

EDUCATION, TRAINING AND DEMAND FOR LABOUR IN FINLAND BY 2020

Ilpo Hanhijoki, Jukka Katajisto, Matti Kimari, Hannele Savioja



FINNISH NATIONAL
BOARD OF EDUCATION

FINLAND IN BRIEF

Population	5.3 million
Surface area	338,000 km ²
Official languages	Finnish (91.2%) and Swedish (5.5%) Saami language in the Saami domicile in Lapland
Religion	Lutheran (82%) Orthodox (1%) Other (1%) Unaffiliated (16%)

Source: Statistics Finland, 2008.



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BACKGROUND

Objective of the anticipation

Anticipation of educational needs aims to consolidate the knowledge base relevant to decisions on educational provision, thus promoting the balance between supply and demand on the labour market. Anticipation provides information on quantitative needs for vocationally/professionally oriented education and training, which are based on long-term employment forecasts. The focus is on anticipating demand for labour over a 15-year period and using the results to derive educational needs. This anticipation concerns vocationally/professionally oriented education and training intended for young people – i.e. upper secondary vocational education and training (VET), polytechnic education and university education – which mainly lasts from 3 to 8 years, depending on the level of education. Educational needs have been expressed in terms of intake needs. This publication is an abbreviated version of a wider-reaching Finnish-language report entitled *Koulutus ja työvoiman kysyntä 2020* ('Education, training and demand for labour by 2020') produced by the Finnish National Board of Education.

This report deals with developments in demand for labour over the period from 2005 to 2020 and, based on these developments, provides forecasts of quantitative educational needs in the first half of the 2010's. Long-term demand for labour is examined from different perspectives: in terms of changes in labour demand by industry, new job openings and opportunities compensating for natural wastage by occupational group (labour market demand) and in terms of intake needs adjusted according to the average young (16–21) age group. In parallel with national anticipation work, all 19 regions of Finland have also anticipated regional labour and educational needs in a consistent manner.

Organisation of anticipation

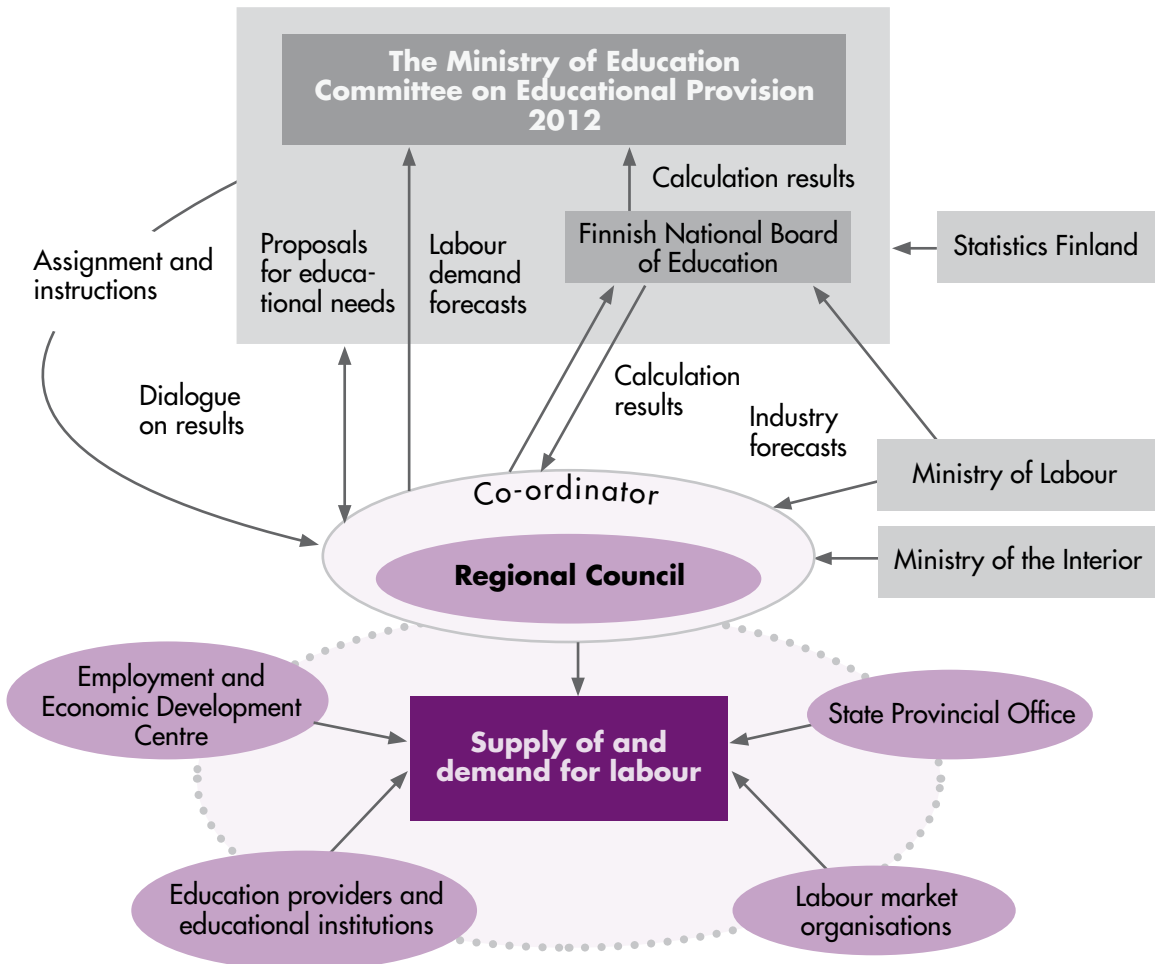
The Finnish National Board of Education (FNBE) implemented a development project of anticipation of demand for labour and educational needs between 1996 and 1999, with funding from the European Social Fund and the Finnish Minis-

