

Pajarinen, Mika; Rouvinen, Petri

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Nokia's Labor Inflows and Outflows in Finland: Observations from 1989 to 2010

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Nokia's Labor Inflows and Outflows in Finland

Observations from 1989 to 2010

Mika Pajarinen* – Petri Rouvinen**

* ETLA – The Research Institute of the Finnish Economy, mika.pajarinen@etla.fi

** ETLA – The Research Institute of the Finnish Economy, petri.rouvinen@etla.fi

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Observations from 1989 to 2010

Abstract

Nokia's ascent, dominance, and descent have resulted in significant labor inflows and outflows in Finland. In this paper, we document the aspects of these flows using official register-based data covering virtually all individuals and organizations in Finland. Our setup may be compared to a laboratory experiment on the impacts of a single company on a country. During the 1990s, a large share of *Nokia* recruits were recent college graduates. Most of these recent graduates assumed various specialist and managerial positions at *Nokia*. During the 2000s, *Nokia* has been a good source of highly skilled labor for other businesses in Finland. More recently, an increasing share of former *Nokia* employees has been engaged with startups. Additionally, the proportion of former *Nokia* employees who have migrated to public sector jobs has grown.

Key words: Nokia, Finland, ICT, labor flows, employer-employee data

JEL: D21, J63, M51

Nokian työpaikkavirrat Suomessa

Havaintoja vuosilta 1989–2010

Tiivistelmä

Nokia on toimintansa aikana ollut merkittävä sekä sisään- että ulospäin suuntautuneiden työpaikkavirtojen lähde. Tässä raportissa tarkastelemme näitä työpaikkavirtoja monien eri taustamuuttujien avulla hyödyntäen Tilastokeskuksen rekisteripohjaisia aineistoja, jotka kattavat käytännössä kaikki henkilöt ja yritykset Suomessa. 1990-luvulla suuri osa Nokiaan tulleista työntekijöistä oli vastavalmistuneita tai opintojen loppusuoralla olevia opiskelijoita. Näistä useat työllistyivät erilaisiin asiantuntija- ja johtotason tehtäviin. 2000-luvulla Nokia on ollut huomattava työntekijöiden lähde yrityksille, jotka ovat rekrytoineet henkilöstöä korkeaa osaamistasoa vaativiin tehtäviin. Viime aikoina kasvava osuus entisistä Nokian työntekijöistä on perustanut uuden yrityksen tai muutoin työllistynyt alkuvaiheen yrityksiin. Myös siirtymät Nokiasta julkisen sektorin tehtäviin ovat lisääntyneet.

Asiasanat: Nokia, Suomi, ICT, työpaikkavirrat, työntekijä-työnantaja-aineisto

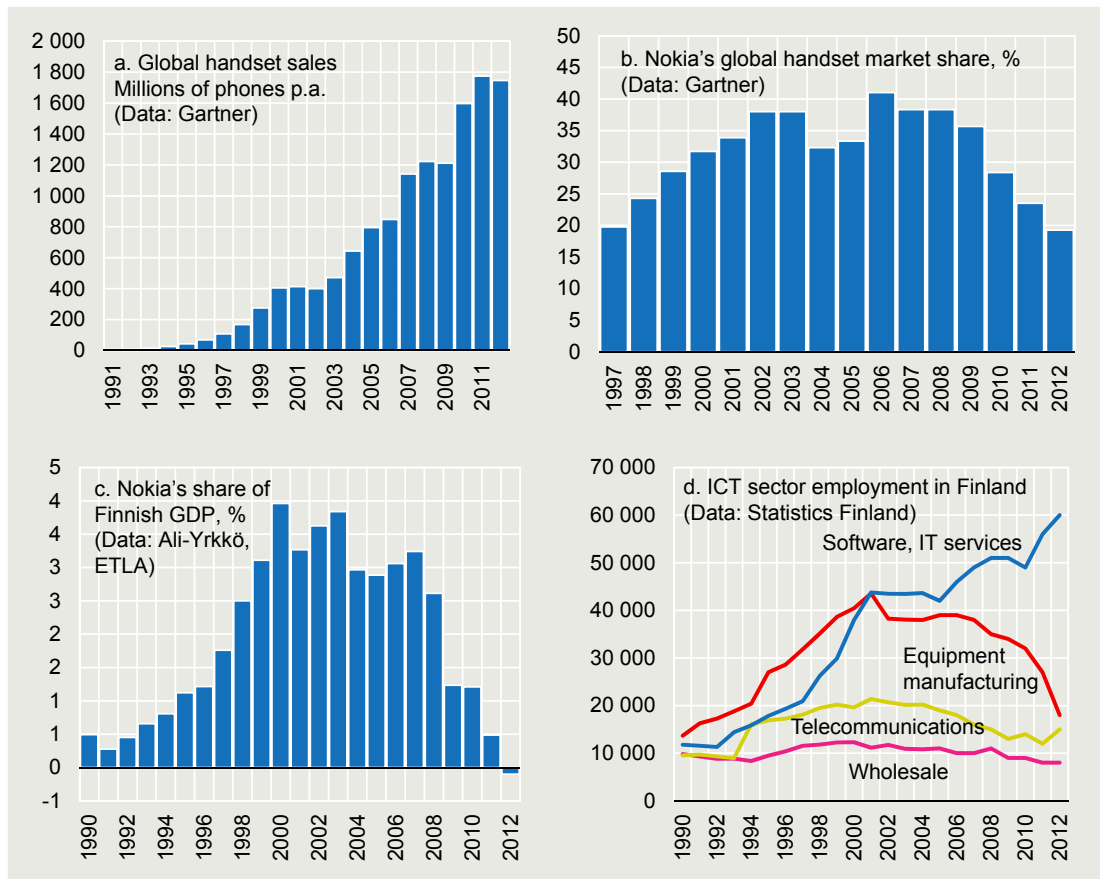
JEL: D21, J63, M51

1 Introduction

Considering the reliance of a national economy on one company, *The Economist* (August 25, 2012) concludes that “The importance of *Nokia* to Finland looks like a one-off [in global comparison].”¹ *Nokia* has also been a global force: the company led the mobile handset industry growing over 40% annually throughout the 1990s (Figure 1.a), and, at its height, the company's share of global mobile phone deliveries was over 40% in 2006 (Figure 1.b).

As a result of *Nokia's* rise during the 1990s, Finland transformed from being one of the least information and communication technology (ICT) specialized countries to becoming the single most specialized one (Koski, Rouvinen, & Ylä-Anttila, 2002).² During the early 1990s, the success of *Nokia* was a major factor in pulling Finland out of the most severe economic crisis in any OECD country since World War II. During the company's prime from 1998 to 2007, *Nokia* contributed to nearly a quarter of Finnish economic growth. On the downside, there is no comparison in Finland's corporate history to *Nokia's* descent since 2008: for example, nearly one-third of the over 8% drop in the Finnish GDP in 2009 is attributable to *Nokia*.

Figure 1 The sectorial context of this paper



¹ Economist. (August 25, 2012). **One-firm economies: The Nokia effect.** *The Economist*, 404(8799), 57. <http://www.economist.com/node/21560867>

² Koski, H., Rouvinen, P., & Ylä-Anttila, P. (2002). ICT Clusters in Europe: The Great Central Banana and Small Nordic Potato. *Information Economics and Policy*, 14(2), 145–165.

Nokia has been instrumental in transforming Finland as a country. The recession of the early 1990s was a watershed between the investment- and innovation-driven stages of Finnish national development. In part as a result of the rise of *Nokia*, Finland grew to become one of the foremost knowledge economies of the world.

Up until the mid-1980s, Finland was a relatively closed economy. By 1993, the opening-up of the country became complete, when the remaining restrictions on the foreign ownership were removed. *Nokia* showed Finland how to become a winner in the global playing field. As a result of the company's success, Finland and its citizens grew more international, prosperous, and information-intense. As far as international business circles are concerned, *Nokia* was little Finland's ticket to fame – global recognition of the company served as a door opener for Finns in all walks of life. *Nokia* imparted its employees with hands-on knowledge of how to conduct large-volume business transactions in virtually all of the countries of the world.

As Figure 1.c shows, *Nokia* accounted for 4% of the Finnish GDP in 2000; the corresponding share was only half a percent a decade earlier. In 2012, *Nokia's* share of the Finnish GDP was actually *negative*. This counter-intuitive observation calls for further explanation. When we calculate *Nokia's* (including *Nokia-Siemens Networks*) value added in Finland as the sum of

- local labor costs,
- local depreciation,
- local rents, and
- the operating profit (or loss) recorded in Finland,

we obtain a sum with a negative sign. As far as *Nokia* is concerned, this figure is indeed approximately the number used to calculate the Finnish GDP in 2012. *Nokia's* global losses recorded in Finland weight heavily in this calculation. From a technical viewpoint the procedure is correct: Finland is *Nokia's* profit-and-loss center globally – in better times the operations in Finland enjoy “excess profits” and in worse times they suffer “excess losses”.³

Because Finland is indeed *Nokia's* main profit-and-loss center globally, the GDP share of the company fluctuates more than several other measures. In 2000, *Nokia* accounted for 1% of the total employment in Finland. *Nokia's* contribution to the country's total employment is still in the 0.6–0.7% range. Furthermore, *Nokia's* share of business enterprise R&D in Finland has remained relatively stable at slightly over 40% throughout the 2000s.

