries (see figure 3.), in which new sector-specific applications of the ICT are being developed. Also manufacturing industries are actively adopting new equipment developed in the interface of the cluster.

The total economic effect of the ICT is likely to be even heavier in the demand-side of the technology than in the supply-side, since innovative applications of the technology are about to revolutionize traditional business models in a number of sectors. (TEKES 2001, 5-6)

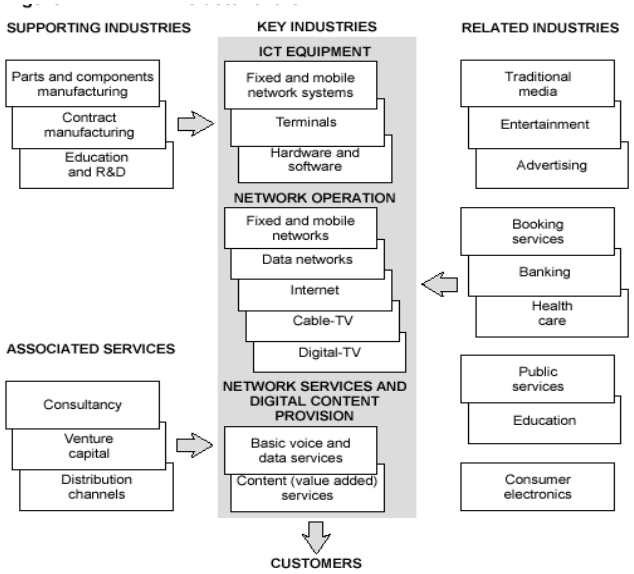

Figure 3. ICT cluster chart (TEKES 2001, 6)

4.3 Defining business model

Business model has been defined in many different ways and especially the characterization of it has been diverse. In this study I concentrate on Hamel's definition, which he has described in his book "Leading the Revolution" (2000). Hamel defines business model as a concept that has been put into practice.

According to Hamel a business model (concept) basically forms around four separate components: Customer Interface, Core Strategy, Strategic Resources and Value network. These components are linked together by three other components: Customer benefits, Configuration and Company boundaries. Finally there are four factors that define business model's profit potential. Figure 4. describes the business model and its elements.

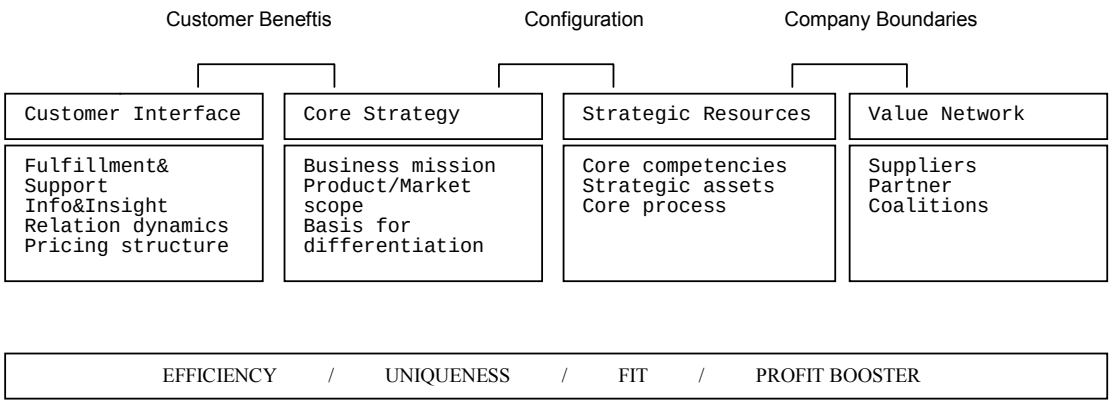

Figure 4. Business model by Hamel (2000, 92)

Customer Interface component has four elements for the company for achieving and serving the customer:

- Fulfillment and Support refers to the way the company goes to the market, reaches the customers, which channels it uses, what kind of customer supports it offers and what level of service it provides.
- Information and Insight refers to all knowledge that is collected and used from the customers.
- Relationship dynamics attach the nature of the interaction between the producer and the customer (direct/indirect, continuous/sporadic, level of loyalty, etc.).
- Pricing structure refers the choice of how to charge from the customers (set prices/market prices, direct/indirect, service included, or not, etc.).

(Hamel 2000, 80-85)

Core Strategy is the essence of how the firm chooses to compete. Core strategy contains three elements:

- The Business mission captures the overall objective of the strategy – what the business model is designed to accomplish or deliver (value proposition, strategic intent, goals, purposes and objectives).
- Product/Market scope defines where the company competes (customers, markets, product segments), and where it does not.
- Basis for differentiation refers how the firm competes differently from its competitors.

(Hamel 2000, 71-74)

Strategic Resources defines a company's competitive advantage rests on its unique firm-specific resources. Strategic resources contain following elements:

- Core competencies are what a firm knows. It contains skills and unique capabilities.

The critical factor in the company's core competencies is the supply of skilled labor. There is a structural mismatch in available skills within the ICT cluster, because of the fast pace of technological development. (Paija 2001, 33)

- Strategic assets are what the firm owns concretely (brands, patents, infrastructure, standards, etc.).
- Core process is what people do. These include firm specific activities to transform inputs into outputs in order to create value for the customer.

(Hamel 2000, 75-77)

Value Network is what surrounds the firm, and which improves the firm`s own resources:

- Usually suppliers are "up the value chain" from the producer.
- Typically partners supply critical complements to a final product or "solution".

- Coalitions are close cooperation that is usually formed amongst the companies of the industry, in order to share risk (and rewards) of a very large investment/research, or against the competition.

(Hamel 2000, 88-91)

4.4 Business models of the operators

Need for services drives computer hardware business. The same reason is the driving force for the wireless telecom business. Innovative services and service content will play decisive roles in third generation service take-off and in the wireless hardware business. (TEKES 2001, 25)

Network operators are facing new challenges. The old business models do not work anymore. New business models are needed. (TEKES 2001, 25) During past years, telephone companies have faced important changes in their business models. Firstly, revenues from basic telephony services have declined. Operators had been forced to specify their strengths. Some operators have diversified their service base by mergers, acquisitions, and joint ventures over traditional service base. Secondly, network capacity is available to any service provider and network services and infrastructure provision are separating from operator business areas. Return on investment is assumed to decline. Because of this some operators have planned on withdrawing from network ownership. It is not feasible for subscribers alone to pay back big investments that have been invested into operating licenses and network building (TEKES 2001, 25). Thirdly, liberalization and new business opportunities in the global markets have encouraged the largest operators to make investments in international markets. In addition, the uncertain and hardly predictable future has motivated operators to look for global partners with whom to share the risks. (Paija 2001, 31)

Since late 1990s, the development to Internet services in developed telecommunications and mobile markets has translated to an extreme

restructuring of the traditional telecommunications industry. New technologies have created rise to new business models as the Internet's open standards and fast innovation have shattered vertical integration in the traditional industry. The new ICT cluster structure is horizontally layered and controlled by companies with horizontal business models. At first, Internet access has created demand for telecommunications bandwidth, which has given a boom in the business. After that, Internet services have caused in functionalities that compete with traditional telecommunications services, which has developed to substitution. In the end, Internet technologies have replaced telecommunications as the first platform for service innovation.

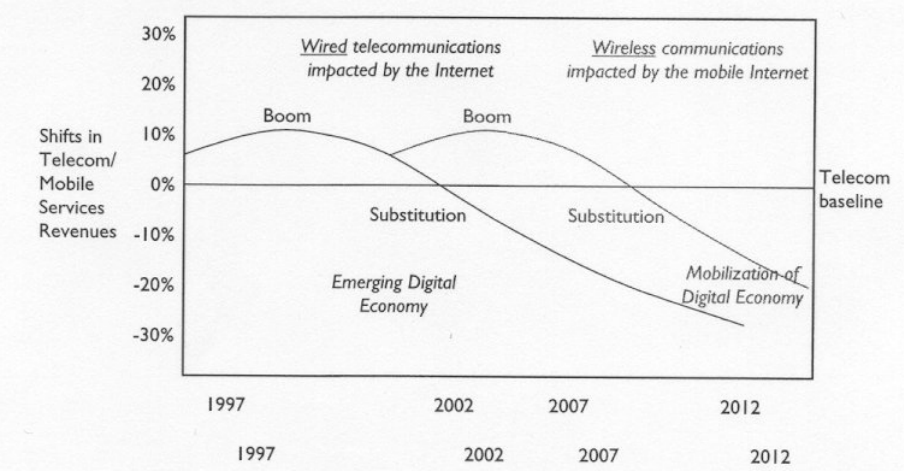

Figure 5. Two substitutions (Steinbock 2001, 136)

The mobilization of the digital economy means another sequence of boom, substitutions, and displacement. The access to the Mobile Internet increases the demand for mobile infrastructure, handsets and services, which causes a boom in the mobile business. Mobile Internet services offer functionalities that compete with mobile services, which translates to substitutions. In the end, mobile Internet technologies displace traditional digital cellular as the main platform for service innovation. (Steinbock 2001, 136)

4.5 Nokia's business model and Finnish ICT cluster

4.5.1 Mission and competencies

Nokia is the world leader in mobile communications. Nokia has become the leading supplier of mobile phones and a leading supplier of mobile, fixed and IP networks thanks to its experience, innovation, user-friendness and secure-solutions. By adding mobility to the Internet Nokia creates new opportunities for companies and further enriches the daily lives of people. (Nokia 2002a)

Nokia's objective is move into the Mobile World and a new era in people's lives. Nokia remains committed to strong growth, profitability and responsible market leadership. Nokia plans to deliver a record number of new mobile devices that will change the way people communicate wirelessly. Nokia will also lead the advance towards new mobile services with the delivery of third generation networks to operators around the world. (Nokia 2002b)

4.5.2 Business groups

Nokia is organized on a worldwide basis into three primary business groups: Nokia Networks, Nokia Mobile Phones and Nokia Ventures Organizations. Nokia's business groups are strategic units that offer different products and services. In addition, Nokia has *Common Group Functions* that consists of common research and general Group functions.

Nokia Networks is a leading provider of mobile, fixed broadband and IP network infrastructure and related services. Nokia Networks aims to be a leader in IP mobility core, radio and broadband access for network providers and operators.

Nokia Mobile Phones develops, manufactures and supplies mobile phones and wireless data products, including a complete range of cellular phones for all major digital and analog standards worldwide.

Nokia Ventures Organization exists to create new business areas outside the natural development path of economy's core activities. The unit comprises venture capital activities, incubation, and a portfolio of new ventures, including two more mature businesses: Nokia Internet Communications and Nokia Home Communications. (Nokia Annual Reports 1999-2001)

Table 2. Nokia business group information (Nokia Annual Reports 1999-2002)

BUSINESS GROUPS	**1999**	**2000**	**2001**	**2002**
Nokia Networks				
Personnel, Dec 31	23 718	23 965	19 392	17 361
Net sales (EURm), 1.1.-31.12.	5 670	7 708	7 521	6 539
Operating profit (EURm), 1.1.-31.12.	1 082	1 358	-73	-49
Research and development (EURm), 1.1.-31.12.	777	1 013	1 135	995
Nokia Mobile Phones				
Personnel, Dec 31	23 775	28 047	26 453	26 090
Net sales (EURm), 1.1.-31.12.	13 168	21 844	23 107	23 211
Operating profit (EURm), 1.1.-31.12.	3 099	4 879	4 521	5 201
Research and development (EURm), 1.1.-31.12.	835	1 306	1 599	1 884
Nokia Ventures Organizations				
Personnel, Dec 31	1 879	2 570	1 886	1 506
Net sales (EURm), 1.1.-31.12.	409	824	563	459
Operating profit (EURm), 1.1.-31.12.	-175	-387	-855	-141
Research and development (EURm), 1.1.-31.12.	110	235	221	136
Common Group Functions				
Personnel, Dec 31	5 888	5 707	6 118	6 791
Operating profit (EURm), 1.1.-31.12.	-98	-74	-231	-231

Nokia Mobile Phones is the largest business group measured by volume of net sales, number of personnel, volume of operating profit and R&D investments. At the year-end 1999 Nokia employed 55 260 personnel, while at the year-end 2002 personnel has decreased to 51 748. During last four years the number of personnel has decreased most in Nokia Networks (see table 2.). Meanwhile in Nokia Mobile Phones personnel has increased from the year-end 1999 23 775 persons to year-end 2002 26 090 persons. Nokia Venture Organizations and Common Group Functions have minority of company's total personnel.

In 2002, Nokia Mobile Phones was only business group that has positive operating profit (5 201 EURm). The other groups have negative operating profit. During last four years Venture Organizations and Common Group Functions have had negative operating profit. In years 1999 and 2000 Networks has positive operating profit (1999; 1 802 EURm and 2000; 1 358 EURm), but since year 2001 operating profit has been slightly negative (2001; -73 EURm and 2002; –49 EURm). During last four years Mobile Phones group has been done Nokia's operating profit. (Nokia Annual Reports 1999-2002) Key figure operating profit is discussed more detailed in chapter 5.2.

In 2002, Nokia continued to invest in its R&D and co-operation. At year-end 2002 Nokia had over 19 thousand R&D employees, about 38% of Nokia's total personnel. Compared to year 1999 R&D investments had increased 73,9%. In 2002 R&D investments totaled 3 052 EURm, representing 10,2% of net sales. Meanwhile in 1999 R&D investments totaled 1 755 EURm, representing 8,9% of net sales. R&D investments have been focused to Nokia Mobile Phones (see table 2.). (Nokia Annual Reports 1999, 2002) It seems that investments to R&D and co-operation will further continue to increase in future, because of the fast development of technology.