try of Education. The project further developed an anticipation method already in use in Finland, which is geared towards anticipating long-term educational needs (about 15 years) based on the needs of the labour market. At the same time, the project created a calculation model (named Mitenna) suitable for anticipation purposes. Following this development work, the method was put to use in national and regional anticipation of demand for labour and educational needs, while also launching co-operation with different ministries. Key collaboration partners include the Ministry of Education, the Ministry of Employment and the Economy (formerly the Ministry of Labour) and Statistics Finland.

In late 2005, the Ministry of Education launched an anticipation project with a view to producing anticipation data for the purpose of preparing the Development Plan for Education and Research for 2007–2012 (Figure 1). The aim was to anticipate national and regional intake targets for 2012 by level, field and subfield of education. In addition, anticipation also involved intake targets for Swedish-language provision. The national and regional anticipation projects were completed in 2007. The results of the nationwide anticipation work are reported in this publication.

The national anticipation work was carried out by the Finnish National Board of Education. The then Ministry of Labour produced national industry forecasts and their regional equivalents in co-operation with the regions. The Finnish National Board of Education supported regional anticipation by providing instructions, adapting statistical data required in anticipation for the 19 regions and producing calculations (based on the Mitenna model) for the regions based on forecasts of demand for labour prepared by the regions.

Figure 1. Organisation of anticipation.



The Finnish education system and steering and regulation of provision

The Finnish education system

Before compulsory education, children have a subjective right to pre-primary education at the age of six. Participation in pre-primary education is voluntary and is provided for 6-year-olds at day-care centres and in pre-primary classes operating in conjunction with comprehensive schools. In 2007, almost all 6-year-olds participated in pre-primary education.