As a result of *Nokia's* both nationally and globally unique role in both quantitative and qualitative terms, considering the consequences of the company's ascent, dominance, and descent provides important lessons. This paper is our first step in uncovering those lessons. Our purpose in this paper is to document some of the basic dimensions of the data on *Nokia* and to develop a basis for a discussion of further areas of analysis with the international research community.

Our quest for uncovering lessons arising from the history of *Nokia* is supported by Finland's most exceptional official statistics, in which the paths of virtually all individuals and organizations can be traced from the cradle to the grave in considerable detail. For the first time in history, we have been granted permission to identify in official statistics one company, *Nokia*,

³ This calculation nevertheless illustrates how current practices in determining the GDP of a nation-state are at times ill-suited for the current era of globalization.

and the company's future, current, and former employees. We are unaware of any prior work using similar data or with the same starting point.

During the 1990s, a large share of *Nokia* recruits were recent college graduates. Most of these recent graduates assumed various specialist and managerial positions at *Nokia*. Currently, *Nokia* seems to be a good and appreciated source of highly skilled, globally orientated labor for other businesses in Finland. The individuals departing from *Nokia* have mostly found managerial and specialist positions in other large corporations. However, more recently, there is a marked increase in the number of ex-*Nokia* employees working at startups.

2 Our approach and dataset

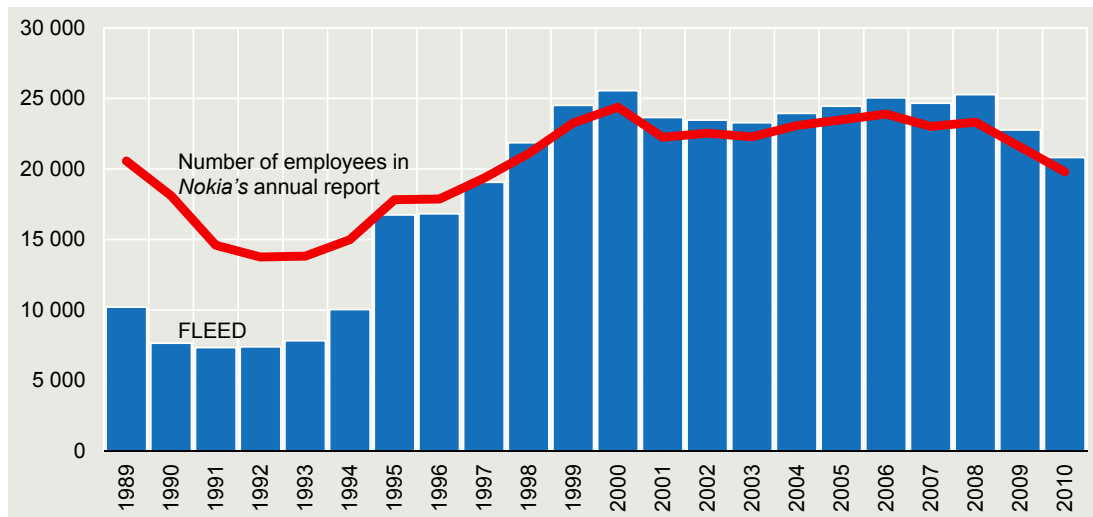
We employ official register-based data at *Statistics Finland* in our research. In principle, our data form a complete record of all individuals and all firms in Finland over their lifespans. To obtain information on individuals, we utilize the *Finnish Linked Employer-Employee Database* (FLEED) for the period from 1989 to 2010.

FLEED contains detailed individual-level information on the working-age population of Finland (for example: age, family relations, education, labor market status, occupation, and wages). FLEED also provides data on employment including the identification code of the employing organization, which can then be linked to data in other comprehensive enterprise-level databases.

We are granted permission to recognize *Nokia* and the company's employees for the purpose of our analysis. In the remainder of this paper, we track employees who worked for *Nokia* at least once during the period from 1989 to 2010. Using these data, we can analyze what an employee has performed before working at *Nokia*, what the employee has performed at *Nokia*, and what the employee has performed since departing from *Nokia*.

Figure 2 compares *Nokia*'s employment numbers from FLEED (bars) to information on Finnish employment by the company from *Nokia*'s annual reports (line). The measurement methods, including the definition of the timing of employment, are not exactly the same. As a result, some discrepancy between these two data sources is expected. As seen in the graph, there are some discrepancies in the data for the period from 1989 to 1994. Otherwise, the headcounts in our data seem to match the data from *Nokia*'s annual reports quite well. At this point, we are unable to confirm the exact cause of the discrepancies for the period from 1989 to 1994. However, these discrepancies seem to relate to the conglomerate strategy that *Nokia* pursued during the 1980s and particularly to the structure of the company's television business division, for which *Nokia* made several sizable acquisitions during this period. For example, *Nokia* acquired Swedish *Luxor* in 1984 and German *Standard Elektrik Lorenz* in 1987. These acquisitions and other non-communications activities were discontinued in the early 1990s. The remaining parts of the TV business were divested in 1994. Presumably, some employees in the TV line of business were moved to the "core" of *Nokia*. Because our primary interest is *Nokia*'s telecom business, this singular weakness in our data should not be too problematic.

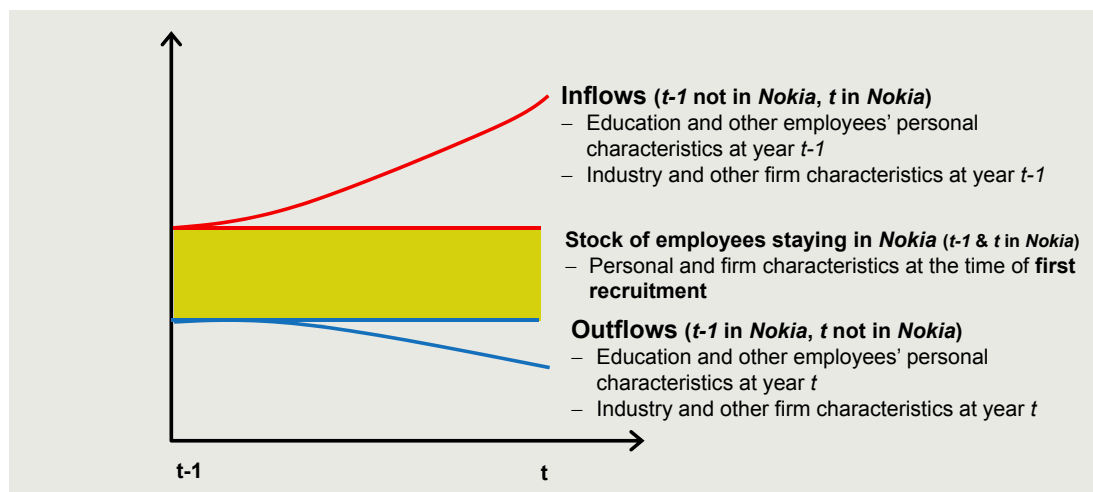
Figure 2 The number of Nokia's employees in Finland according to FLEED (bars) and according to the company's annual reports (line)



Data: Statistics Finland and Nokia's annual reports. The authors' calculations.

Our approach in this descriptive study is as follows: We look at the characteristics of those employees entering *Nokia* (inflow), those employees departing from *Nokia* (outflow), and those employees that remain employed by *Nokia* (stock). Figure 3 illustrates this setup. The **inflow** is defined as the group of employees who were *not* employed by *Nokia* at period $t-1$ and who *were* employed by *Nokia* at period t . Similarly, the **outflow** is defined as the group of employees who *were* employed by *Nokia* at period $t-1$ and who were *not* employed by *Nokia* at period t . The **stock** in each period is defined as the group of employees who were employed by *Nokia* both at $t-1$ and at t .

Figure 3 The setup of our analysis



We divide the characteristics of employment flows into personal and enterprise parts.

Personal characteristics:

- Labor market status (employed, unemployed, study or equivalent, retired),
- Age (under 25 years, 25 to 29 years, 30 to 44 years, 45 to 59 years, at least 60 years),
- Marital status (single, cohabiting, divorced),
- Field of education (technical, business, other),
- Level of education (PhD, master's, some lower level than master's),
- Job title (manager, specialist, clerical, production, other), and
- Wage change (increased/decreased, both over a year and two years before or after entering into or departing from *Nokia*).