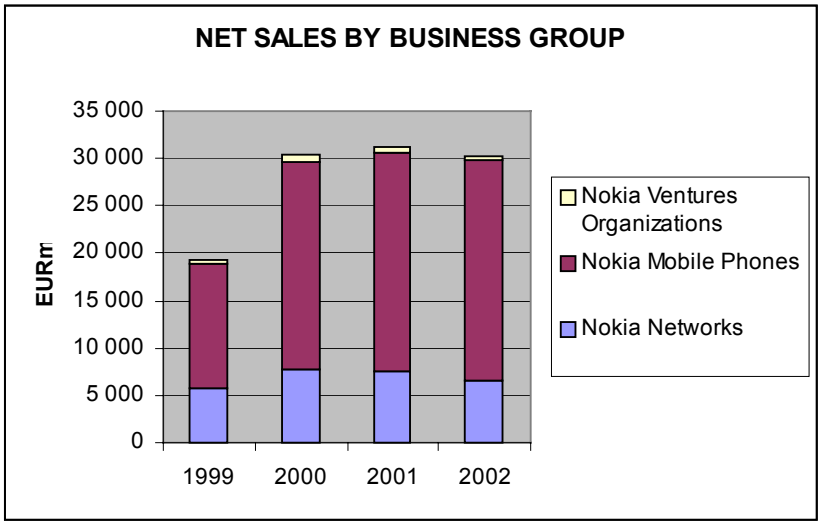

Figure 6. Nokia by business groups (EURm)

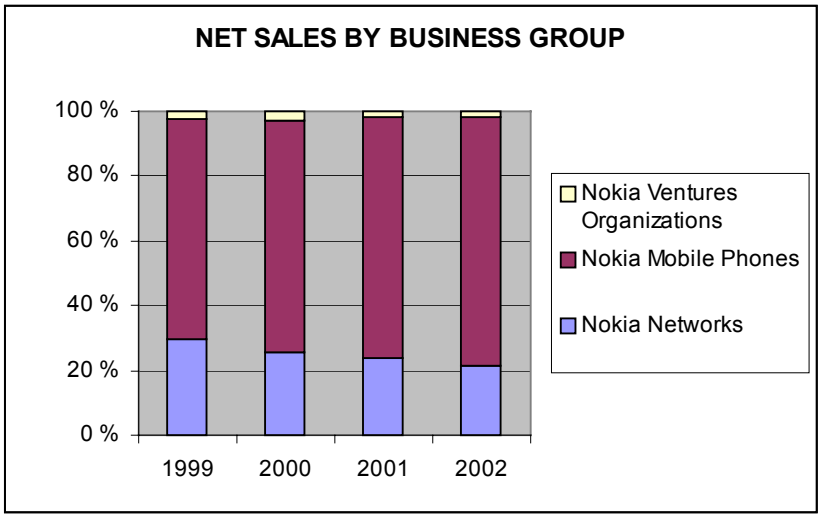

Figure 7. Nokia by business groups (%)

In fiscal year 2002, Nokia's total net sales was 30 016 EURm. Nokia Mobile Phones earned 77% of total net sales in 2002. In 2002, Nokia Network's share of net sales was 22% and Nokia Venture Organizations 1%. As figures 6. and 7. and table 2. show, Mobile Phones is the main business model and the source of income.

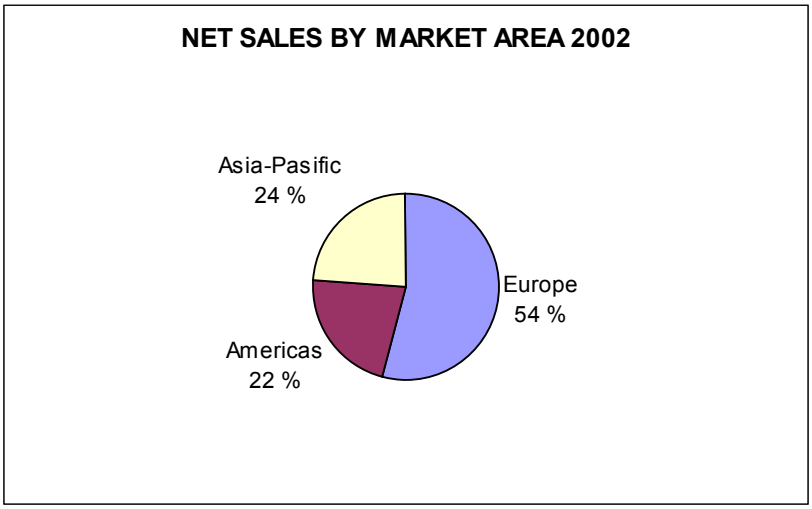

Figure 8. Nokia by market area 2002

In 2002, 54% of Nokia's net sales came from Europe, 24% came from Asia-Pasific region and 22% came from North and South Americas. As figure 8. shows, Europe is Nokia's main market area.

Table 3. Nokia's 10 major markets (Nokia Annual Reports 1999-2002)

10 MAJOR MARKETS, net sales (EURm)	**1999**	**2000**	**2001**	**2002**
USA	3 360	5 312	5 614	4 665
UK	1 855	2 828	2 808	3 111
China	2 332	3 065	3 418	2 802
Germany	1 679	2 579	2 003	1 849
Italy	968	1 243	1 168	1 342
France	951	1 085	1 260	1 273
United Arab Emirates		316	619	925
Thailand		445	908	827
Brazil	600	1 056	892	1 056
Poland		478	590	582

Table 3. represents Nokia's 10 major markets in years 1999-2002. USA is the most notable market. During past four years UK has become the second notable market. UK had outstripped China, which is now the third notable market. Although net sales in China have decreased during last fiscal year, China might have huge market potential in the future because

of its large population. In 2002, above-mentioned 10 largest markets together represented 60% of total sales.

During past years Nokia's playing field has become very challenging. However, Nokia has maintained its leading role in creating communication products and services. In the future Nokia has to concentrate on its core strengths in its two main business groups Mobile Phones and Networks. In the hard rivalry Nokia's strong competitive advantage is the good brand.

4.5.3 Finnish ICT cluster and Nokia

Nokia has become one of the world's leading high-tech companies. Nokia is a multinational company, but major of its activities are still located in Finland. Nokia has effected strongly into the Finnish economy and industry. But there is much more than only Nokia. The whole ICT cluster in Finland has grown fast. There are hundreds of small and medium-sized rapidly expanded companies in the cluster. Many of these companies are Nokia's suppliers and partners or have their roots in the ICT-related knowledge. (Ali-Yrkkö 2001, 8)

How does Finland succeed to create a successful ICT cluster? After Porter (1990, 71) the answer lies in four broad attributes of a nation that shape the environment in which local companies compete that advance or prevent the generation of competitive advantage.

1. Factor conditions; The nation's position in factors of production, as skilled labor or infrastructure, necessary to compete in a given industry.
2. Demand conditions; The nature of home demand for the industry's product and service
3. Related and supporting industries; The presence or absence in the nation of supplier industries and related industries that are internationally competitive.

4. Company strategy, structure, and competition; The conditions in the nation governing how companies are created, organized, managed, and the nature of domestic competition.

The supporting industries, as parts and components manufacturing, contract manufacturing, education and R&D, (see figure 3.) have specialized in serving Nokia and the other ICT companies. Worldwide growth in the demand for ICT equipment and increased outsourcing has created lots of new suppliers. Also existing companies have started to supply more directly towards ICT manufacturers' demands. The research institutes and universities have been successful in the generating advanced human resources and R&D for the need of the ICT cluster. The industry, universities and the public Technical Research Centre (VTT) have long traditions in technology development co-operation. The advanced ICT knowledge has tempted leading foreign manufacturers, as Ericsson, Hewlett Packard, IBM and Siemens, to base R&D centres in Finland.

After the Statistics Finland (Ministry of Transport and Communications) the key activities of the ICT cluster generated a turnover of EUR 17,5 billion in 1998. The cluster output consists of mainly equipment manufacturing, which represents two thirds of the value. The share of the ICT cluster of the GDP was 6,6% in 1998. At the same year, the Nokia's share of the GDP was 2,4%. In 2000, Nokia accounted already for 4,6% of the GDP. In 1998, 85% of the total ICT equipment manufactures were exported, representing about 20% of total exports. In 1990, the share was only 5%. In Finland, the fast expansion of the electronics industry has lead to an industrial restructuring in the former forest and metal based Finnish economy. The ICT cluster has caught up with the main trading sectors in export shares, transforming the economy less vulnerable to fluctuating raw material based industries. (Ali-Yrkkö 2001, 17-20)

4.6 Microsoft's business model

4.6.1 Outlook

Microsoft develops, manufactures, licenses, and supports a wide range of software products for a wide amount of computing devices. Microsoft software includes scalable operating systems for servers, personal computers, and intelligent devices; server applications for client/server environments; knowledge worker productivity applications; and software development tools. Microsoft's online aims include the MSN network of Internet products and services and alliances with companies involved with broadband access and various forms of digital interactivity. In addition, Microsoft licenses consumer software programs; sells hardware devices; provides consulting services; trains and certifies system integrators and developers; and researches and develops advanced technologies for future software products. Microsoft's business strategy accents the development of a broad line of software products for information technology (IT) professionals, knowledge workers, developers, and consumers, marketed through numerous distribution channels. (Microsoft Annual Report 2001)

Vision of technology and the values are two key aspects to Microsoft's past and future success. Microsoft's long-term success is based on helping customers achieve their goals. Microsoft's long-term approach to research and development is combined with their constant efforts to anticipate customer needs, improve quality and reduce cost. Microsoft believes that these actions will enable them to deliver the best products and technologies. The central of Microsoft mission is to help partners succeed and grow their businesses with the best platforms, tools and support. (Microsoft 2002)

Microsoft is concentrated on a wide array of new technology issues. In June 30, 2001 19 400 employees of total 47 600 people were in product

research and development (Microsoft Annual Report 2001). During fiscal year 2002 R&D investments totaled $ 4,31 billion, representing 15,2% of net sales. Meanwhile during fiscal year 2000 R&D investments totaled $ 3,77 billion, representing 16,4% of net sales. (Microsoft Annual Report 2002) Research and product development is important for Microsoft, because it wants to be at the head of technological development. So, it can be assume that Microsoft will continue to increase invests in R&D in the future years.

4.6.2 Business groups

Microsoft's business groups are: Desktop and Enterprise Software and Services; Consumer Software, Services and Devices; Consumer Commerce Investments; and Other.

The Desktop and Enterprise Software and Services group includes the Platforms group and the Productivity and Business Services Group. The Platforms Group develops the Windows platform. The division also includes the .NET Enterprise Server Group, the Developer Tools Division, and the Windows Digital Media Division. The Productivity and Business Services Group drives Microsoft's wide vision for productivity and business process applications and services. In addition, this group includes the Office Division, the Emerging Technologies Group, the Business Tools Division, and the Business Applications Group, which includes bCentral and Microsoft Great Plains.

The Consumer Software, Services and Devices group includes the MSN Business Group; the Personal Service Business Group; and the Home and Retain Division. MSN Business Group attends the network programming, business development, and worldwide sales and marketing for MSN and Microsoft's other services efforts, containing MSN eShop, the MSNBC venture, Slate, and MSNTV. The Personal Services Group concentrates on making it easier for consumers and businesses to connect online and

to deliver software as a service on a variety of devices. The Home and Retail Division develops and markets learning and entertainment software and future Xbox game console.

Consumer Commerce Investments include Expedia, Inc., the HomeAdvisor online real estate service, and the CarPoint online automotive service.

Other business group includes e.g. Microsoft Hardware, which develops and markets many PC input devices including the Microsoft IntelliMouse family of hald-held pointing devices that make easier using PC. Microsoft also markets many types of keyboards including the Microsoft Natural Keyboard, which is an ergonomically designed keyboard. In addition, Microsoft sells many Microsoft SideWinder game controllers and force feedback joysticks with realistic performance technology to use with PC games. Microsoft Press offers comprehensive learning and training resources to contribute new users, power users, and professionals get the most from Microsoft technology through books, CD's, self-paced training kits, and videos that are developed to adapt different learning styles and preferences. (Microsoft Annual Report 2001)

Table 4. Microsoft business group information (Microsoft Annual Reports 1999-2002)

BUSINESS GROUPS	**1999**	**2000**	**2001**	**2002**
The Desktop and Enterprise Software and Services				
Revenue **(EURm)** 1.7.-30.6.	20 209	23 159	25 780	26 990
Revenue ($ millions) 1.7.-30.6.	17 810	20 410	22 720	23 786
Operating profit **(EURm)**		14 989	16 182	16 647
Operating profit ($ millions) 1.7.-30.6.		13 210	14 261	14 671
The Consumer Software, Services, and Devices				
Revenue **(EURm)** 1.7.-30.6.	1 303	1 877	2 225	4 007
Revenue ($ millions) 1.7.-30.6.	1 148	1 654	1 961	3 531
Operating profit **(EURm)**		-1 237	-1 890	-2 017
Operating profit ($ millions) 1.7.-30.6.		-1 090	-1 666	-1 778
Consumer Commerce Investments				
Revenue **(EURm)** 1.7.-30.6.	70	207	592	278
Revenue ($ millions) 1.7.-30.6.	62	182	522	245
Operating profit **(EURm)**		-68	-252	26
Operating profit ($ millions) 1.7.-30.6.		-60	-222	23
Other				
Revenue **(EURm)** 1.7.-30.6.	673	784	740	609
Revenue ($ millions) 1.7.-30.6.	593	691	652	537
Operating profit **(EURm)**		98	110	67
Operating profit ($ millions) 1.7.-30.6.		86	97	59

Amounts converted into euros after exchange rate of the Bank of Finland 28.12.2001, USD / EURO = 0,8813

Desktop and Enterprise Software and Services is the largest business group measured by volume of revenue and operating profit. During last three years The Desktop and Enterprise Software and Services business

group has been done most of all Microsoft's operating profit. During last three years The Consumer Software, Services, and Devices group has had negative operating profit. In years 2000 and 2001 The Consumer Commerce Investments group has negative operating profit (2000; -60 $m and 2001; -222 $m), but in year 2002 operating profit was slightly positive (2002; 23 $m). Since 1999 The Other business group has had positive operating profit, but group's share of Microsoft total operating profit is not notable. Key figure operating profit is discussed more detailed in chapter 5.2.