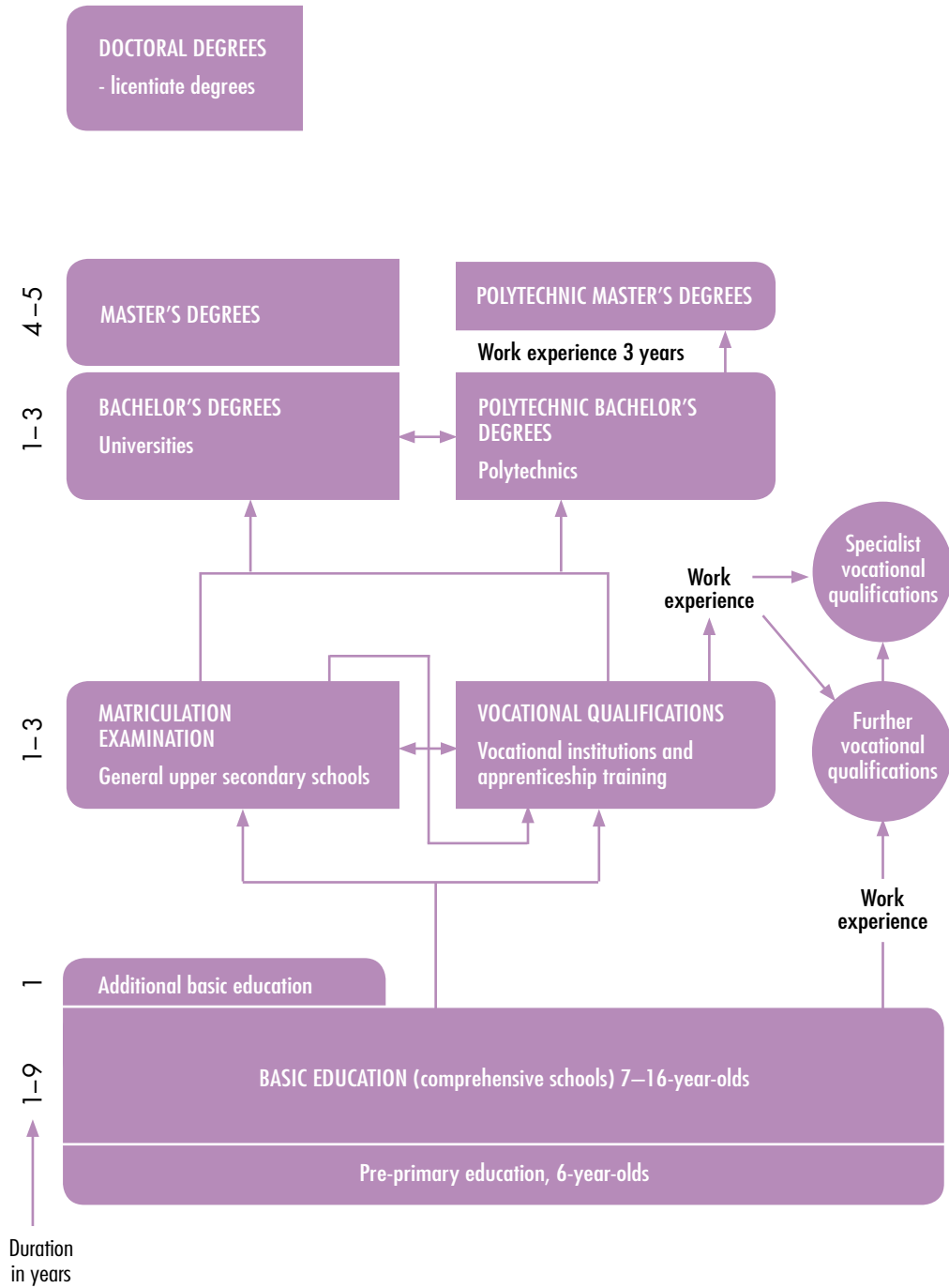
Compulsory education begins at the age of seven. After nine years in basic education, it is possible to continue either to general upper secondary education or to vocational upper secondary education and training, and then to a polytechnic or university.

Basic education means general education provided for each age group as a whole. It is intended for children aged between seven and sixteen and completion of its syllabus at comprehensive school takes nine years. Once they have completed basic education, pupils have fulfilled their compulsory education.

Upper secondary education includes general upper secondary education and upper secondary vocational education and training. General upper secondary education is non-vocational education preparing for the matriculation examination. The main objective of upper secondary vocational education and training, in turn, is to provide vocational competence. In 2007, approximately 92% of comprehensive school leavers moved on to general or vocational upper secondary studies immediately after basic education. In 2007, 86% of the 25–34 age group had attained at least upper secondary education.

Higher education is made available by universities and polytechnics. Both sectors have their own profiles; universities focus on scientific research and instruction, whereas polytechnics are professionally oriented higher education institutions adopting a more practical approach.

Figure 2. The Finnish education system.