Company-level characteristics:

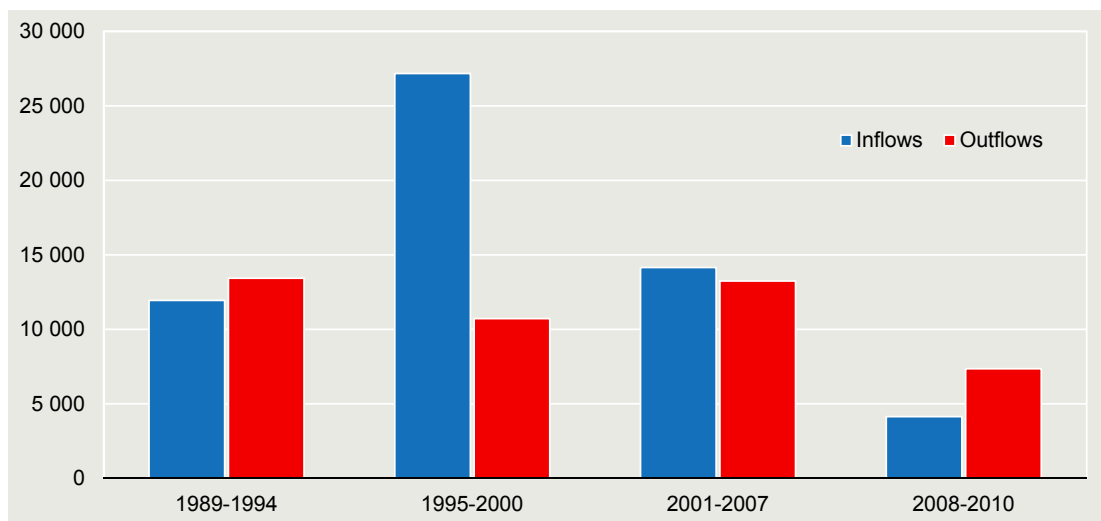
- Sector (ICT manufacturing, non-ICT manufacturing, ICT services, non-ICT business services, other services, public sector and other),
- Company age (under 3 years, 3 to 5 years, 6 to 10 years, at least 11 years), and
- Size (under 10 employees, 10 to 49 employees, 50 to 249 employees, at least 250 employees).

We consider four periods:

- 1989 to 1994: Restructuring from conglomerate to telecom manufacturer,
- 1995 to 2000: Intense growth cycle,
- 2001 to 2007: Steady state, and
- 2008 to 2010: Crisis.

Figure 4 shows the aggregate labor inflows to and outflows from *Nokia* during these four periods. During the early 1990s, there was a severe recession in Finland. During this time period, *Nokia* streamlined the company's business focus from a diversified conglomerate to a pure-play communications company. This restructuring process resulted in over 13,000 employees

Figure 4 Employee inflows to and outflows from Nokia



Data: Statistics Finland. The authors' calculations.

leaving *Nokia*, while nearly 12,000 new employees joined the company. Subsequently *Nokia*'s recruitment intensified because the company's telecom business grew rapidly. From 1995 to 2000, *Nokia* recruited over 27,000 employees, while around 10,000 persons left the company. After the intense growth cycle experienced during the latter half of the 1990s, business grew more steadily. From 2000 to 2007, around 14,000 persons joined *Nokia*, while approximately 13,000 left *Nokia*. As a result of the global financial crisis, certain industry developments, and internal mishaps, *Nokia*'s fortunes turned. Consequently, from 2008 to 2010, over 7,000 employees left, while only 4,000 joined the company.

In the remainder of this paper, we study labor inflows and outflows by analyzing personal and organizational characteristics. **All inflow and stock characteristics are determined at the time a person either joins or leaves *Nokia*.** Thus, we leave room for further analyses to study, for example, whether the probability of an employee's divorce is higher or lower when the employee is employed by *Nokia* and whether organizations that employ former *Nokia* employees subsequently over- or under-perform. All outflow characteristics are determined at the time of an employee's departure from *Nokia*.

We provide a similarly structured figure for each of the afore-mentioned personal and organizational characteristics. The "end composition" that we report for the year 2010 is based on the statuses of employees at the time at which these employees *joined Nokia*. Thus, we do not, e.g., account for marriages and divorces while at *Nokia*. We will report the compositions of inflows and outflows for the four time windows defined above (annual figures are available upon request).

Because certain information may, e.g., be conditional on remaining in employment after leaving *Nokia*, each figure also reports the inflow and outflow headcounts.

3 Personal characteristics

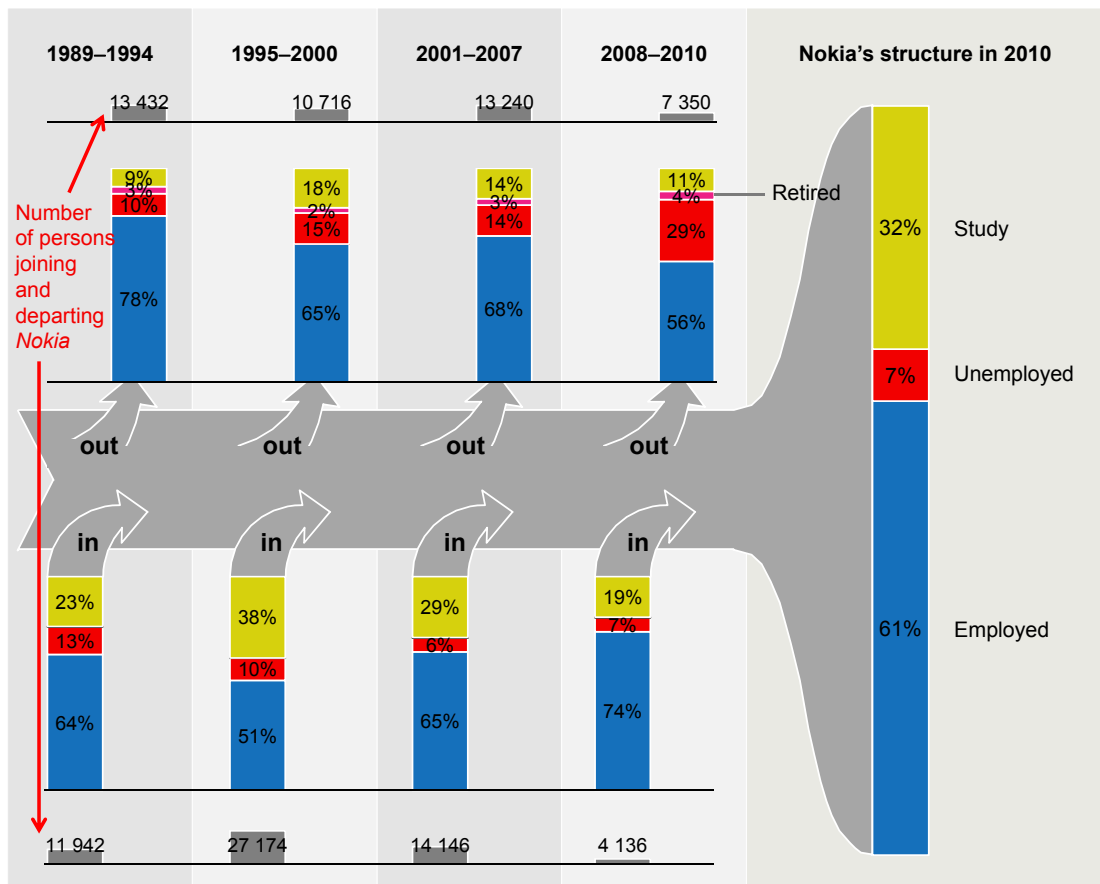
3.1 Labor market status

Figure 5 illustrates labor inflows, outflows, and the stock in the final year with respect to employee labor market statuses (the lower and upper bars show inflows and outflows, respectively). In each period, over half of the new recruits were elsewhere employed immediately before working at *Nokia*. This proportion was the largest (74%) for the period from 2008 to 2010 and the lowest (51%) for the period from 1995 to 2000. The share of recruits, who were unemployed immediately before joining *Nokia*, was 10% or above in the 1990s, but decreased in the 2000s. Students have been a notable source of *Nokia* recruits, especially during the rapid growth from 1995 to 2000, when over 10,000 students joined the company totaling 38% of all new employees. The share of student inflows has decreased in the 2000s and was the lowest (19%) for the period from 2008 to 2010. Of the employees that worked at *Nokia* in 2010, six-tenths were employed elsewhere before joining *Nokia*, one-third was college or university students, and one-tenth was unemployed immediately before joining *Nokia*.