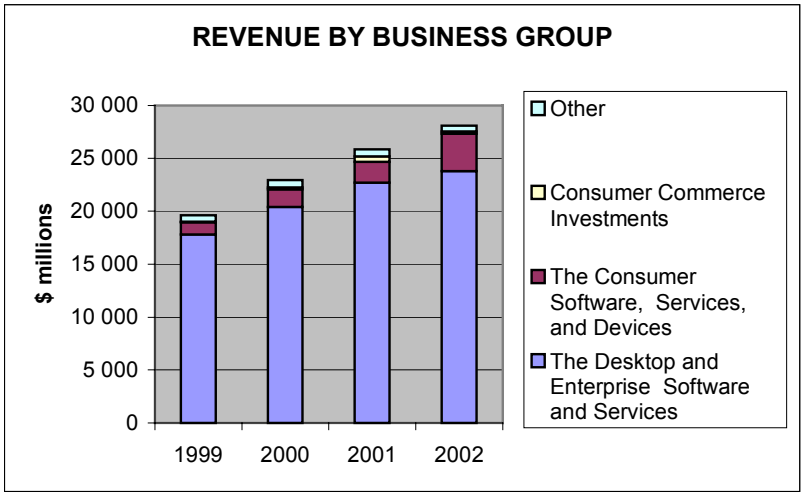

Figure 9. Microsoft by business groups ($ millions)

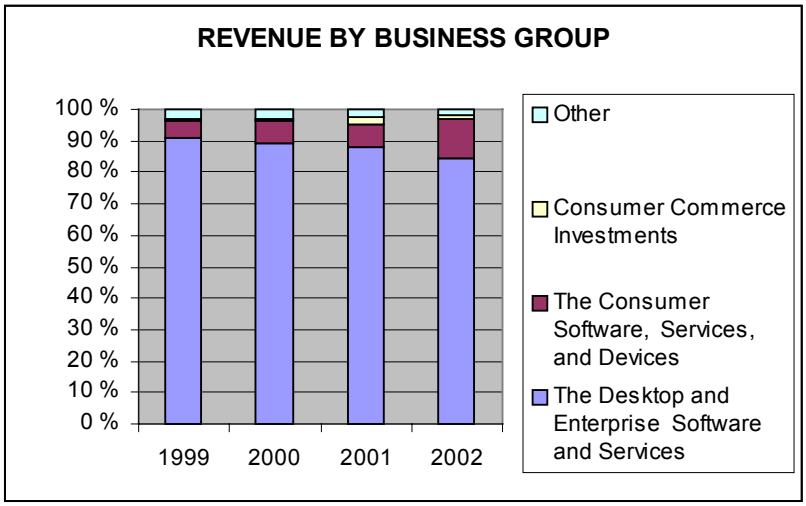

Figure 10. Microsoft by business groups (%)

In fiscal year 2002, Microsoft's total revenue was 28 365 $ millions. The Desktop and Enterprise Software and Services business group earned 84% of total net sales in fiscal year 2002. In 2002, The Consumer Software, Services and Devices group share of net sales was 12%, Consumer Commerce Investment 1% and Other group 2%. As figures 9. and 10. show, The Desktop and Enterprise Software and Services is the source of income.

Microsoft's main business model is Software products licence sales. In order to defend the principal business model Microsoft is preparing actions to reorganize its distribution channels to cut down the distribution costs and get better access to its final customers. Very important note is that enterprises present extremely important part of Microsoft's customers. Secondly, as an outstanding opportunity, Microsoft is pursuing the mobile devices operating system market and consumer markets. Presently the consumer business is not profitable. The service models like MSN.NET and Wireless Services support this attempt. In figure 5 is presented Microsoft's revenues by business groups. MSN.NET Business model is based on Advertising and Aggregator revenues. (Laaksonen et al. 2002, 6)

4.7 Verizon's business model

4.7.1 Objectives and competencies

Verizon companies are the largest providers of wireline and wireless communications in the United States, with 132,1 million access line equivalents and 29,4 million wireless customers. Verizon is also the largest directory publisher in the world. Verizon has global representation more than 40 countries in the Americas, Europe, Asia and the Pacific.

Verizon focus is on the "blocking and tackling" of operational excellence. Verizon desires to reduce cost, manage complex networks, introduce new

products and particular deliver superior service to customers. Verizon's Chairman Charles R. Lee and President Ivan G. Seidenberg belive that: "as in any competitive business, the bar for being the market leader gets higher every year. Technological change and increasing competition from cable, Internet telephony and other full-service carriers will continue to accelerate - challenging us to execute our game plan faster, better and with a greater sense of urgency." (Verizon Annual Report 2001)

4.7.2 Verizon's business groups

Verizon has divided its businesses into four business groups, which they operate and manage as strategic business units: Domestic Telecom, Domestic Wireless, International and Information Services.

Domestic Telecom business group provides local telephone services, including voice and data transport, enhanced and custom calling features, network access, directory assistance, private lines and public telephones. In addition, Domestic business group provides long distance services, customer premises equipment distribution, data solutions and systems integration, billing and collections, Internet access services, research and development and inventory management services.

Domestic Wireless products and services include wireless voice and data services, paging services and equipment sales. This business group primarily represents the operations of the Verizon Wireless joint venture. Verizon Wireless was formed in April 2000 through the combination of Verizon wireless properties with the U.S. properties and paging assets of Vodafone.

International operates include wireline and wireless communications operations, investments and management contracts in the Americas, Europe, Asia and the Pacific.

Information Services include domestic and international publishing of print and electronic directories and Internet-based shopping guides. Information Services also include website creation and other electronic commerce services. (Verizon Annual Report 2001)

Table 5. Verizon business group information (Verizon Annual Reports 2000-2002)

BUSINESS GROUPS	**1999**	**2000**	**2001**	**2002**
Domestic Telecom				
Net sales (EURm), 1.1.-31.12.	47 343	49 181	48 880	46 195
Net sales ($ millions), 1.1.-31.12.	41 723	43 343	43 078	40 712
Operating profit (EURm), 1.1.-31.12.	11 156	11 408	11 140	
Operating profit ($ millions), 1.1.-31.12.	9 832	10 054	9 818	
Domestic Wireless				
Net sales (EURm), 1.1.-31.12.	8 684	16 153	19 736	21 854
Net sales ($ millions), 1.1.-31.12.	7 653	14 236	17 393	19 260
Operating profit (EURm), 1.1.-31.12.	1 574	2 019	2 615	
Operating profit ($ millions), 1.1.-31.12.	1 387	1 779	2 305	
International				
Net sales (EURm), 1.1.-31.12.	1 945	2 242	2 652	3 361
Net sales ($ millions), 1.1.-31.12.	1 714	1 976	2 337	2962
Operating profit (EURm), 1.1.-31.12.	289	297	332	
Operating profit ($ millions), 1.1.-31.12.	255	262	293	
Information Services				
Net sales (EURm), 1.1.-31.12.	4 636	4 702	4 894	4 864
Net sales ($ millions), 1.1.-31.12.	4 086	4 144	4 313	4287
Operating profit (EURm), 1.1.-31.12.	2 273	2 319	2 579	
Operating profit ($ millions), 1.1.-31.12.	2 003	2 044	2 273	

Amounts converted into euros after exchange rate of the Bank of Finland 28.12.2001, USD / EURO = 0,8813

Domestic Telecom is the largest business group measured by volume of net sales and operating profit. During years 1999-2001 Domestic Telecom business group has been done over half of all Verizon's operating profit. In year 2001 Domestic Telecom's share of Verizon's total operating profit

was 67%. During years 1999-2001 all of Verizon business groups have had positive operating profit. Segment information of operating profit is not available in year 2002. Key figure operating profit is discussed more detailed in chapter 5.2.

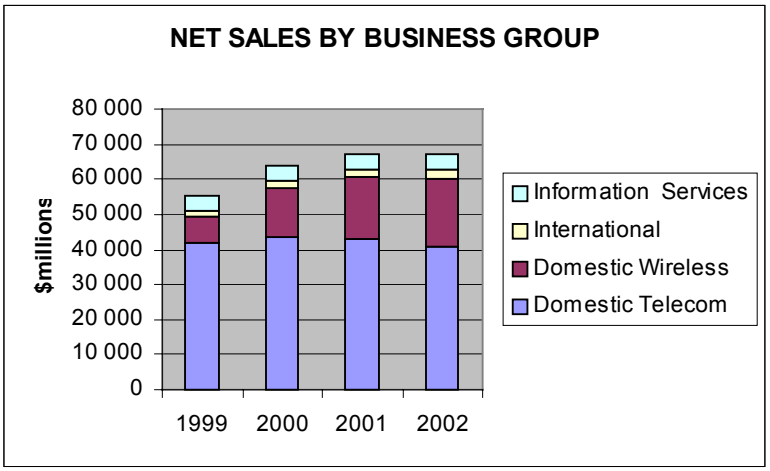

Figure 11. Verizon by business groups ($ millions)

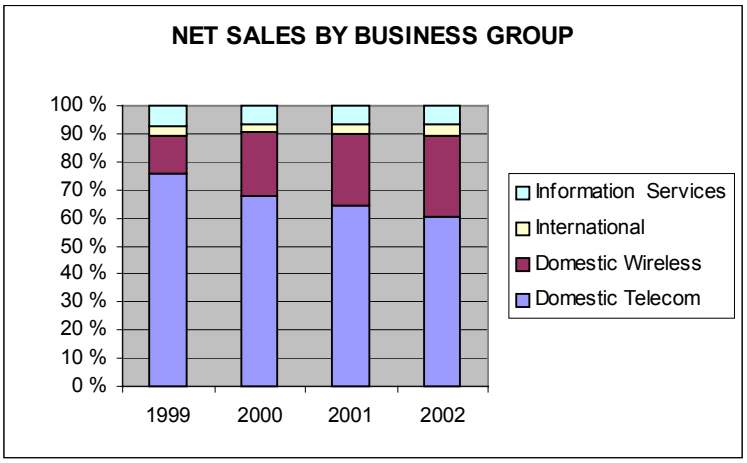

Figure 12. Verizon by business groups (%)

In fiscal year 2002, Verizon's total net sales was 67 625 $ millions. Domestic Telecom business group earned 60% of total net sales in fiscal year 2002. In 2002, Domestic Wireless group share of net sales was 28%, International 4% and Information Services group 6%. As table 5. and figures 11. and 12. show, Verizon main source of income is the Domestic

Telecom business group, but the other three groups have strengthen their position. Especially Domestic Wireless has become more notably group.

4.8 Vodafone's business model

4.8.1 Outlook

Vodafone is the largest mobile telecommunications network company in the world. It has interests in mobile networks in 29 countries across five continents. By market capitalization, Vodafone is the largest company in Europe, and is one of the ten largest companies in the world. (Vodafone 2002a)

Vodafone's objectives are to enable more people to do more things from more places and to exceed customer expectations, because world of mouth is the most powerful marketing tool for all. To attain this objectives Vodafone has developed the following vision: "To be the world's leading wireless communications and information provider, bringing more services and more value to more customers than any other. Vodafone's vision is based on an understanding of the huge benefits of mobile communications. Its growth is founded on the capacity to deliver those benefits through focused customer service and a commitment to being at the forefront of innovative services. (Vodafone 2002b)

4.8.2 Business groups

Vodafone's business is principally the supply of mobile telecommunications services and products. Other operations mainly comprise fixed line telecommunications businesses acquired as part of the acquisition of Mannesmann AG and the Vizzavi Europe joint venture.

From June 2000, Vodafone's geographical divisions of operations were reorganized into the following regions: Continental Europe, the Americas

and Asia Pacific, and the UK, Middle East and Africa. The result for the Asia Pacific region and Vodafone's Middle East and Africa operations are reported as separate segments. (Vodafone 2001)

Comparable group information is not available per annum 1999.
Net sales and operating profit per business group is counted accordance with accounting standards in the United Kingdom.

Table 6. Vodafone market area information (Vodafone Annual Reports 2000-2003)

Mobile telecommunications	**2000**	**2001**	**2002**
Continental Europe			**Europe**
Net sales (EURm), 1.4.-31.3.	2 802	15 739	26 873
Net sales (£m), 1.4.-31.3.	1 705	9 577	16 352
Operating profit (EURm), 1.4.-31.3.	1 569	4 988	-9 361
Operating profit (£m), 1.4.-31.3.	955	3 035	-5 696
United Kingdom			(includes in
Net sales (EURm), 1.4.-31.3.	4 767	5 660	Continental
Net sales (£m), 1.4.-31.3.	2 901	3 444	Europe 2002)
Operating profit (EURm), 1.4.-31.3.	1 160	1 306	
Operating profit (£m), 1.4.-31.3.	706	795	
Americas			
Net sales (EURm), 1.4.-31.3.	4 248	15	20
Net sales (£m), 1.4.-31.3.	2 585	9	12
Operating profit (EURm), 1.4.-31.3.	889	2 033	-112
Operating profit (£m), 1.4.-31.3.	541	1 237	-68
Asia Pacific			
Net sales (EURm), 1.4.-31.3.	923	1 172	6 692
Net sales (£m), 1.4.-31.3.	565	713	4 072
Operating profit (EURm), 1.4.-31.3.	309	337	25
Operating profit (£m), 1.4.-31.3.	188	205	15
Middle East and Africa			
Net sales (EURm), 1.4.-31.3.	192	506	503
Net sales (£m), 1.4.-31.3.	117	308	306
Operating profit (EURm), 1.4.-31.3.	243	350	56
Operating profit (£m), 1.4.-31.3.	148	213	34
Other operations	**2000**	**2001**	(fiscal year
			2002 is not
Continental Europe			comparable
Net sales (EURm), 1.4.-31.3.	0	1 566	to year 2001)
Net sales (£m), 1.4.-31.3.	0	953	
Operating profit (EURm), 1.4.-31.3.	0	-462	
Operating profit (£m), 1.4.-31.3.	0	-281	

Amounts converted into euros after exchange rate of the Bank of Finland 28.12.2001, GBP / EURO = 0,60850.