Steering and regulation of provision

Upper secondary VET

The quantitative regulation system of Finnish vocational education and training was reformed in the late 1990's. The new legislation is more flexible, emphasising education providers' own responsibility and enabling them to decide on the means used to achieve the objectives of education and training independently, within the limits of the relevant legislation and the authorisation to provide education and training.

In 2008, there were 169 providers of upper secondary VET in Finland. The authorisation to provide upper secondary VET specifies the framework for the provider's education and training activities. The authorisations include regulations on the types and scopes of education and training that providers may organise with financing for the education and culture sector. Within the framework of its authorisation, each provider decides on the configuration, names and educational missions of their educational institutions and on the forms of provision. The authorisations specify aspects such as fields and levels of education and, in certain cases, qualifications and annual student numbers.

Education providers may independently transfer intake quotas from one institution and field to another on a yearly basis within the limits of the maximum annual student numbers authorised. Provision of some qualifications has been restricted due to modest educational needs or high costs of provision, etc. Examples of such qualifications include upper secondary vocational qualifications in the field of Culture and qualifications for forest machine operators within the field of Natural Resources. A specific educational mission may also include obligations, such as an obligation to offer certain types of education and training or to maintain certain services.

Higher education institutions

The Finnish higher education system consists of two complementary sectors, namely, universities and polytechnics (universities of applied sciences), which have different roles and profiles. The model is based on the differentiated degrees, contents and missions of the two sectors. The network of higher education institutions operating within the Ministry of Education sector consists of 20 universities and 26 polytechnics.

One of the key objectives of the Government's higher education reform is to achieve a network of higher education institutions that is stronger and more effective in regional terms. This entails a reduction in the number of higher education institutions and their units. The role of polytechnic education and research, development and innovation activities will become more pronounced in areas without an independent university in particular.

By nature, polytechnics are mostly multidisciplinary and regional higher education institutions with operational focus on links with the world of work and regional development. Their degrees are higher education degrees with a professional emphasis. The statutory mission of polytechnics is to provide higher education for professional expert assignments based on the requirements of the world of work and its development as well as on research and artistic premises. According to Government policy decisions, polytechnics focus on high-quality education relevant to the world of work and on applied research and development specifically geared towards supporting small and medium-sized business activities and the service sector. Polytechnics are also responsible for responding to regional demand for labour.

All Finnish universities are state-owned and they operate under the auspices of the Ministry of Education within central government. The Ministry is responsible for preparing matters concerning universities and appropriate operations and steering of universities.

A new Universities Act is due to come into force on 1st January 2010. The purpose of the university reform and the new Universities Act is to increase universities' autonomy, establish them as independent legal entities and create better operating conditions for them in international terms. The reform would change the status of universities from state accounting offices to independent public corporations or foundations governed by the Foundations Act. The new Universities Act would include provisions on the universities' mission, administration, operational funding and steering, as well as on aspects relating to university research and education, students and staff.

The key objectives of the university reform and structural development include improving the quality of education, developing study processes and raising the international standard of research. As a result of the university reform, universities' increasing powers and accountability create incentives and conditions to organise university operations more efficiently and appropriately. The operations of universities, including private institutions, will mostly be financed from government funds and the universities will also continue to discharge the public mission assigned to them by central government.

The key components of the system employed by the Ministry of Education to steer higher education institutions are funding, legislation and information-based guidance. The main steering instruments include agreements between the Ministry and higher education institutions, the feedback procedure and monitoring systems.