The employees who have departed from *Nokia* seem to have found new employment quite easily. However, during the ongoing global crisis finding new employment has been more difficult for ex-*Nokia* employees compared to other periods, e.g., the early 1990s at which time Fin-

land faced a domestic financial crisis. During the period from 2008 to 2010, roughly half of the employees who left *Nokia* found new jobs immediately, whereas in the early 1990s, as many as four-fifths found employment immediately after departing from *Nokia*. Consequently, the share of unemployed ex-*Nokia* employees has increased almost threefold from the earlier period to the later period, even though the shares of individuals leaving to study (11% vs 9%) or to retire (4% vs 3%) remain quite stable.

Figure 5 Nokia's employment flows by labor market status



Data source: *Statistics Finland*. The authors' calculations. Notes: Category "Study" also includes compulsory military service. The structure in 2010 is based on information on the first recruitment by *Nokia*.

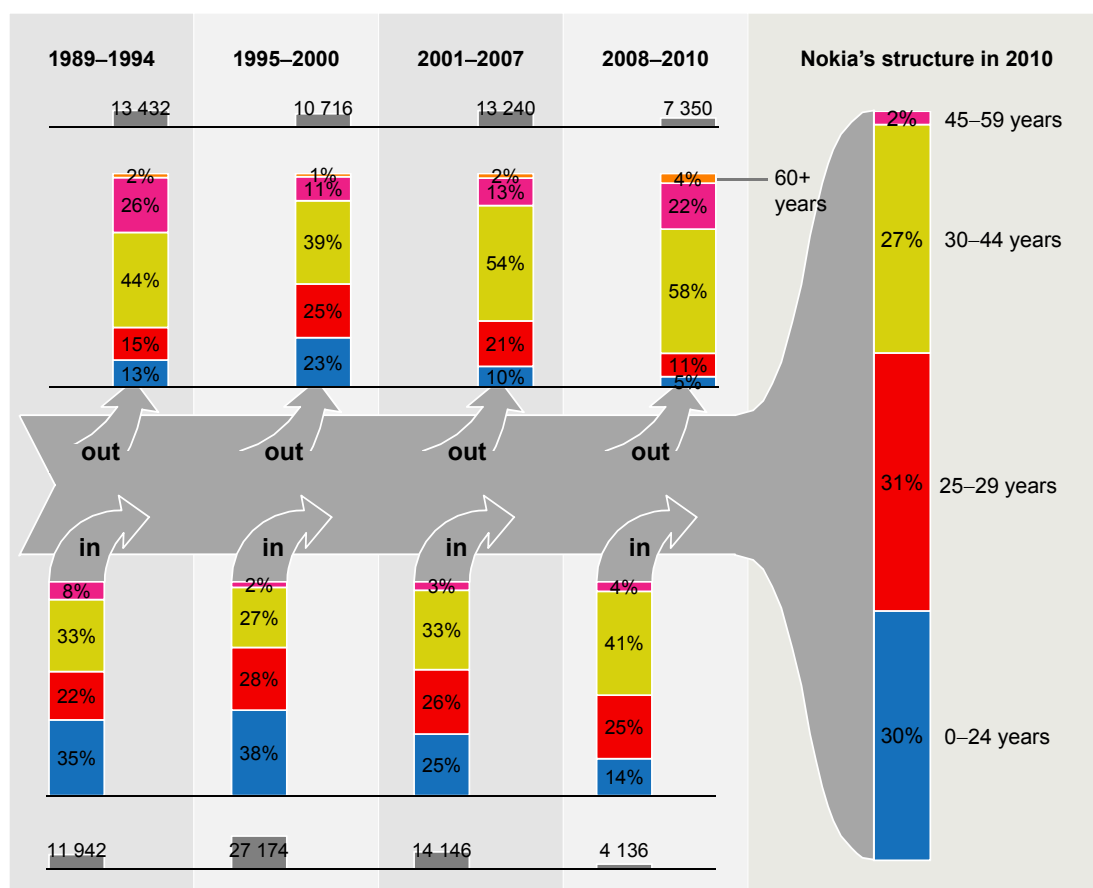
3.2 Employee age

Nokia has recruited relatively young people, which is especially notable when taking into account the lengthy study times in Finland. Thirty percent of *Nokia* employees in 2010 were under 25 years old when recruited by *Nokia*, whereas 60% were less than 30 years old. Only 2% were 45 years or older when joining *Nokia* for the first time. The share of young recruits was the highest during the intensive growth cycle during the latter half of the 1990s, when 64% of newcomers were under 30 years old and almost 40% were under 25 years old. In contrast, during the final two periods under study, the proportion of young recruits declined, while the

share of more experienced individuals increased. From 2008 to 2010, roughly every fourth newcomer was between 30 to 44 years old and the share of employees who were less than 25 year olds dropped to 14%.

The share of 30–44 year olds (at the time of departure from *Nokia*) departing from *Nokia* has been the largest outflow for all of the observation periods, ranging from 39% in the late 1990s to 58% in from 2008 to 2010. The share of departing employees under 30 was the highest outflow during the latter half of the 1990s (48%) and the lowest outflow from 2008 to 2010 (16%). Notably, employees typically depart from *Nokia* well before reaching retirement age. Only one to four percent of employees departing from the company at any given time are 60 years or older.

Figure 6 Nokia's employment flows by employee age

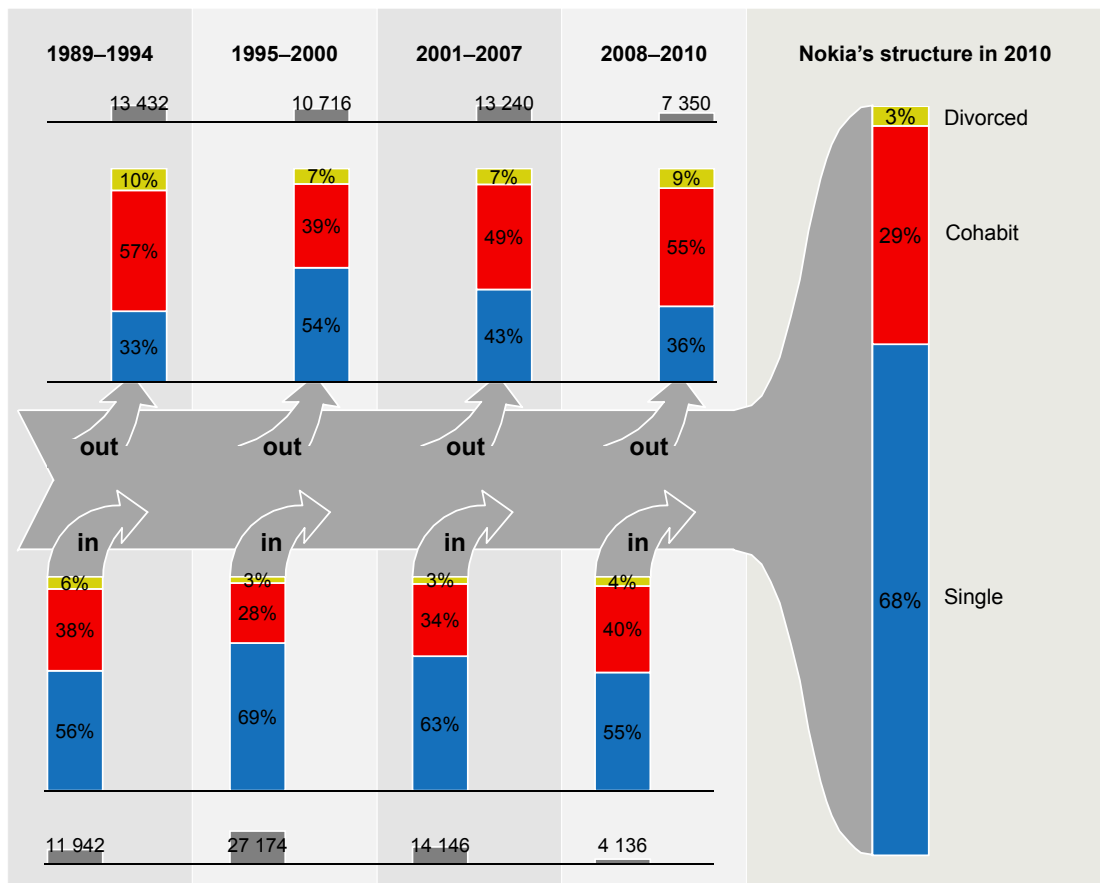


Data source: Statistics Finland. The authors' calculations. The structure in 2010 is based on information on the first recruitment by *Nokia*.