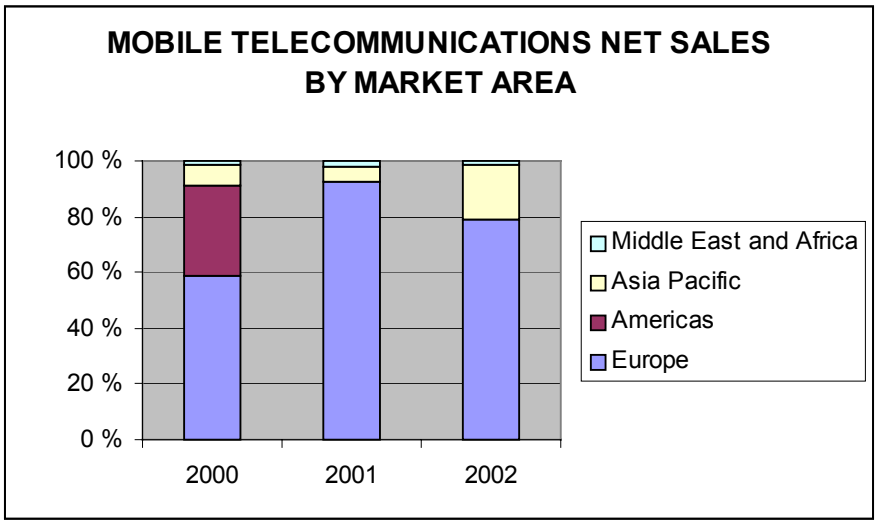

Figure 13. Vodafone by market area 2000-2002

As table 6. and figure 13. show, in fiscal years 2000-2002 most of Vodafone's net sales and operating profit came from Europe. During fiscal year 2002, Asia Pacific region importance has increased. Meanwhile Americas importance has decreased notably after fiscal year 2000. Middle East and Africa region share of Vodafone total net sales has stayed very little.

Mobile telecommunications is a rapidly developing market and competition is enormous. Customers can and do migrate from network to network. Vodafone has kept its leadership by continually providing customers with better value, better products and better service. Vodafone has strong areas such as highest quality and most reliable networks, leading-edge products and services and highest quality customer care. (Vodafone 2002c)

4.8.3 Vodafone's R&D

In previous years, Vodafone has been a user rather than a prime developer of technology. Vodafone used £72 million in the fiscal year 2001 on research and development. In the fiscal year 2000 Vodafone used £46 million and in the fiscal year 1999 £37 on research and development. Thus, Vodafone's investments on R&D had increased substantially. (Vodafone 2001)

4.8.4 Vodafone's future visions

Vodafone belives that, the trend of reducing average revenues per customer will continue. The proportion of prepaid customers, who use their phones less frequently, will increase in the overall mix of the customer base. The aim in the future will be to maximize economic returns rather then continuing to increase the size of the customer base, even if this results some decrease in market share. Vodafone expects a lower rate of customer growth due to reduction in handset subsidies and the high penetration rates already presented in Vodafone's main markets. Anyhow, the potential for more fast growth still exists in the US, Japan and China, where penetration rates are still at fairly low levels.

The global telecommunications market continues to provide the potential for important revenue growth. Vodafone thinks that mobile communications will become the substitute for fixed line networks in voice and data services. Also, the development of multi-access internet portals will provide customers with new communication facilities. In the future, data services are expected to be a key driver of revenue growth and profitability. (Vodafone 2001)

4.9 IBM's business model

4.9.1 Outlook

IBM's (International Business Machines Corporation) business model is relatively straightforward. IBM sells services, hardware and software. These offerings are strengthened by IBM's research and development capabilities. In so far as a customer needs financing, IBM can provide needed financing too. The fundamental strength of this business model is IBM's ability to build the optimal mix of these offerings to designing tailored solutions for customers and to continue to win in the marketplace.

IBM uses advanced information technology to provide customer solutions. IBM operates mainly in a single industry using many segments that develop value by offering a wide range of solutions that include, either singularly or in some combination, technologies, systems, products, services, software and financing. IBM offers its products through its worldwide sales and distribution organizations. IBM also offers its products through a variety of third party distributors and resellers, as well as through its on-line channels. IBM's businesses employ a wide range of components, supplies and raw materials from a large number of suppliers world around. (IBM 2001)

4.9.2 Business groups

Organizationally, IBM's major operations comprise: Global Services, Enterprise Systems, Personal and Printing Systems, Technology, Software, Global Financing, and Enterprise Investments. Enterprise Systems, Personal and Printing Systems, and Technology include hardware products. The business groups are determined based on several factors, including customer base, homogeneity of products, technology and delivery channels.

The Global Services business group is the world's largest I/T services provider, supporting computer hardware and software products and providing professional services to help customers of all sizes realize the full value of I/T.

Enterprise Systems, Personal and Printing Systems, and Technology include *Hardware* products.

The Enterprise Systems business group produces powerful multipurpose computer servers that operate many open-network-based applications simultaneously for multiple users. They perform high-volume transaction processing and serve data to personal systems and other end-user devices.

The Personal and Printing Systems business group produces general-purpose computer systems, advanced function printers, and point-of-sale solutions. Major business units include Personal Computers, Retail Store Solutions, and Printing Systems. Major brands include ThinkPad mobile systems and NetVista.

The Technology business group provides components such as semiconductors and HDDs for use in the company's products and for sale to original equipment manufacturers. Major business units include Microelectronics and Storage Technology.

The Software business group delivers operating systems for the company's servers and e-business enabling software (middleware) for IBM and non-IBM platforms.

The Global Financing business group is the world's largest provider of financing services for I/T. The Global Financing provides lease and loan financing that enables the company's customers to acquire complete I/T and e-business solutions – hardware, software and services - provided by

the company and its business partners. Global Financing, as a reliable source of capital for the distribution channel, also provides the company's business partners with customized commercial financing for inventory, accounts receivable and term loans, helping them manage their cash flow, invest in infrastructure and grow their business. Global Financing also selectively participates in syndicated loan activities.

The Enterprise Investments business group provides industry-specific I/T solutions, supporting the Hardware, Software and Global Services groups of the company. The Enterprise investments develop unique products designed to meet specific marketplace requirements and to complement the company's overall portfolio of products. Enterprise Investments revenue is primarily derived from the sale of software products.

Table 7. IBM business group information (IBM Annual Reports 1999-2002)

BUSINESS GROUPS	**1999**	**2000**	**2001**	**2002**
Global Services				
Net sales **(EURm)**, 1.1.-31.12.	36 505	37 617	39 664	41 257
Net sales ($ millions), 1.1.-31.12.	32 172	33 152	34 956	36 360
Hardware				
Net sales **(EURm)**, 1.1.-31.12.	42 991	42 865	37 889	31 351
Net sales ($ millions), 1.1.-31.12.	37 888	37 777	33 392	27 630
Software				
Net sales **(EURm)**, 1.1.-31.12.	14 367	14 295	14 682	14 835
Net sales ($ millions), 1.1.-31.12.	12 662	12 598	12 939	13 074
Global Financing				
Net sales **(EURm)**, 1.1.-31.12.	3 560	3 932	3 887	3 634
Net sales ($ millions), 1.1.-31.12.	3 137	3 465	3 426	3 203
Enterprise Investments/Other				
Net sales **(EURm)**, 1.1.-31.12.	1 916	1 593	1 308	1 160
Net sales ($ millions), 1.1.-31.12.	1 689	1 404	1 153	1 022

Amounts converted into euros after exchange rate of the Bank of Finland 28.12.2001, USD / EURO = 0,8813

Since 2001 Global Services has been the largest business group measured by volume of net sales. In the years 1999-2000 Hardware was the largest business group measured by volume of net sales.

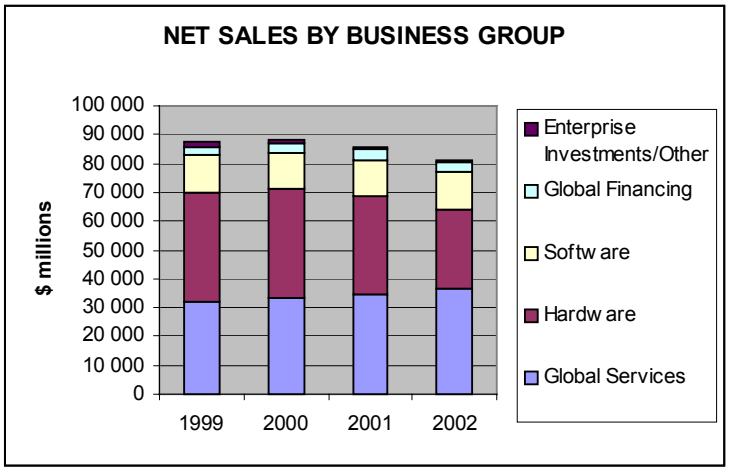

Figure 14. IBM by business groups ($ millions)

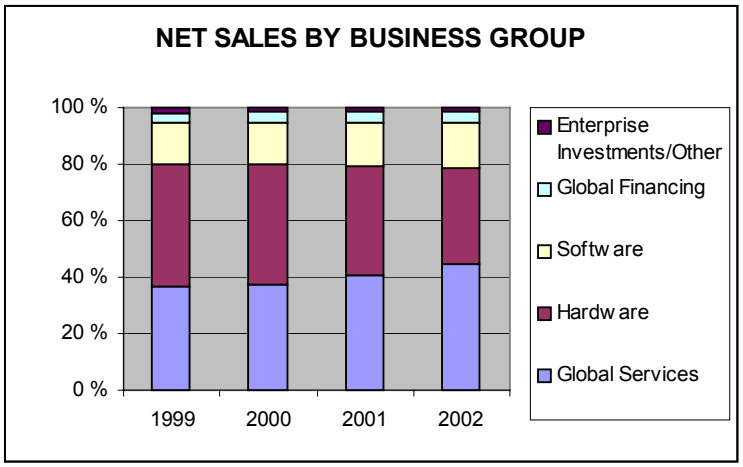

Figure 15. IBM by business groups (%)

In fiscal year 2002, IBM's total net sales was 81 186 $millions.

Global Services earned 45% of total net sales in 2002. In 2002, Hardware's share of net sales was 34%, Software 16%, Global Financing 4% and Enterprise Investments/Other 1%. As figures 14. and 15. and table 7. show, Global Services and Hardware are the source of net sales.

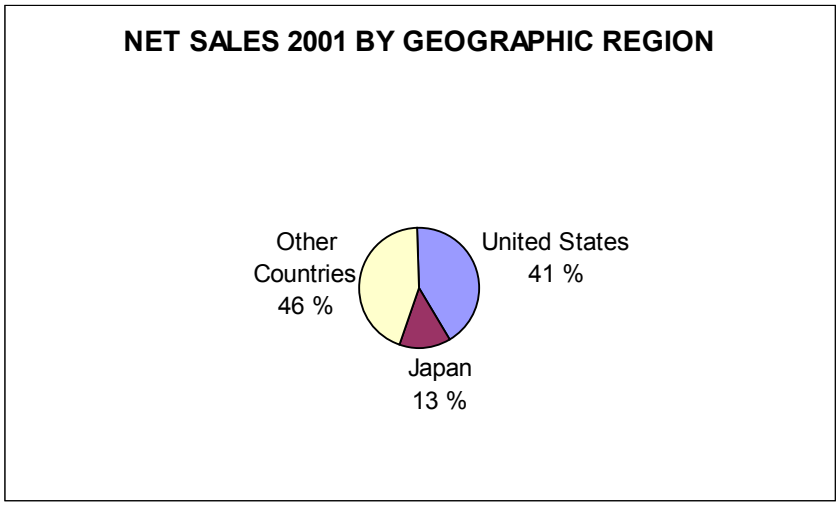

Figure 16. IBM by geographic region 2001

In 2001, 41% of IBM's net sales came from home market United States, 13% came from Japan and 46% came from other countries.

4.9.3 IBM's research, development and engineering

IBM's research, development and engineering investments declined 10% in 2002 from 2001, following a decrease of 1,6% in 2001 from 2000. The decline in 2002 and 2001 was a result of actions taken to reduce overhead costs. In addition, IBM reprioritized its spending to increase its investments in high-growth opportunities such as e-business, initiatives to support Linux and middleware software products (IBM 2001). R&D&E costs have declined during last four years. In 1999, R&D&E investments was 5.505 $millions and in 2002 R&D&E investments was declined to 4.750 $millions. It seems that IBM's actions of R&D&E are contrary to Nokia,

Microsoft and Vodafone, which have increased R&D investments during last years.