3.3 Marital status

The relatively young ages of recruits is reflected in their marital statuses. The composition of employees at *Nokia* in 2010 based on marital status at the start of employment was two-thirds single employees, 30% married or cohabiting employees, and 3% divorced or widowed employees. The share of single employees was the highest for both in inflows (69%) and outflows (54%) during the late 1990s, but this share decreased thereafter. From 2008 to 2010, the share of single employees among new recruits and among departing employees was 55% and 36%, respectively. The shares of married employees in inflows and outflows have risen over time. At 3 to 4% of inflows and at nearly 10% of outflows, the share of divorced employees has remained rather stable.

Figure 7 Nokia's employment flows by employee marital status

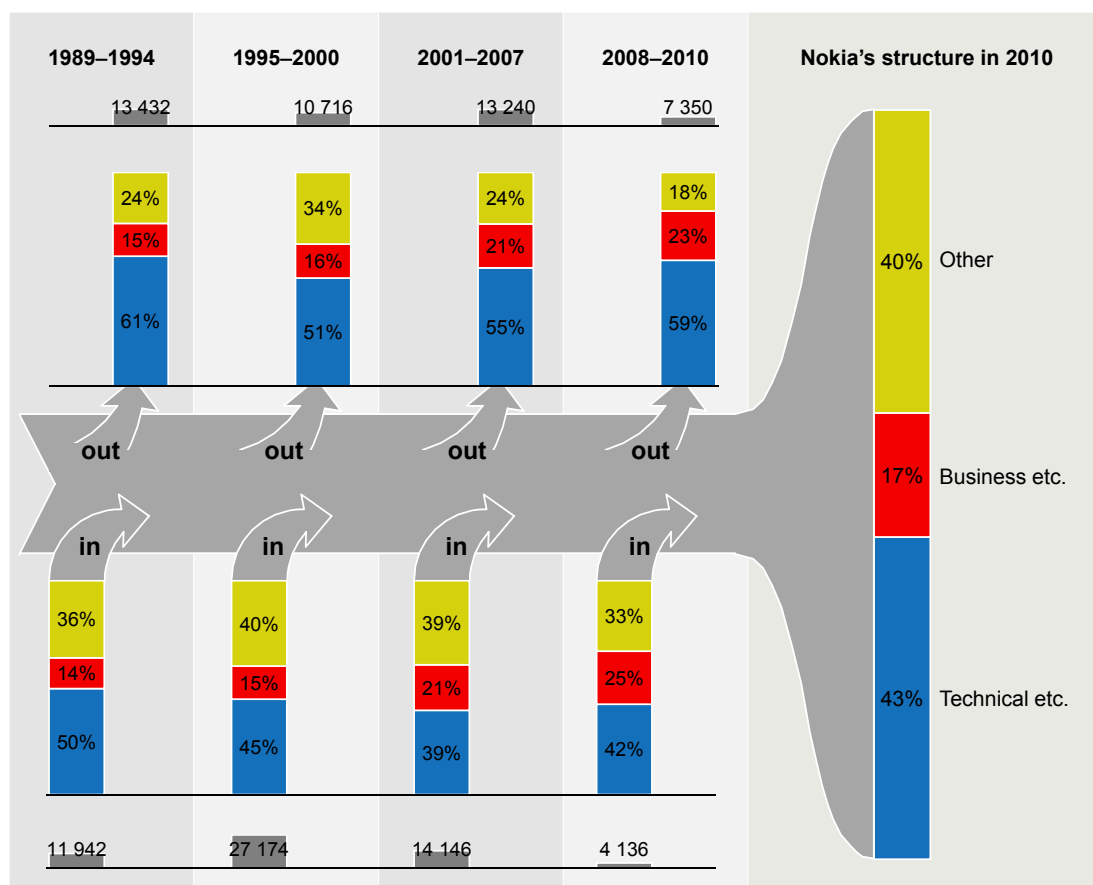


Data source: *Statistics Finland*. The authors' calculations. Notes: The structure in 2010 is based on information on the first recruitment by *Nokia*.

3.4 Field of education

Forty-three percent of *Nokia*'s employees in 2010 studied technical subject matter, 17% studied business or the social sciences, and the remaining 40% studied other subjects. A structural shift seems to have taken place over time: the share of recruits with technical educational backgrounds dropped from 50% during the early 1990s to 42% from 2008 to 2010. In contrast, the share of recruits with business-related educational backgrounds increased from 14% from 1989 to 1994 to 25% from 2008 to 2010. The share of outflowing employees with technical educational backgrounds has been approximately 50 to 60% in each period. The share of departing workers with business-related educational backgrounds increased from 15 to 16% during the 1990s to 23% from 2008 to 2010.

Figure 8 Nokia's employment flows by employee educational background

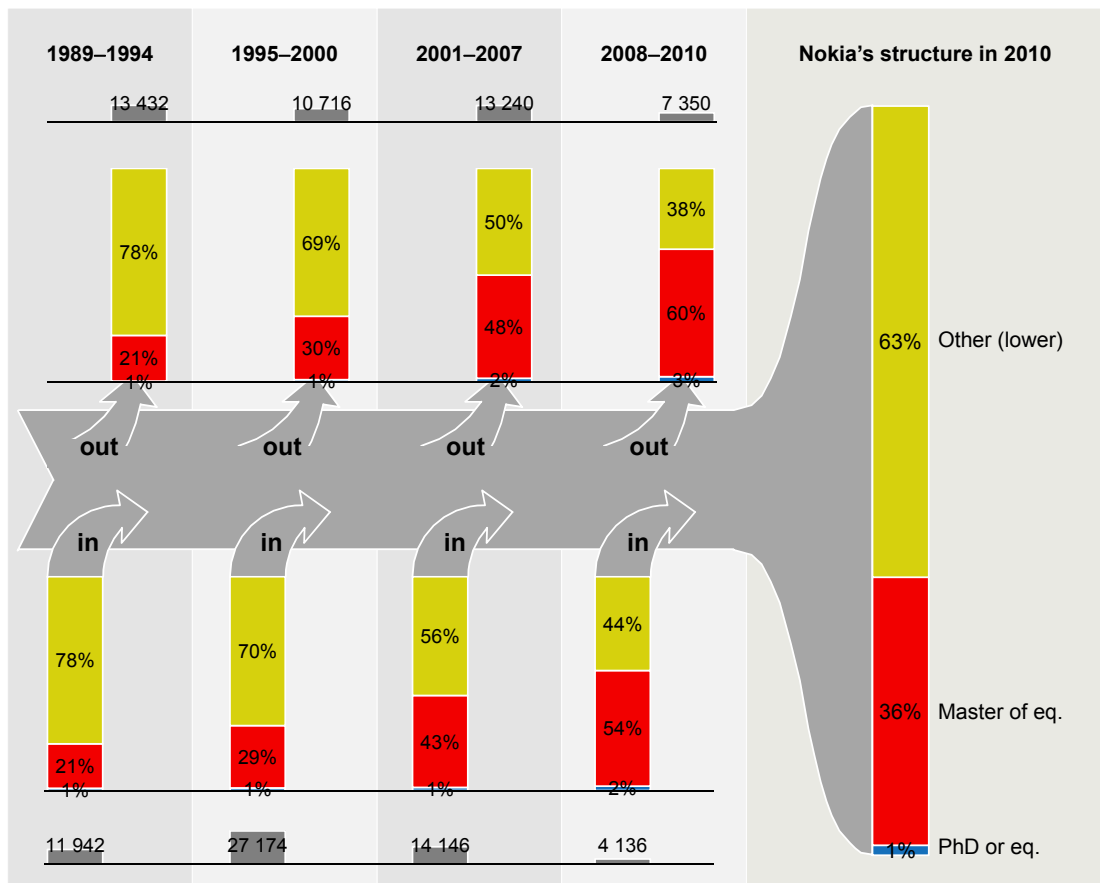


Data source: *Statistics Finland*. The authors' calculations. Notes: The structure in 2010 is based on information on the first recruitment by *Nokia*.

3.5 Level of education

One-fourth of *Nokia's* employees in 2010 had at least a master's-level degree, and 1% had a PhD or equivalent degree. The share of advanced academic level recruits increased gradually from 22% during the early 1990s to 56% from 2008 to 2010. The educational levels of departing employees increased over time. From 1989 to 1994, 22% of departing *Nokia* employees had a master's-level degree, whereas from 2008 to 2010, the share of departing employees with this educational level was 62%.