4.10 Summary of five companies

Nokia is the world leader in mobile communications. Nokia supplies mobile phones and mobile, fixed and IP networks. Nokia is organized on a worldwide basis into three primary business groups: Nokia Networks, Nokia Mobile Phones and Nokia Ventures Organizations. Nokia's business groups are strategic units that offer different products and services. In addition, Nokia has *Common Group Functions* that consists of common research and general Group functions. Nokia Mobile Phones is Nokia's largest business group measured by volume of net sales, number of personnel, volume of operating profit and R&D investments. In 2002, Nokia Mobile Phones was Nokia's only business group that has positive operating profit. During last four years Mobile Phones group has been done Nokia's operating profit. In 2002, Nokia continued to invest in its R&D and co-operation. At year-end 2002 Nokia had over 19 thousand R&D employees, about 38% of Nokia's total personnel. Compared to year 1999 R&D investments had increased 73,9%. In 2002 R&D investments totaled 3 052 EURm, representing 10,2% of net sales. Meanwhile in 1999 R&D investments totaled 1 755 EURm, representing 8,9% of net sales. R&D investments have been focused to Nokia Mobile Phones. It seems that investments to R&D and co-operation will further continue to increase in future, because of the fast development of technology. In fiscal year 2002, Nokia's total net sales was 30 016 EURm. Nokia Mobile Phones earned 77% of total net sales in 2002. In 2002, Nokia Network's share of net sales was 22% and Nokia Venture Organizations 1%. Mobile Phones is the main business model and the source of income. In 2002, 54% of Nokia's net sales came from Europe, 24% came from Asia-Pasific region and 22% came from North and South Americas. Europe is Nokia's main market area.

Microsoft develops, manufactures, licenses, and supports a wide range of software products for a wide amount of computing devices. Microsoft's business groups are: Desktop and Enterprise Software and Services; Consumer Software, Services and Devices; Consumer Commerce Investments; and Other. Desktop and Enterprise Software and Services is the largest business group measured by volume of revenue and operating profit. During last three years The Desktop and Enterprise Software and Services business group has been done most of all Microsoft's operating profit. In fiscal year 2002, Microsoft's total revenue was 28 365 $ millions. The Desktop and Enterprise Software and Services business group earned 84% of total net sales in fiscal year 2002. In 2002, The Consumer Software, Services and Devices group share of net sales was 12%, Consumer Commerce Investment 1% and Other group 2%. The Desktop and Enterprise Software and Services is the source of income. Microsoft's main business model is Software products licence sales.

Verizon companies are the largest providers of wireline and wireless communications in the United States, with 132,1 million access line equivalents and 29,4 million wireless customers. Verizon is also the largest directory publisher in the world. Verizon has divided its businesses into four business groups, which they operate and manage as strategic business units: Domestic Telecom, Domestic Wireless, International and Information Services. Domestic Telecom is the largest business group measured by volume of net sales and operating profit. During years 1999-2001 Domestic Telecom business group has been done over half of all Verizon's operating profit. In year 2001 Domestic Telecom's share of Verizon's total operating profit was 67%. In fiscal year 2002, Verizon's total net sales was 67 625 $ millions. Domestic Telecom business group earned 60% of total net sales in fiscal year 2002. In 2002, Domestic Wireless group share of net sales was 28%, International 4% and Information Services group 6%. As table 5. and figures 12. and 13. show, Verizon main source of income is the Domestic Telecom business group,

but the other three groups have strengthen their position. Especially Domestic Wireless has become more notably group.

Vodafone is the largest mobile telecommunications network company in the world. It has interests in mobile networks in 29 countries across five continents. By market capitalization, Vodafone is the largest company in Europe, and is one of the ten largest companies in the world. Vodafone's business is principally the supply of mobile telecommunications services and products. Other operations mainly comprise fixed line telecommunications businesses acquired as part of the acquisition of Mannesmann AG and the Vizzavi Europe joint venture. In fiscal years 2000-2002 most of Vodafone's net sales and operating profit came from Europe. During fiscal year 2002, Asia Pacific region importance has increased. Meanwhile Americas importance has decreased notably after fiscal year 2000. Middle East and Africa region share of Vodafone total net sales has stayed very little. In previous years, Vodafone has been a user rather than a prime developer of technology. Vodafone used £72 million in the fiscal year 2001 on research and development. In the fiscal year 2000 Vodafone used £46 million and in the fiscal year 1999 £37 on research and development. Thus, Vodafone's investments on R&D had increased substantially.

IBM sells services, hardware and software. Organizationally, IBM's major operations comprise: Global Services, Enterprise Systems, Personal and Printing Systems, Technology, Software, Global Financing, and Enterprise Investments. Enterprise Systems, Personal and Printing Systems, and Technology include hardware products. Since 2001 Global Services has been the largest business group measured by volume of net sales. In the years 1999-2000 Hardware was the largest business group measured by volume of net sales. In fiscal year 2002, IBM's total net sales was 81 186 $millions. Global Services earned 45% of total net sales in 2002. In 2002, Hardware's share of net sales was 34%, Software 16%, Global Financing 4% and Enterprise Investments/Other 1%. Global Services and Hardware

are the source of net sales. In 2001, 41% of IBM's net sales came from home market United States, 13% came from Japan and 46% came from other countries. In 1999, R&D&E investments was 5.505 $millions and in 2002 R&D&E investments was declined to 4.750 $millions. It seems that IBM's actions of R&D&E are contrary to Nokia, Microsoft and Vodafone, which have increased R&D investments during last years.

5 KEY FIGURES

Company's economic situation and its changes can been describe with key figures. The study discuss seven key figures: net sales, operating profit, return on capital employed (ROCE), equity ratio, gearing, current ratio, and personnel. For better comparability all key figures are after US GAAP. In addition, amounts converted into euros after exchange rate of the Bank of Finland 28.12.2001, USD / EURO = 0,8813 and GBP / EURO = 0,60850. The grading scales of key figures are adapted after Yritystutkimusneuvottelukunta (1999).

5.1 Net sales

Net sales describe the volume of business.

Table 8. Net sales in fiscal years 1999-2002

NET SALES (EURm)	1999	2000	2001	2002
Nokia	19 772	30 376	31 191	30 016
Microsoft	22 407	26 048	28 703	32 185
Verizon	66 032	73 422	76 240	76 733
Vodafone	5 522	12 938	18 247	28 988
IBM	99 340	100 302	97 431	92 121

Net sales of five analyzed companies are presented more detailed in study's appendix 1.

Measured by net sales, IBM is the biggest company of five above presented companies. Measured by net sales, Vodafone is the smallest company of five above presented companies. Net sales of Nokia, Microsoft, Verizon, and Vodafone have increased from 1999 to 2002, but net sales of IBM have slightly decreased from 1999 to 2002.

Net sales of Nokia have increased strongly from 1998 to 1999 (48,4%) and from 1999 to 2000 (53,6%). Since 2000 net sales have not had essential changes. In 2002, net sales was 30 016 million euros.

Net sales of Microsoft have increased during years of comparison 1998-2002. In 2002, net sales was 32 185,4 million euros (28 365 million dollars).

In 2002, net sales of Verizon was 76 733 million euros (67 625 million dollars). During years of comparison 1998-2002 net sales have increased very steadily.

Net sales of Vodafone have increased notably during years of comparison 1998-2002. Net sales have increased 425% from 1999 to 2002. In 2002, net sales was 28 988 million euros (17 639 million pounds).

In 2002, net sales of IBM was 92 121 million euros (81 186 million dollars). From 1999 to 2002 net sales have decreased 7 219 millions euros (7%).

5.2 Operating profit

Operating profit gives view of business profitability. It is profit after depreciation. Operating profit describes primary operation profit before financial amounts.

Table 9. Operating profit in fiscal years 1999-2002

OPERATING PROFIT (EURm)	**1999**	**2000**	**2001**	**2002**
Nokia	3 908	5 776	3 362	4 780
Microsoft	11 358	12 488	13 299	13 514
Verizon	18 102	19 015	13 085	17 017
Vodafone		1 311	-11 486	-19 448
IBM	12 109	13 129	12 698	

Operating profits of five analyzed companies are presented more detailed in study's appendix 2.

During years of comparison 1999-2002 operating profits of Nokia, Microsoft, Verizon, and IBM have been positive, but the operating profit of Vodafone has been notably negative since 2001. Nokia and Microsoft have had increasing operating profits from 1999 to 2002. The operating profit of Verizon has slightly decresed since fiscal year 2000.

During years of comparison 1998-2002 the operating profit of Nokia has increased 1998-2000 and 2001-2002, but 2000-2001 the operating has decreased. In 2002, the operating profit was 4 780 million euros.

During years of comparison 1999-2002 the operating profit of Microsoft has increased every year. In 2002, the operating profit was 13 514,1 million euros (11 910 million dollars).

During years of comparison 1998-2002 the operating profit of Verizon has increased 1998-2000 and 2001-2002, but 2000-2001 the operating has decreased. In 2002, the operating profit was 17 017 million euros (14 997 million dollars).

Since fiscal year 2001, the operating profit of Vodafone has been negative. In fiscal year 2000, the operating profit was 1 311 million euros (798 million pounds), but by fiscal year 2002 it was decreased to –19 448 million euros (-11 834 million pounds).

During years of comparison 1998-2001 the operating profit of IBM has been clearly positive. In fiscal year 2000, the operating profit was 13 129 million euros (11 571 million dollars), but by fiscal year 2001 it was decreased to 12 698 million euros (11 191 million dollars).

5.3 Return on capital employed (ROCE)

ROCE describes profitability of business.

ROCE = (profit before taxes and minority interest + interest and other financial expenses) / (average shareholders' equity + short-term borrowings + long-term interest-bearing liabilities (including the current portion thereof) + minority shareholders' interests)

ROCE, % grading scale:
good > 15%
satisfying 15% - 9%
passable 8,99% - 0%
poor < 0%

Table 10. ROCE in fiscal years 1999-2002

ROCE, %	1999	2000	2001	2002
Nokia	47,9	49,3	27,1	33,7
Microsoft	41,8	34,5	24,4	27,4
Verizon	21,0	18,9	5,7	9,7
Vodafone	30,0	1,1	-4,0	-8,1
IBM	24,8	24,2	22,0	15,7

ROCE of five analyzed companies are presented more detailed in study's appendix 3.

In fiscal year 2002, Nokia has the best ROCE of five above presented companies, also Microsoft has very good ROCE. In addition, IBM ROCE has slightly grade good in 2002. In 2002, Verizon has satisfying ROCE, meanwhile the ROCE of Vodafone was clearly poor.

During years of comparison 1999-2002 the ROCE of Nokia has been good. In 2002, the ROCE was 33,7%. ROCE has slightly got worse compared to year 1999. The main reason for descent is increased average

shareholder's equity. For attain better ROCE, Nokia should for instance cut down less profitable businesses and concentrate on profitable main business model.

During years of comparison 1999-2002 the ROCE of Microsoft has been good. In 2002, the ROCE was 27,4%. Compared to 1999 ROCE has been downward, although profit has increased. The reason for downgrade is increased average shareholder's equity.

In 2002, the ROCE of Verizon was 9,7% which is satisfying. During years 1999 and 2000 the ROCE was good, but by 2001 it had sink to passable.

In 2002, the ROCE of Vodafon was –8,1%, which is poor. As well as in 2001, it was negative and poor. In 1999, the ROCE was good, but by 2000 it had felt to passable. Since 1999 profit has been collapsed, average shareholder's equity has been increased notably and long-term interest has been multiplied. The personnel of Vodafone have been increased from 1999 to 2002 54 536 persons (431,4%). It seems that Vodafone has grown heedless of profitability.

During years of comparison 1999-2002 the ROCE of IBM has been good, but downward. In 2002, the ROCE was 15,7%. Since 1999 the profit has decreased. Like Nokia, IBM should concentrate on profitable businesses.

5.4 Equity ratio

Equity ratio, % measures businesses capital adequacy, endurance in case of loss and ability to deal with long-term liabilities.

Equity Ratio = (shareholders' equity + minority shareholders' interests) / (total assets – advance payments received)

Equity ratio, % grading scale:

good > 40%

satisfying 40% - 32,5%

passable 32,49% - 20%

poor < 20%

Table 11. Equity ratio in fiscal years 1999-2002

EQUITY RATIO, %	1999	2000	2001	2002
Nokia	52,6	56,1	55,2	61,9
Microsoft	73,6	79,3	78,9	77,1
Verizon	23,2	34,5	32,3	33,9
Vodafone	41,7	85,3	66,6	63,8
IBM	23,4	23,3	26,7	23,6

Equity ratios of five analyzed companies are presented more detailed in study's appendix 4.

In fiscal year 2002, Microsoft has the best equity ratio of five above presented companies, also Vodafone and Nokia have very good equity ratios. In 2002, Verizon has satisfying equity ratio and IBM's grade was passable.

During years of comparison 1999-2002 the equity ratio of Nokia has been good. In 2002, it was 61,9% and 52,6% in 1999. Thanks to bigger total assets / shareholder's equity ratio, the equity ratio has been become slightly superior.

During years of comparison 1999-2002 the equity ratio of Microsoft has been good. In 2002, it was 77,1%.

In 2002, the equity ratio of Verizon was 33,9%, which is satisfying. In 1999, the equity ratio was 23,2% to be passable, but by 2000 it had arisen to 34,5% to be satisfying. In 2001, the equity ratio felt a little bit to be marginally passable.

During years of comparison 1999-2002 the equity ratio of Vodafone has been good ranging between 41,7% to 85,3%. In 2002, it was 63,8%.

During years of comparison 1999-2002 the equity ratio of IBM has been passable.

5.5 Gearing

Gearing describes the debt of company. Gearing = net debt to equity. The smaller the better gearing is. The gearing less than 100% is good (Yritystutkimusneuvottelukunta 1999, 60).

Gearing = (short-term borrowings + long-term interest bearing liabilities (including the current portion thereof) – cash and cash equivalents) / (shareholders' equity + minority shareholders' interests)

Table 12. Gearing in fiscal years 1999-2002

GEARING, %	**1999**	**2000**	**2001**	**2002**
Nokia	-41,3	-26,6	-41,5	-61,4
Microsoft	-60,6	-57,5	-66,8	-74,1
Verizon	157,1	97,4	112,2	89,2
Vodafone	76,7	4,5	4,3	8,4
IBM	109,8	120,5	87,9	88,0

Gearings of five analyzed companies are presented more detailed in study's appendix 5.

During years of comparison 1999-2002 Nokia and Microsoft have not been much in debt, meanwhile Verizon and IBM have been rather much in debt. Microsoft has any short-term borrowings or long-term interest bearing liabilities during fiscal years 1999-2002.

In 2002, the gearing of Nokia was –61,4%. During years of comparison 1999-2002 the gearing has been ranging between –26,6% to –61,4%. The debt situation of Nokia is quite good and cash and cash equivalents have increased since 1999 being 9 351 million euros in year-end 2002. With its cash and reasonable debt situation Nokia has possibility to make R&D investments to do nicely in the fast developing technology playing field.

During years of comparison 1999-2002 the gearing of Microsoft has been ranging between –57,5% to –74,1%. In 2002, the gearing was –74,1%. Microsoft is free from debt and its cash and cash equivalents are great. This excellent situation gives Microsoft possibilities to react quickly to changes in the operational environment. In addition, debt free situation empower Microsoft to make investment plans.

In 1999, the gearing of Verizon was 157,1%, but by 2002 it has decreased to 89,2%. The debt situation of Verizon has become a little bit better during 2002, thanks to considerably less short-term borrowings.
Verizon is in dept. In fiscal year-end 2002, the cash and cash equivalents were only 3 480 million euros, but short-term borrowings were 9 288 million euros. Since 1999 long-term interest bearing liabilities have increased being 44 791 million euros in 2002.

In 1999, the gearing of Vodafone was 76,7%. Since 2000 the gearing has been notably smaller. In 2002, it was 8,4%. The main reason for better gearing is booming shareholder's equity. In 1999, the shareholder's equity was 1 858 million euros, but 140 887 million euros in 2002.

During years of comparison 1999-2002 the gearing of IBM has been ranging between 120,5% to 87,9%. In 2002, the gearing was 88,0%. The most notable change is that short-term borrowings have decreased while long-term interest bearing liabilities have increased. Like Verizon, IBM is in dept. Both companies can't afford much big investments and their reactivity to changes in the operational environment is constricted.

5.6 Current ratio

Current ratio describes the sufficiency of finance in the moment of financial statement. The liquidity of business may change during fiscal year.

Current ratio = (financial assets + current assets) / (short-term borrowings)

Current ratio, grading scale:
good > 2,0
satisfying 2,0 - 1,5
passable 1,4999 - 1,0
poor < 1,0

Table 13. Current ratio in fiscal years 1999-2002

CURRENT RATIO	1999	2000	2001	2002
Nokia	1,7	1,6	1,6	2,1
Microsoft	4,4	5,4	5,3	4,5
Verizon	0,7	0,7	0,6	0,8
Vodafone	0,6	1,5	0,7	0,8
IBM	1,1	1,2	1,2	1,2

Current ratios of five analyzed companies are presented more detailed in study's appendix 6.

In fiscal year 2002, Microsoft has the best current ratio of five above presented companies, also Nokia has good current ratio. In 2002, IBM's current ratio was passable, but Vodafone's and Verizon's grades were poor.

During years 1999-2001, the current ratio of Nokia has been satisfying. In 2002, it arose to be good. By 2002 Nokia's current assets have increased some, while short-term borrowings have increased few.

During years of comparison 1999-2002 the current ratio of Microsoft has been good ranging between 4,4 to 5,3. In 2002, it was 4,5. Good liquidity gives margin for Microsoft.

During years of comparison 1999-2002 the current ratio of Verizon has been poor. The short-term borrowings of Verizon are big compared to the current assets. Verizon's liquidity situation is strict.

In years 2000 and 2002, the current ratio of Vodafone has been poor. In 2001, it was temporarily passable. Like Verizon, the short-term borrowings of Vodafone are big compared to the current assets.

Since 1999, the current ratio of IBM has been steadily passable. In 2002, it was 1,21.

5.7 Personnel

IBM is evidently the biggest employer of five above presented companies and Microsoft is the smallest employer. Nokia and Microsoft are rather same sized measured by number of personnel. Verizon is the second biggest employer of five above presented companies. Nokia and Verizon have decreased personnel compared to fiscal year 1999, meanwhile Microsoft, Vodafone and IBM have increased personnel compared to fiscal year 1999.

Table 14. Personnel at fiscal year-ends 1999-2002

PERSONNEL AT FISCAL YEAR-END	**1999**	**2000**	**2001**	**2002**
Nokia	55 260	60 289	53 849	51 748
Microsoft	31 396	39 100	47 600	50 500
Verizon	244 000	260 000	247 000	229 500
Vodafone	12 642	29 465	53 325	67 178
IBM	307 401	316 303	319 876	315 889

Personnel of five analyzed companies are presented more detailed in study's appendix 7.

The personnel of Nokia have been decreased from 1999 to 2002 3512 persons (6,4%). At the year-end 2002, Nokia employed nearly 52 000 persons. Nokia has made it business operations more effective. Rationalization has been necessary, because net sales have not been increased at the same time. Decreasing of personnel has been concentrated on less important business groups, while the personnel of main business model have been increased. By rationalization Nokia has improved its sales/personnel ratio and has maintained competitiveness.

The personnel of Microsoft have been increased from 1999 to 2002 19 104 persons (60,8%). At the year-end 2002, Microsoft employed 50 500 persons. During years of comparison 1999-2002 the personnel of Microsoft have been increased clearly every fiscal year. At the same time also net sales has been increased, so Microsoft has been retained good sales/personnel ratio.

The personnel of Verizon have been decreased from 1999 to 2002 14 500 persons (5,9%). At the year-end 2002, Verizon employed 229 500 persons. During years of comparison 1999-2002 net sales of Verizon have been increased slightly. By rationalization Verizon has better little its sales/personnel ratio, but more rationalization might needed.

The personnel of Vodafone have been increased from 1999 to 2002 54 536 persons (431,4%). At the year-end 2002, Vodafone employed over 67 000 persons. The considerable increase in the number of employees in the fiscal year 2001 compared to the fiscal year 2000, mainly arises from the acquisitions of Mannesmann and Airtel which ware completed during the fiscal year, partly offset by transfer of employees in the US wireless businesses to Verizon wireless (Vodafone Annual Report 2001).

The personnel of IBM have been increased from 1999 to 2002 8 488 persons (2,8%). At the year-end 2002, Microsoft employed nearly 316 000 persons. IBM has been forced to rationalize its business operations, because net sales have been downward. However sales/personnel ratio of IBM has got worse.

Table 15. Net sales / Personnel in fiscal years 1999-2002

NET SALES / PERSONNEL				
Fiscal year	**1999**	**2000**	**2001**	**2002**
Nokia	0,358	0,504	0,579	0,580
Microsoft	0,714	0,666	0,603	0,637
Verizon	0,271	0,282	0,309	0,334
Vodafone	0,437	0,439	0,342	0,432
IBM	0,323	0,317	0,305	0,292

As table 15. shows, in fiscal year 2002, Microsoft has the best net sales/personnel ratio. Net sales/personnel ratio describes the efficiency of work and economy. The net sales/personnel ratio of Microsoft was 0,637 in 2002. At the same fiscal year, the net sales/personnel ratio of IBM was only 0,292. IBM has the weakest ratio of five above presented companies. Also the ratio of Verizon is weak. IBM and Verizon should take up the slack for better succeed in the hard rivalry of ICT industry.

5.8 Summary of key figures

Measured by net sales, IBM is the biggest company of five above presented companies. In 2002, the net sales of IBM was 92 121 million euros. Measured by net sales, Vodafone is the smallest company of five above presented companies. In 2002, the net sales of Vodafone was 28 988 million euros. Net sales of Nokia, Microsoft, Verizon, and Vodafone have increased from 1999 to 2002, but net sales of IBM have slightly decreased from 1999 to 2002.

During years of comparison 1999-2002 operating profits of Nokia, Microsoft, Verizon, and IBM have been positive, but the operating profit of Vodafone has been notably negative since 2001. Nokia and Microsoft have had increasing operating profits from 1999 to 2002. The operating profit of Verizon has slightly decresed since fiscal year 2000.

In fiscal year 2002, Nokia has the best ROCE of five above presented companies, also Microsoft has very good ROCE. In addition, IBM ROCE has slightly grade good in 2002. In 2002, Verizon has satisfying ROCE, meanwhile the ROCE of Vodafone was clearly poor.

In fiscal year 2002, Microsoft has the best equity ratio of five above presented companies, also Vodafone and Nokia have very good equity ratios. In 2002, Verizon has satisfying equity ratio and IBM's grade was passable.

During years of comparison 1999-2002 Nokia and Microsoft have not been much in debt, meanwhile Verizon and IBM have been rather much in debt. Microsoft has any short-term borrowings or long-term interest bearing liabilities during fiscal years 1999-2002.

In fiscal year 2002, Microsoft has the best current ratio of five above presented companies, also Nokia has good current ratio. In 2002, IBM's current ratio was passable, but Vodafone's and Verizon's grades were poor.

At the fiscal year-end 2002, IBM employed nearly 316 thousand persons. IBM is evidently the biggest employer of five above presented companies and Microsoft is the smallest employer. At the fiscal year-end 2002, Microsoft employed slightly over 50 thousand persons and Nokia has nearly 52 thousand persons. So, Nokia and Microsoft are rather same sized measured by number of personnel. Vodafone employed over 67 thousand persons at the fiscal year-end 2002. Verizon is the second

biggest employer of five above presented companies. At the year-end 2002, Verizon employed 229,5 thousand persons. Nokia and Verizon have decreased personnel compared to fiscal year 1999, meanwhile Microsoft, Vodafone and IBM have increased personnel compared to fiscal year 1999.

In 2002, Microsoft has the best net sales/personnel ratio of five above presented companies. Microsoft has ratio 0,637. Nokia's ratio was the second best, being 0,580. Vodafone has the third best ratio 0,432. Verizon's ratio was 0,334. The most ineffective was IBM with ratio 0,292.

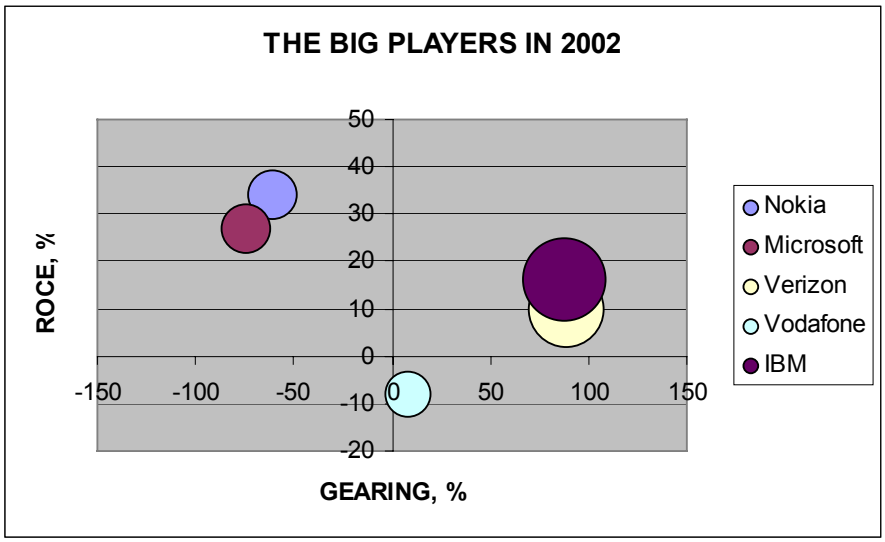

Figure 17. Relation between Nokia, Microsoft, Verizon, Vodafone and IBM measured by net sales, gearing and cash in fiscal year 2002

The size of bubble pictures the volume of net sales. As figure 17. shows, IBM and Verizon have big net sales, but both are much debt. Nokia and Microsoft have smaller net sales, but they are not much debt. The net sales of Vodafone are the smallest. Vodafone's debt situation is average. Verizon has the weakest ROCE %. The ROCE % of Nokia is best and Microsoft also has good ROCE %.

6 CONCLUSIONS AND SUMMARY

Global business environment is changing quickly. The main characters of the change are fast development of technology, global competition, focusing and consolidation. The future is not at all predictable because of the fast technology development. Mobility brings totally new dimension into development of the industries by opening up completely new business opportunities. The introduction of wireless applications is about to begin. The convergence of the IT and Telecom markets creates totally new ways for companies to operate.

The aim of the study was to analyze ICT industry recent situation from the strategic and competitive analyze perspective. In addition the study approached competitive strategy theories. The main objective was to create a view of ICT industry and it's big players. The study analyzed five ICT industry companies in Europe and USA. Analyzed companies were the big and notable players in the ICT industry playing field. The five big players were Nokia, Microsoft, Verizon, Vodafone and IBM.

Study's objective was to find similarities and differences between above five companies. The study analyzed above companies main business models. The study also tried to piece to together above companies situation in the ICT industry. In addition, the study concerned above companies goals and strategies to attain and maintain competitiveness in the industry. Study's empirical part was concentrated on financial statements analyzes and other public information, mainly annual reports.