Figure 9 Nokia's employment flows by employee level of education

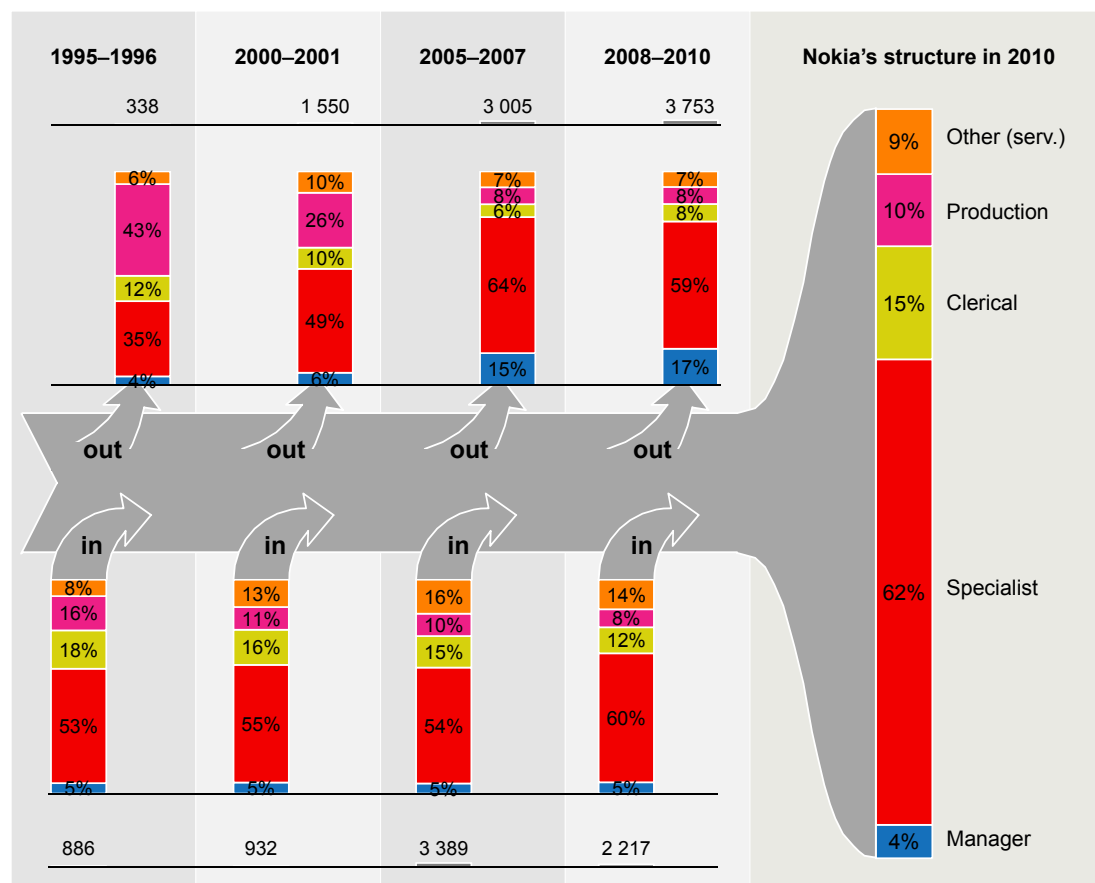


Data source: *Statistics Finland*. The authors' calculations. Notes: The structure in 2010 is based on information on the first recruitment by *Nokia*.

3.6 Occupation

Our time-series data on employee occupations is not as good as the data for the other characteristics. Employee job titles are available only for the years of 1995 to 1996, 2000 to 2001, 2005 to 2007, and 2008–2010. We nevertheless perform the same exercise, which uncovers a story corresponding to the analysis of employee educational backgrounds discussed in the previous section. The shares of highly skilled occupations, such as programmers, designers, and business and sales professionals, have increased in both labor inflows and outflows. From 2008 to 2010, 60% of the previously employed recruits held specialist positions immediately before working at *Nokia*. Specialists were represented in roughly the same proportion among those departing from *Nokia*.

Figure 10 Nokia's employment flows by employee job title (conditional on remaining employed)

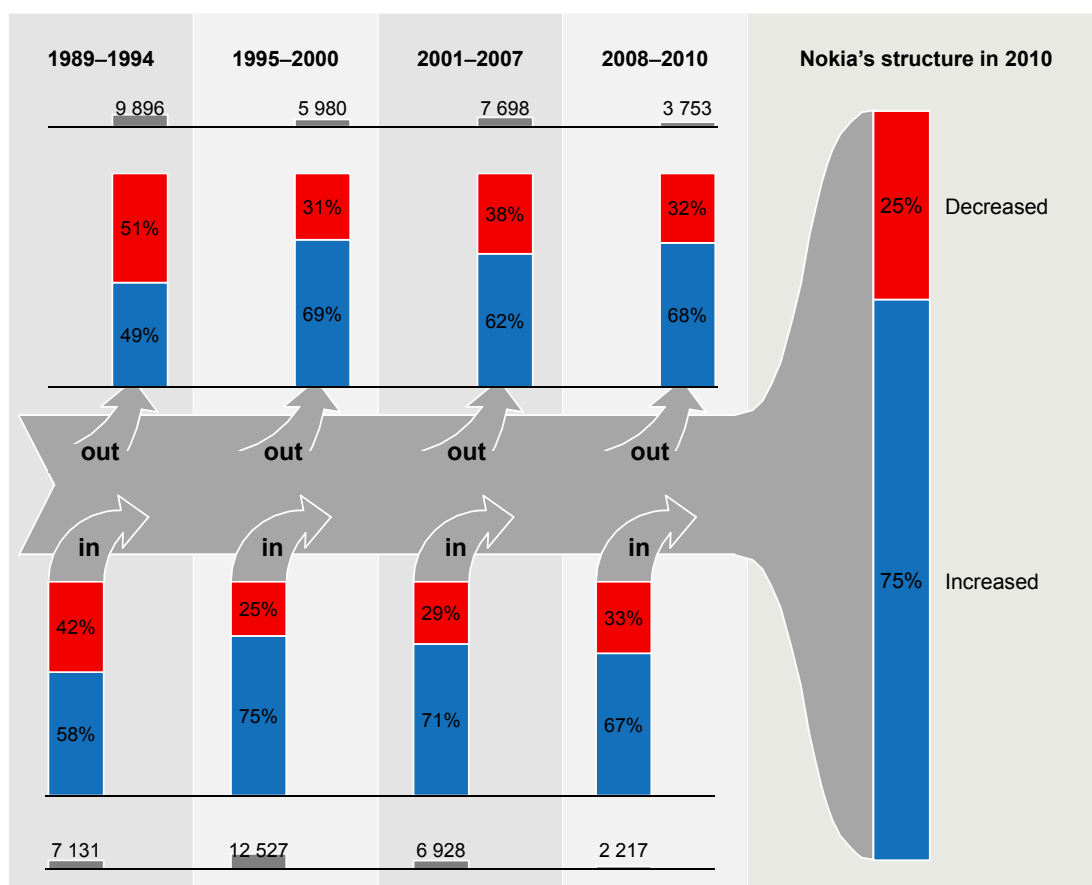


Data source: *Statistics Finland*. The authors' calculations. Notes: Different sub-periods. The structure in 2010 is based only on data relating to the first recruitment by *Nokia* of 2004 to 2010 recruits.

3.7 Wage change during a one-year period

Three-fourths of the *Nokia* employees in 2010 received pay increases upon joining the company compared to the wage levels of these employees **one year** prior to joining *Nokia*. (Here, we do not study later wage developments at *Nokia*). The share of incoming employees achieving pay increases was the highest from 1995 to 2000 (75%) and the lowest from 1989 to 1994 (58%). From 1995 to 2000 and from 2008 to 2010, two-thirds of outgoing employees left for better-paying jobs. From 1989 to 1994, the share of outgoing employees leaving *Nokia* for higher paying jobs was the lowest (49%) of all of the periods.

Figure 11 Nokia's employment flows by employee wage increase during a one-year period (conditional on remaining employed)

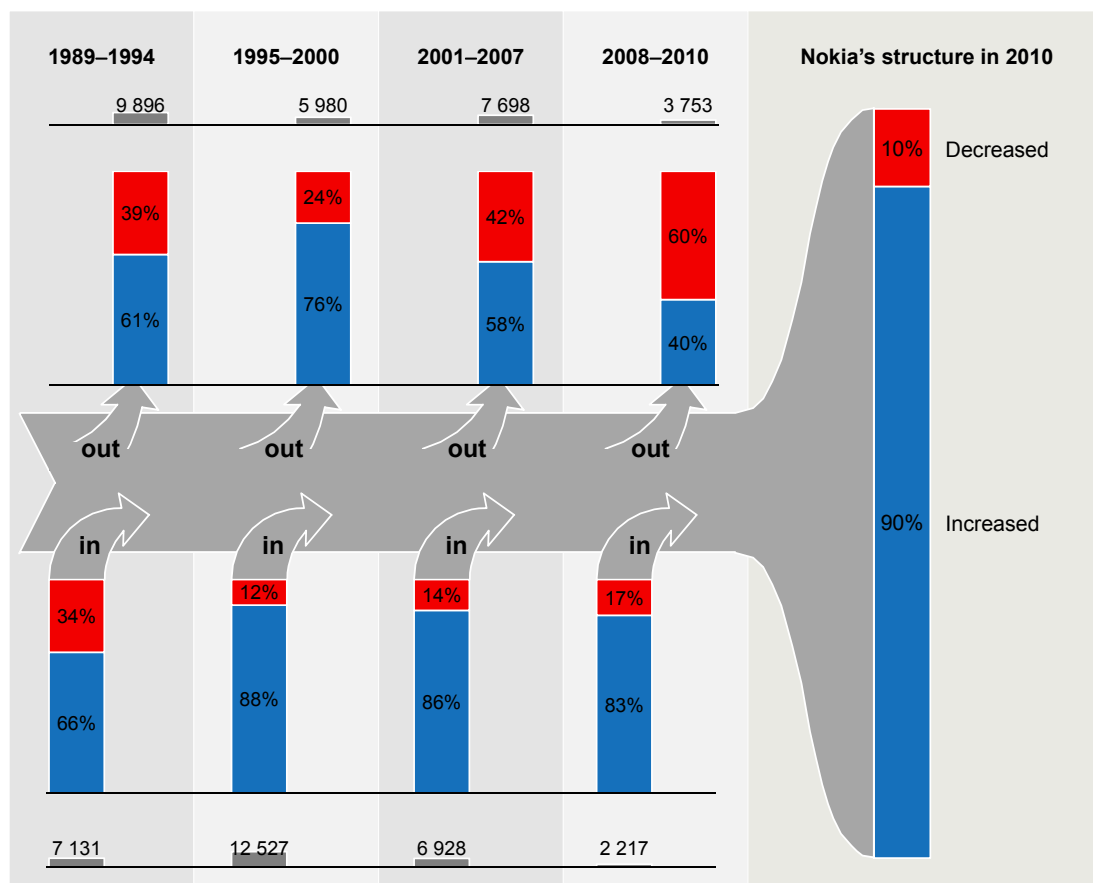


Data source: *Statistics Finland*. The authors' calculations. Notes: Wages have been deflated by the index of wage and salary earnings. The structure in 2010 is based on information on the first recruitment by *Nokia*.

3.8 Wage change during a two-year period

The analysis of wage changes in the previous section may be biased by bonuses and other extraordinary payments. Thus, we performed the same exercise for wage changes over a **two-year** period. This new analysis increases the share of employees whose wage level increased upon joining *Nokia*. Ninety percent of *Nokia* employees in 2010 received pay increases upon joining the company using the two-year criterion. The share of inflows for this characteristic was the highest (88%) during the latter half of the 1990s and the lowest (66%) during the early 1990s. Notable differences arise in this analysis for outflows compared to the one-year wage change analysis. During the early 1990s, 61% of *Nokia*'s departing employees received pay raises (compared to 49% in the previous section). From 2008 to 2010, wages increased for 40% of departing *Nokia* employees (compared to 68% in the previous section).

Figure 12 Nokia's employment flows by a person's wage increase, over 2 years
(conditional on remaining in employment)



Data source: *Statistics Finland*. The authors' calculations. Notes: Wages have been deflated by the index of wage and salary earnings. The structure in 2010 is based on information on the first recruitment by *Nokia*.

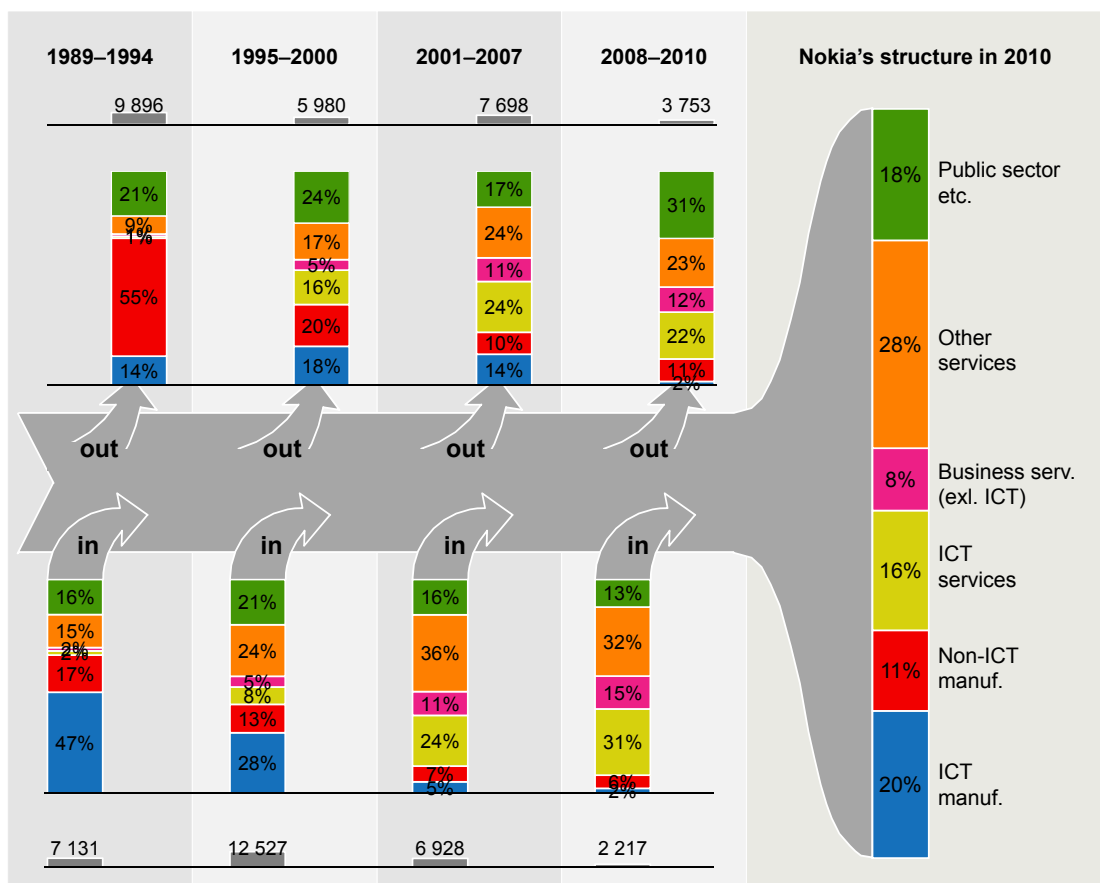
4 Organizational characteristics

4.1 Industry

Over time, *Nokia's* business emphasis has shifted from manufacturing towards services, which is reflected through the originating industries of the company's recruits: the share of recruits from manufacturing has declined from 64% in the early 1990s to 8% from 2008 to 2010. In contrast, recruits from ICT services increased from 2% in the first half of the 1990s to 31% from 2008 to 2010.

The share of departing employees moving to other manufacturing firms has also decreased from 69% in the early 1990s to 13% from 2008 to 2010. Many departing employees enter the public sector (which in our definition includes universities, public research institutes, and other non-profit organizations). The share moving to the public sector was the largest from 2008 to 2010 (31%).

Figure 13 Nokia's employment flows by sector (conditional on remaining in employment)