The methodology of the study was both qualitative and quantitative research. Companies have been analyzed by using both numerical and qualitative material. The intention of the study was to describe ICT business present state and elements that affect to this present state. This study was based on literature, articles and preexisting research reports. Internet sources and mobile companies homepages and annual reports

have also been used. Microsoft, Nokia, Verizon, Vodafone and IBM were used as an example companies in the study's empirical part.

Nokia is the world leader in mobile communications. Nokia supplies mobile phones and mobile, fixed and IP networks. Nokia is organized on a worldwide basis into three primary business groups: Nokia Networks, Nokia Mobile Phones and Nokia Ventures Organizations. Nokia's business groups are strategic units that offer different products and services. In addition, Nokia has *Common Group Functions* that consists of common research and general Group functions. Nokia Mobile Phones is Nokia's largest business group measured by volume of net sales, number of personnel, volume of operating profit and R&D investments. In 2002, Nokia Mobile Phones was Nokia's only business group that has positive operating profit. During last four years Mobile Phones group has been done Nokia's operating profit. In 2002, Nokia continued to invest in its R&D and co-operation. At year-end 2002 Nokia had over 19 thousand R&D employees, about 38% of Nokia's total personnel. Compared to year 1999 R&D investments had increased 73,9%. In 2002 R&D investments totaled 3 052 EURm, representing 10,2% of net sales. Meanwhile in 1999 R&D investments totaled 1 755 EURm, representing 8,9% of net sales. R&D investments have been focused to Nokia Mobile Phones. It seems that investments to R&D and co-operation will further continue to increase in future, because of the fast development of technology. In fiscal year 2002, Nokia's total net sales was 30 016 EURm. Nokia Mobile Phones earned 77% of total net sales in 2002. In 2002, Nokia Network's share of net sales was 22% and Nokia Venture Organizations 1%. Mobile Phones is the main business model and the source of income. In 2002, 54% of Nokia's net sales came from Europe, 24% came from Asia-Pasific region and 22% came from North and South Americas. Europe is Nokia's main market area.

Microsoft develops, manufactures, licenses, and supports a wide range of software products for a wide amount of computing devices. Microsoft's

business groups are: Desktop and Enterprise Software and Services; Consumer Software, Services and Devices; Consumer Commerce Investments; and Other. Desktop and Enterprise Software and Services is the largest business group measured by volume of revenue and operating profit. During last three years The Desktop and Enterprise Software and Services business group has been done most of all Microsoft's operating profit. In fiscal year 2002, Microsoft's total revenue was 28 365 $ millions. The Desktop and Enterprise Software and Services business group earned 84% of total net sales in fiscal year 2002. In 2002, The Consumer Software, Services and Devices group share of net sales was 12%, Consumer Commerce Investment 1% and Other group 2%. The Desktop and Enterprise Software and Services is the source of income. Microsoft's main business model is Software products licence sales.

Verizon companies are the largest providers of wireline and wireless communications in the United States, with 132,1 million access line equivalents and 29,4 million wireless customers. Verizon is also the largest directory publisher in the world. Verizon has divided its businesses into four business groups, which they operate and manage as strategic business units: Domestic Telecom, Domestic Wireless, International and Information Services. Domestic Telecom is the largest business group measured by volume of net sales and operating profit. During years 1999-2001 Domestic Telecom business group has been done over half of all Verizon's operating profit. In year 2001 Domestic Telecom's share of Verizon's total operating profit was 67%. In fiscal year 2002, Verizon's total net sales was 67 625 $ millions. Domestic Telecom business group earned 60% of total net sales in fiscal year 2002. In 2002, Domestic Wireless group share of net sales was 28%, International 4% and Information Services group 6%. As table 5. and figures 12. and 13. show, Verizon main source of income is the Domestic Telecom business group, but the other three groups have strengthen their position. Especially Domestic Wireless has become more notably group.

Vodafone is the largest mobile telecommunications network company in the world. It has interests in mobile networks in 29 countries across five continents. By market capitalization, Vodafone is the largest company in Europe, and is one of the ten largest companies in the world. Vodafone's business is principally the supply of mobile telecommunications services and products. Other operations mainly comprise fixed line telecommunications businesses acquired as part of the acquisition of Mannesmann AG and the Vizzavi Europe joint venture. In fiscal years 2000-2002 most of Vodafone's net sales and operating profit came from Europe. During fiscal year 2002, Asia Pacific region importance has increased. Meanwhile Americas importance has decreased notably after fiscal year 2000. Middle East and Africa region share of Vodafone total net sales has stayed very little. In previous years, Vodafone has been a user rather than a prime developer of technology. Vodafone used £72 million in the fiscal year 2001 on research and development. In the fiscal year 2000 Vodafone used £46 million and in the fiscal year 1999 £37 million on research and development. Thus, Vodafone's investments on R&D had increased substantially.

IBM sells services, hardware and software. Organizationally, IBM's major operations comprise: Global Services, Enterprise Systems, Personal and Printing Systems, Technology, Software, Global Financing, and Enterprise Investments. Enterprise Systems, Personal and Printing Systems, and Technology include hardware products. Since 2001 Global Services has been the largest business group measured by volume of net sales. In the years 1999-2000 Hardware was the largest business group measured by volume of net sales. In fiscal year 2002, IBM's total net sales was 81 186 $millions. Global Services earned 45% of total net sales in 2002. In 2002, Hardware's share of net sales was 34%, Software 16%, Global Financing 4% and Enterprise Investments/Other 1%. Global Services and Hardware are the source of net sales. In 2001, 41% of IBM's net sales came from home market United States, 13% came from Japan and 46% came from other countries. In 1999, R&D&E investments was 5.505 $millions and in

2002 R&D&E investments was declined to 4.750 $millions. It seems that IBM's actions of R&D&E are contrary to Nokia, Microsoft and Vodafone, which have increased R&D investments during last years.

Measured by net sales, IBM is the biggest company of five above presented companies. In 2002, the net sales of IBM was 92 121 million euros. Measured by net sales, Vodafone is the smallest company of five above presented companies. In 2002, the net sales of Vodafone was 28 988 million euros. Net sales of Nokia, Microsoft, Verizon, and Vodafone have increased from 1999 to 2002, but net sales of IBM have slightly decreased from 1999 to 2002.

During years of comparison 1999-2002 operating profits of Nokia, Microsoft, Verizon, and IBM have been positive, but the operating profit of Vodafone has been notably negative since 2001. Nokia and Microsoft have had increasing operating profits from 1999 to 2002. The operating profit of Verizon has slightly decresed since fiscal year 2000.

In fiscal year 2002, Nokia has the best ROCE of five above presented companies, also Microsoft has very good ROCE. In addition, IBM ROCE has slightly grade good in 2002. In 2002, Verizon has satisfying ROCE, meanwhile the ROCE of Vodafone was clearly poor.

In fiscal year 2002, Microsoft has the best equity ratio of five above presented companies, also Vodafone and Nokia have very good equity ratios. In 2002, Verizon has satisfying equity ratio and IBM's grade was passable.

During years of comparison 1999-2002 Nokia and Microsoft have not been much in debt, meanwhile Verizon and IBM have been rather much in debt. Microsoft has any short-term borrowings or long-term interest bearing liabilities during fiscal years 1999-2002.

In fiscal year 2002, Microsoft has the best current ratio of five above presented companies, also Nokia has good current ratio. In 2002, IBM's current ratio was passable, but Vodafone's and Verizon's grades were poor.

At the fiscal year-end 2002, IBM employed nearly 316 thousand persons. IBM is evidently the biggest employer of five above presented companies and Microsoft is the smallest employer. At the fiscal year-end 2002, Microsoft employed slightly over 50 thousand persons and Nokia has nearly 52 thousand persons. So, Nokia and Microsoft are rather same sized measured by number of personnel. Vodafone employed over 67 thousand persons at the fiscal year-end 2002. Verizon is the second biggest employer of five above presented companies. At the year-end 2002, Verizon employed 229,5 thousand persons. Nokia and Verizon have decreased personnel compared to fiscal year 1999, meanwhile Microsoft, Vodafone and IBM have increased personnel compared to fiscal year 1999.

In 2002, Microsoft has the best net sales/personnel ratio of five above presented companies. Microsoft has ratio 0,637. Nokia's ratio was the second best, being 0,580. Vodafone has the third best ratio 0,432. Verizon's ratio was 0,334. The most ineffective was IBM with ratio 0,292.

REFERENCES

Ali-Yrkkö, J. 2001. Nokia's Network – Gaining Competitiveness from Co-operation. Taloustieto. Helsinki.

Andersson, C. 2001. GPRS and 3G Wireless Applications: The Ultimate Guide to Maximizing Mobile Internet Technologies. Wiley. New York.

Bailey, W., Masson, R., Raeside, R. 1998. Choosing successful technology development partners: a best-practice model. Technology Management, Vol. 15, pages 124-138.

Dixon Wilcox, H., Chang, K-C., Grover, V. 2001. Valuation of mergers and acquisitions in the telecommunications industry: a study on diversification and firm size. Information & Management, Vol. 38, pages 459-471.

Deutsche Telekom Annual Report 2001

Hamel, G. 2000. Leading the revolution: Harvard Business School Press. Boston.

Hartman, A. 2000. Net Ready. McGraw-Hill. New York.

IBM Annual Reports 1999-2002

Kanter, R. 1999. Why Collaborate? Executive Excellence, 8 april.

Kanter, R. 1997. The power of partnering. Sales and Marketing Management, Vol. 149, Issue 6.

Kotler, P. 1997. Marketing Management: Analysis, Planning, Implementation, and Control. Ninth Edition. Prentice Hall International. New Jersey.

Laaksonen, P., Lopperi, K., Bergman, J-P., Soininen, M., Kanerva, K., Edelmann, J., Kytölä, O. 2002.
Project Report from “New Business Models Arising from the Convergence of E-Business and Mobility in the USA and Europe”: Microsoft and MSN – Emerging Wireless Services. 2.8.2002. TBRC Lappeenranta.

Laaksonen, P. 2001. Research Plan: New business models arising from the convergence of the E-Business and Mobility in USA and Europe.

Littler, D., Leverick, F. 1995. Joint Ventures for Product Development: Learning from Experience. Long Range Planning, Vol. 28, No. 3, pages 58-67.

Lopperi, K. 2002. Master´s Thesis: Describing innovative business models and evaluating their wealth potential-Cases Stora Enso and E-Bay. Lappeenranta University of Technology. Lappeenranta.

Microsoft Annual Reports 1999-2002

Microsoft. 2002. Living our values. [In Microsoft www-pages]. [retrieved May 16, 2002]. From: *http://microsoft.com/mscorp/values.html*

Myburgh, S. 2002. Strategic information management: Understanding a new reality. Information Management Journal, Vol. 36, Issue 1, pages 36-43.

Nokia Annual Reports 1999-2002

Nokia. 2002a. Nokia in brief. [In Nokia www-pages]. [retrieved May 2, 2002]. From: http://www.nokia.com/aboutnokia/inbrief/index.html

Nokia. 2002b. Our objectives. [In Nokia www-pages]. [retrieved May 2, 2002]. From: http://www.nokia.com/aboutnokia/our-objectives/index.html

Paija, L. 2001. The ICT Cluster in Finland – Can We Explain It?. In: Paija, L., Rönkkö, P., Steinbock, D. (ed.) Finnish ICT cluster in the digital economy. Taloustieto. Helsinki. Pages 9-70.

Porter, M. 1998. On competition. A Harvard Business Review Book. Boston.

Porter, M. 1990. The Competitive Advantage of Nations. The Free Press. New York..

Porter, M. 1986. Competition in Global Industries. Harvard Business School Press. Boston.

Porter, M. 1985. Competitive advantage: creating and sustaining superior performance. The Free Press. New York.

Porter, M. 1980. Competitive strategy: techniques for analyzing industries and competitors. The Free Press. New York.

Sissonen, A. 2002. Master´s Thesis: Wireless Applications Evaluation and Development Process: Case-Paper Industry Logistics. Lappeenranta University of Technology. Lappeenranta.

Sonera. 2002. Press release 15.3.2002 Available at: http://www.sonera.fi

Steinbock, D. 2001. Two Kinds of ICT Pioneers: The Mobilization of the Digital Economy. In: Paija, L., Rönkkö, P., Steinbock, D. (ed.) Finnish ICT cluster in the digital economy. Taloustieto. Helsinki. Pages 133-178.

TEKES. 2001. Global Networking in Wireless Teletechnology Business. Technology Review 114/2001.

Verizon Annual Reports 2000-2002

Vodafone Annual Reports 2000-2003

Vodafone. 2002a. The company overview. [In Vodafone www-pages]. [retrieved May 6, 2002]. From: http://www.vodafone.com/about/overview.htm

Vodafone. 2002b. Vodafone thinkings overview. [In Vodafone www-pages]. [retrieved May 6, 2002]. From: http://www.vodafone.com/about/vod_thinking.htm

Vodafone. 2002c. Keep today's customers tomorrow. [In Vodafone www-pages]. [retrieved May 6, 2002]. From: http://www.vodafone.com/about/vod_work.htm

Wireless E-Business project. 2001. "Content and Methodology Specifications of the Wireless e-Business Project"-research paper. Lappeenranta.

Yritystutkimusneuvottelukunta. 1999. Yritystutkimuksen tilinpäätösanalyysi. Kuudes painos. Gaudeamus. Helsinki.