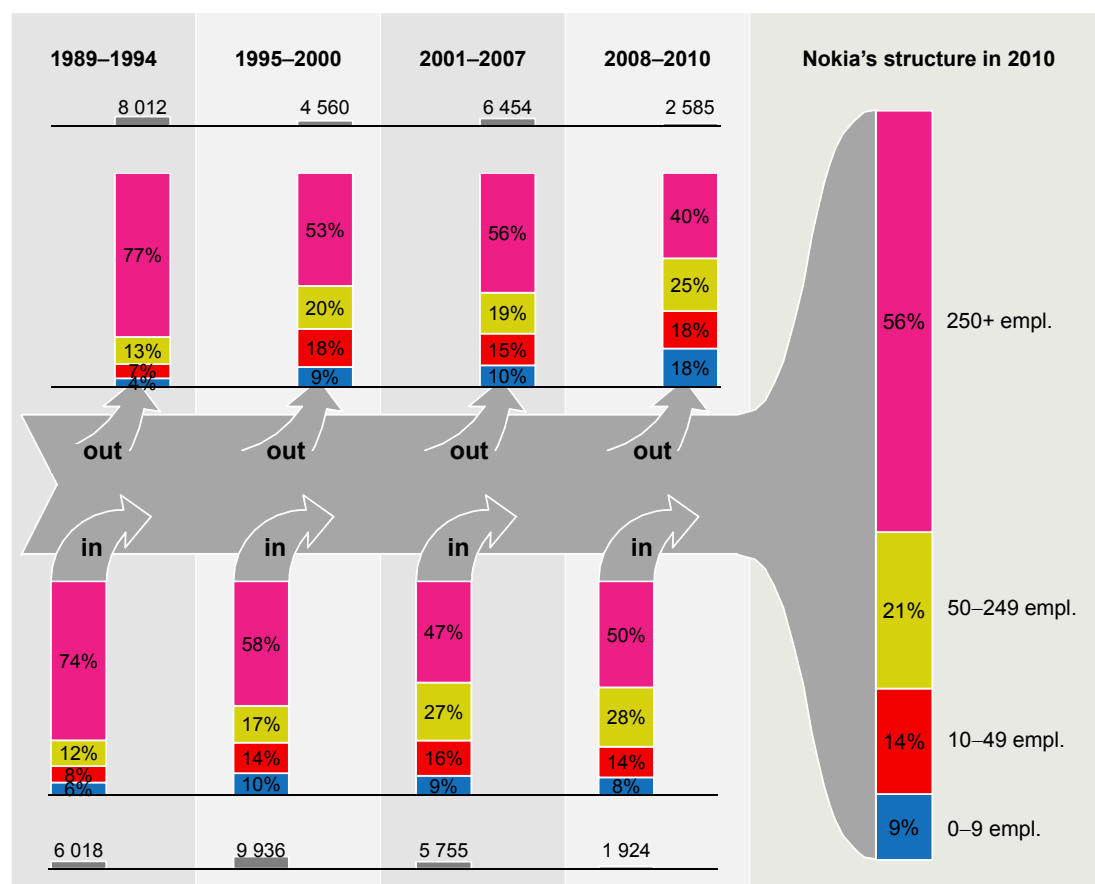
Data source: *Statistics Finland*. The authors' calculations. Notes: The structure in 2010 is based on information on the first recruitment by *Nokia*.

Half of the *Nokia* employees in 2010 had previously been employed in private sector services. In 2010, one-third was previously employed in manufacturing, while one-fifth was previously employed in the public sector. Nearly one-third in 2010 had been recruited from other ICT firms either in manufacturing or services.

4.2 Firm size

Over half of *Nokia* employees in 2010 were previously employed by another large firm (with at least 250 employees in Finland). The share of inflows from large firms was the largest in the early 1990s (74%), but this share of inflows has gradually decreased to 50% from 2008 to 2010. During the latter time period, the share of mid-sized firms as a source of recruits grew from 12% to 28%. The shares of outflows are similar to the shares of inflows. Furthermore, from 2008 to 2010, every fifth employee departed to a small (0 to 49 employees) or micro (0 to 9 employees) firm.

Figure 14 Nokia's employment flows by firm size (conditional on remaining in private sector employment)

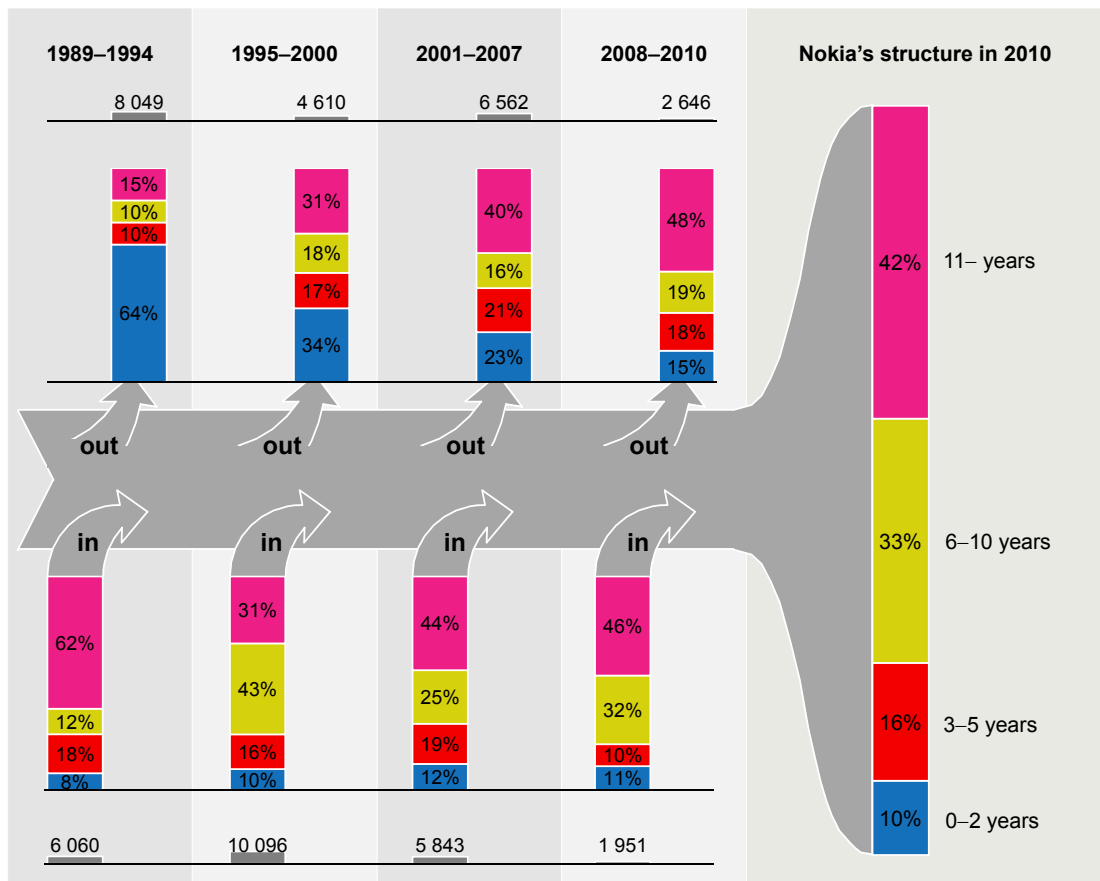


Data source: *Statistics Finland*. The authors' calculations. Notes: The structure in 2010 is based on information on the first recruitment by *Nokia*.

4.3 Firm age

Nokia has primarily recruited from other mature companies (defined as companies which are over 10 years old). The mature share was the largest (62%) in the early 1990s. The share of outflows to younger companies was large (64%) in the early 1990s, which was driven by divestments in *Nokia*'s non-ICT businesses around that time. Some businesses that continued under new ownership simply received new business identification codes and thus are considered to be new firms.⁴ In these data, we do *not* observe a marked increase in the startup activities of departing employees during 2008 to 2010, which is contrary to the “conventional wisdom” in Finland. Recall, however, that the *Nokia*-related startup boom in Finland took place in 2011 and 2012, but that these years are not (yet) included in our data.

Figure 15 Nokia's employment flows by firm age (conditional on remaining in private sector employment)



Data source: *Statistics Finland*. The authors' calculations. Notes: The structure in 2010 is based on information on the first recruitment of *Nokia*.

⁴ There are alternative ways of defining a firm's age, but here we employ the most commonly used alternative, i.e., counting the time since the official business identification code was granted.

5 Discussion

In part because of the relatively small size of Finland, *Nokia's* direct tangible impact on Finland has been huge. Arguably, *Nokia's* greatest impact on Finland has nevertheless been intangible in nature: *Nokia* provided Finnish citizens with hands-on knowledge of how to succeed in global business. As a result of *Nokia's* success, Finland grew more international, prosperous, and information-intensive.

Because of the characteristics of both *Nokia* and Finland as well as due to both domestic and global turmoil in the surrounding environment, the context in this paper resembles a laboratory experiment on the impact of a single company on a country.

In recent years, *Nokia* has reduced recruitment directly from colleges and universities. The level of formal education obtained by *Nokia* recruits has nevertheless risen over time. The dominance of engineer employees has declined over time. Particularly during the 1990s, *Nokia* recruited relatively young people. By and large, recruits have assumed various specialist and managerial positions at *Nokia*.

During the 2000s, *Nokia* seems to have been a good source of highly skilled labor for other businesses in Finland. Typically, departing ex-*Nokia* employees seem to have found employment in high-level managerial and specialist positions. More recently, an increasing share of *Nokia* employees has been employed at startups. Presumably, this tendency will be more pronounced when the years 2011 and 2012 are considered (yet to be added to our data). During the most recent period, the level of migration of ex-*Nokia* employees to public sector jobs has also grown.

Nokia's ascent, dominance, and descent have significantly impacted labor flows in Finland. In this paper, we have documented some of the basic dimensions of these flows with the purpose of engaging other members of the international research community in thinking about possible future research and analysis questions relating to *Nokia's* employment data. We are open to suggestions and look forward to finding new collaborators and co-authors!

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ETLA

Elinkeinoelämän tutkimuslaitos
The Research Institute of the Finnish Economy
Lönnrotinkatu 4 B
00120 Helsinki

Puh. 09-609 900
Fax 09-601 753
www.etla.fi
etunimi.sukunimi@etla.fi

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