Appendix 1. Net sales

Nokia net sales (Nokia Annual Reports 1999-2002)

FISCAL YEAR (1.1.-31.12.)	(EURm)	Change, %
1999	19 772	48,4
2000	30 376	53,6
2001	31 191	2,7
2002	30 016	-3,8

Microsoft net sales (Microsoft Annual Reports 1999-2002)

FISCAL YEAR (1.7.-30.6.)	($ million)	**(EURm)**	Change, %
1999	19 747	22 406,7	29,4
2000	22 956	26 047,9	16,3
2001	25 296	28 703,1	10,2
2002	28 365	32 185,4	12,1

Verizon net sales (Verizon Annual Reports 2000-2002)

FISCAL YEAR (1.1.-31.12.)	($ million)	**(EURm)**	Change, %
1999	58 194	66 032	2,0
2000	64 707	73 422	11,2
2001	67 190	76 240	3,8
2002	67 625	76 733	0,6

Vodafone net sales (Vodafone Annual Reports 2000-2003)

FISCAL YEAR (1.4.-31.3.)	(£m)	**(EURm)**	Change, %
1999	3 360	5 522	35,1
2000	7 873	12 938	134,3
2001	11 103	18 247	41,0
2002	17 639	28 988	58,9

IBM net sales (IBM Annual Reports 1999-2002)

FISCAL YEAR (1.1.-31.12.)	($ million)	**(EURm)**	Change, %
1999	87 548	99 340	7,2
2000	88 396	100 302	1,0
2001	85 866	97 431	-2,9
2002	81 186	92 121	-5,5

Appendix 2. Operating profit

Nokia operating profit (Nokia Annual Reports 1999-2002)

FISCAL YEAR (1.1.-31.12.)	(EURm)	Change, %
1999	3 908	57,0
2000	5 776	47,8
2001	3 362	-41,8
2002	4 780	42,2

Microsoft operating profit (Microsoft Annual Reports 1999-2002)

FISCAL YEAR (1.7-30.6.)	($ million)	**(EURm)**	Change, %
1999	10 010	11 358,2	
2000	11 006	12 488,4	10,0
2001	11 720	13 298,5	6,5
2002	11 910	13 514,1	1,6

Verizon operating profit (Verizon Annual Reports 2000-2002)

FISCAL YEAR (1.1.-31.12.)	($ million)	**(EURm)**	Change, %
1999	15 953	18 102	35,7
2000	16 758	19 015	5,0
2001	11 532	13 085	-31,2
2002	14 997	17 017	30,0

Vodafone operating profit (Vodafone Annual Reports 2000-2003)

FISCAL YEAR (1.4.-31.3.)	(£m)	**(EURm)**	Change, %
2000	798	1 311	
2001	-6 989	-11 486	-976,0
2002	-11 834	-19 448	-69,3

IBM operating profit (IBM Annual Reports 1999-2001)

FISCAL YEAR (1.1.-31.12.)	($ million)	**(EURm)**	Change, %
1999	10 671	12 109	
2000	11 571	13 129	8,4
2001	11 191	12 698	-3,3

Appendix 3. ROCE

Nokia ROCE (Nokia Annual Reports 1999-2002)

(EURm)	**1999**	**2000**	**2001**	**2002**
Profit before taxes and minority interests	3 845	5 862	3 475	4 917
Interest and other financial expenses	260	196	116	97
Average shareholders` equity	7 384	10 871	12 021	14 150
Short-term borrowings	792	1 116	831	377
Long-term interest-bearing liabilities	269	173	207	187
Minority shareholders` interests	122	177	196	173
ROCE, %	**47,9**	**49,3**	**27,1**	**33,7**

Microsoft ROCE (Microsoft Annual Reports 1999-2002)

($ million)	**1999**	**2000**	**2001**	**2002**
Profit before taxes and minority interests	11 891	14 275	11 525	14 275
Interest and other financial expenses	0	0	0	0
Average shareholders` equity	28 438	41 368	47 289	52 180
Short-term borrowings	0	0	0	0
Long-term interest-bearing liabilities	0	0	0	0
Minority shareholders` interests	0	0	0	0
ROCE, %	**41,81**	**34,51**	**24,37**	**27,36**

to be continued

appendix 3. continues

Verizon ROCE (Verizon Annual Reports 2000-2002)

($ million)	**1999**	**2000**	**2001**	**2002**
Profit before taxes and minority interests	13 327	18 035	3 388	7 472
Interest and other financial expenses	2 616	3 490	3 369	3 237
Average shareholders` equity	26 376	34 578	32 539	32 616
Short-term borrowings	15 063	14 838	18 669	9 288
Long-term interest-bearing liabilities	32 419	42 491	45 657	44 791
Minority shareholders` interests	1 900	21 830	22 149	24 141
ROCE, %	**21,04**	**18,93**	**5,677**	**9,662**

Vodafone ROCE (Vodafone Annual Reports 2000-2003)

(£m)	**1999**	**2000**	**2001**	**2002**
Profit before taxes and minority interest	935	1 349	-8 095	-13 539
Interest and other financial expenses	94	401	1 177	845
Average shareholders` equity	1 858	146 334	155 522	140 887
Short-term borrowings	377	794	3 611	1 319
Long-term interest-bearing liabilities	1 137	6 038	10 772	12 584
Minority shareholders` interests	109	1 527	2 389	2 855
ROCE, %	**29,56**	**1,13**	**-4,02**	**-8,05**

IBM ROCE (IBM Annual Reports 1999-2002)

($ million)	**1999**	**2000**	**2001**	**2002**
Profit before taxes and minority interests	11 757	11 534	10 953	7 524
Interest and other financial expenses	352	347	238	145
Average shareholders` equity	20 511	20 624	23 614	22 782
Short-term borrowings	14 230	10 205	11 188	6 031
Long-term interest-bearing liabilities	14 124	18 371	15 963	19 986
Minority shareholders` interests	0	0	0	0
ROCE, %	**24,78**	**24,15**	**22,04**	**15,72**

Appendix 4. Equity ratio

Nokia Equity ratio (Nokia Annual Reports 1999-2002)

(EURm)	**1999**	**2000**	**2001**	**2002**
Shareholders` equity	7 384	10 871	12 021	14 150

Minority shareholders`interests	122	177	196	173
Total assets	14 279	19 890	22 427	23 327
Advance payments received	0	181	294	196
EQUITY RATIO, %	**52,57**	**56,06**	**55,2**	**61,92**

Microsoft Equity ratio (Microsoft Annual Reports 1999-2002)

($ million)	**1999**	**2000**	**2001**	**2002**
Shareholders` equity	28 438	41 368	47 289	52 180
Minority shareholders` interests	0	0	0	0
Total assets	38 625	52 150	59 257	67 646
Advance payments received	0	0	0	0
EQUITY RATIO, %	**73,63**	**79,33**	**79,80**	**77,14**

Verizon Equity ratio (Verizon Annual Reports 2000-2002)

($ million)	**1999**	**2000**	**2001**	**2002**
Shareholders` equity	26 376	34 578	32 539	32 616
Minority shareholders` interests	1 900	21 830	22 149	24 141
Total assets	122 830	164 735	170 795	167 468
Advance payments received	1 123	1 162	1 640	0
EQUITY RATIO, %	**23,23**	**34,48**	**32,33**	**33,891**

to be continued

appendix 4. continues

Vodafone Equity ratio (Vodafone Annual Reports 2000-2003)

(£m)	**1999**	**2000**	**2001**	**2002**
Shareholders` equity	1 858	146 334	155 522	140 887
Minority shareholders` interests	109	1 527	2 389	2 855
Total assets	4 719	173 347	236 967	225 184
Advance payments received	0	0	0	0
EQUITY RATIO, %	**41,68**	**85,30**	**66,64**	**63,83**

IBM Equity ratio (IBM Annual Reports 1999-2002)

($ million)	**1999**	**2000**	**2001**	**2002**
Shareholders` equity	20 511	20 624	23 614	22 782
Minority shareholders` interests	0	0	0	0
Total assets	87 495	88 349	88 313	96 484
Advance payments received	0	0	0	0
EQUITY RATIO, %	**23,44**	**23,34**	**26,74**	**23,61**

Appendix 5. Gearing

Nokia Gearing (Nokia Annual Reports 1999-2002)

(EURm)	**1999**	**2000**	**2001**	**2002**
Short-term borrowings	792	1 116	831	377
Long-term interest bearing liabilities	269	173	207	187
Cash and cash equivalents	4 159	4 183	6 113	9 351
Shareholders` equity	7 384	10 871	12 021	14 150
Minority shareholders` interests	122	177	196	173
GEARING, %	**-41,27**	**-26,62**	**-41,54**	**-61,35**

Microsoft Gearing (Microsoft Annual Reports 1999-2002)

($ million)	**1999**	**2000**	**2001**	**2002**
Short-term borrowings	0	0	0	0
Long-term interest bearing liabilities	0	0	0	0
Cash and cash equivalents	17 236	23 798	31 600	38 652
Shareholders` equity	28 438	41 368	47 289	52 180
Minority shareholders` interests	0	0	0	0
GEARING, %	**-60,61**	**-57,53**	**-66,82**	**-74,07**

Verizon Gearing (Verizon Annual Reports 2000-2002)

($ million)	**1999**	**2000**	**2001**	**2002**
Short-term borrowings	15 063	14 838	18 669	9 288
Long-term interest bearing liabilities	32 419	42 491	45 657	44 791
Cash and cash equivalents	3 068	2 370	2 970	3 480
Shareholders` equity	26 376	34 578	32 539	32 616
Minority shareholders` interests	1 900	21 830	22 149	24 141
GEARING, %	**157,07**	**97,43**	**112,19**	**89,15**

to be continued

appendix 5. continues

Vodafone Gearing (Vodafone Annual Reports 2000-2003)

(£m)	**1999**	**2000**	**2001**	**2002**
Short-term borrowings	377	794	3 611	1 319
Long-term interest bearing liabilities	1 137	6 038	10 772	12 584
Cash and cash equivalents	6	189	7 661	1 869
Shareholders` equity	1 858	146 334	155 522	140 887
Minority shareholders` interests	109	1 527	2 389	2 855
GEARING, %	**76,66**	**4,49**	**4,26**	**8,37**

IBM Gearing (IBM Annual Reports 1999-2002)

($ million)	**1999**	**2000**	**2001**	**2002**
Short-term borrowings	14 230	10 205	11 188	6 031
Long-term interest bearing liabilities	14 124	18 371	15 963	19 986
Cash and cash equivalents	5 831	3 722	6 393	5 975
Shareholders` equity	20 511	20 624	23 614	22 782
Minority shareholders` interests	0	0	0	0
GEARING, %	**109,81**	**120,51**	**87,91**	**87,97**

Appendix 6. Current ratio

Nokia Current ratio (Nokia Annual Reports 1999-2002)

(EURm)	**1999**	**2000**	**2001**	**2002**
Current assets (includes financial assests)	10 792	13 502	15 515	17 585
Short-term borrowings (including the current portion of long-term debt)	6 372	8 594	9 566	8 412
CURRENT RATIO	**1,69**	**1,57**	**1,6219**	**2,09**

Microsoft Current ratio (Microsoft Annual Reports 1999-2002)

($ million)	**1999**	**2000**	**2001**	**2002**
Total current assets	38 625	52 150	59 257	67 646
Short-term borrowings	8 802	9 755	11 132	15 068
CURRENT RATIO	**4,3882**	**5,346**	**5,3231**	**4,4894**

Verizon Current ratio (Verizon Annual Reports 2000-2002)

($ million)	**1999**	**2000**	**2001**	**2002**
Current assets (includes financial assests)	19 995	22 121	23 187	20 921
Short-term borrowings (including the current portion of long-term debt)	29 750	34 236	38 011	27 047
CURRENT RATIO	**0,67**	**0,65**	**0,61**	**0,77**

Vodafone Current ratio (Vodafone Annual Reports 2000-2003)

(£m)	**2000**	**2001**	**2002**
Total current assets	2 517	18 182	9 438
Short-term borrowings	4 441	12 377	13 455
CURRENT RATIO	**0,57**	**1,47**	**0,70**

to be continued

appendix 6. continues

IBM Current ratio (IBM Annual Reports 1999-2002)

($ million)	**1999**	**2000**	**2001**	**2002**
Current assets (includes financial assests)	43 155	43 880	42 461	41 652
Short-term borrowings (including the current portion of long-term debt)	39 578	36 406	35 119	34 550
CURRENT RATIO	**1,09**	**1,21**	**1,21**	**1,21**

Appendix 7. Personnel

Nokia Personnel (Nokia Annual Reports 1999-2002)

Personnel at year-end (31.12.)		Change	Change, %
1999	55 260	12 367	28,8
2000	60 289	5 029	9,1
2001	53 849	-6 440	-10,7
2002	51 748	2 101	-3,9

Microsoft Personnel (Microsoft Annual Reports 1999-2002)

Personnel at fiscal year-end (30.6.)		Change	Change, %
1999	31 396		
2000	39 100	7 704	24,6
2001	47 600	8 500	21,7
2002	50 500	2 900	6,1

Verizon Personnel (Verizon Annual Reports 2000-2002)

Personnel at year-end (31.12.)		Change	Change, %
1999	244 000		
2000	260 000	16 000	6,6
2001	247 000	-13 000	-5,0
2002	229 500	-17 500	-7,1

Vodafone Personnel (Vodafone Annual Reports 2000-2003)

Personnel at year-end (31.3.)		Change	Change, %
1999	12 642	3 002	19,2
2000	29 465	16 823	133,1
2001	53 325	23 860	81,0
2002	67 178	13 853	26,0

to be continued

appendix 7. continues

IBM Personnel (IBM Annual Reports 1999-2002)

Personnel at year-end (31.12.)		Change	Change, %
1999	307 401	16 334	5,6
2000	316 303	8 902	2,9
2001	319 876	3 573	1,1
2002	315 889	3 987	-1,2