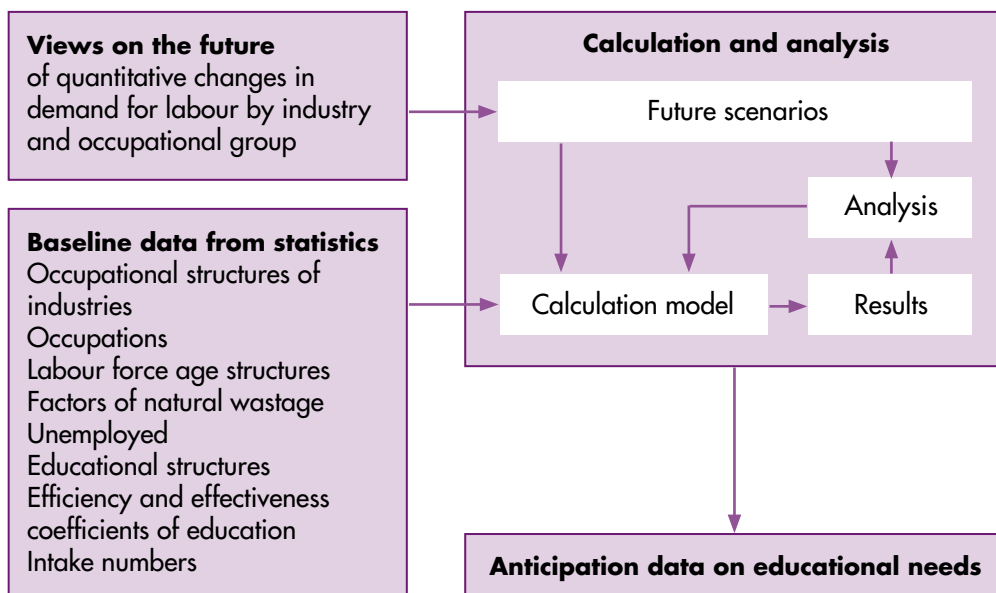
Regular negotiations between the Ministry of Education and higher education institutions play a key role in the steering process. In these negotiations, the parties – i.e. the universities and the Ministry of Education within the university sector and the polytechnics, their maintaining organisations and the Ministry within the polytechnic sector – agree on the individual institutions' mission, profile and priority fields as well as on key objectives and development measures in terms of national higher education policy to be set for their operations for a specified number of years at a time. The outline of the agreements for the 2010–2012 period consists of the common objectives of the higher education system, the missions, profiles and priority fields of individual higher education institutions, their quantitative targets, such as degree targets, as well as significant development measures and funding criteria. Starting from 2013, agreements will be negotiated for four years at a time.

Anticipation method

The anticipation work in terms of demand for labour and educational needs carried out by the Finnish National Board of Education is based on an application of the labour force method. In this method, new labour requirements are anticipated on the basis of demand on the labour market and the labour demand is then converted into educational needs. The aim is to ensure the best possible match between provision of vocationally/professionally oriented education and training and future demand for skilled labour on the labour market.

In addition to statistics, anticipation makes use of surveys and studies on trends and developments in different industries as well as on changes in occupations and skills needs. Different views on the future have an impact, first and foremost, on preparation of industry and occupational structure forecasts, on determination of the efficiency and effectiveness targets for education and training and on formulation of correspondence keys between occupations and education. Choices of baseline data and views on future changes in the labour market and labour force influence the trend of results produced by the anticipation model (Figure 3 and Appendix 1).

Figure 3. Anticipation of quantitative needs for vocational/professional education and training.



Anticipation calculations provide data on changes in demand for labour, natural wastage of labour, demand for skilled labour and educational needs. Practical anticipation work often involves making alternative calculations based on different development prospects on the labour market. Interpretation of anticipation results also takes account of other research and survey data concerning industries, occupations and education.

The Finnish National Board of Education has classified industry and occupational groups, based on Statistics Finland’s Standard Industrial Classification (2002) and Classification of Occupations (2001), to suit anticipation purposes. Statistics Finland is the primary source of basic anticipation statistics. Other important sources of anticipation statistics include the Ministry of Employment and the Economy and the Finnish Centre for Pensions (see Appendix 2).

The first stage is to anticipate demand for new labour on the labour market by industry. The change in demand for labour in different industries over the forecasting period is derived as the difference between the current situation and the forecast year, which in this case is 2020. Enterprises, institutions and other workplaces are assigned to different industries according to their principal activity, which means that the entire staff of a workplace fall within the same industry.

Since education is more closely associated with occupations than industries, it is essential to establish a link between occupations and education. This is why the process also involves anticipation of changes in the occupational structures of industries. This means analysis of the different occupations represented by people employed in each industry and the relative proportions of these occupations among people employed in that specific industry. Change in demand for labour is calculated as the difference between the occupational structure forecasts for the target year summed up by industry and the occupational structure of the most recent reference year.

The total demand for new labour – in other words, the number of job openings – is obtained by summing up the change in demand for labour and natural wastage (due to death, disability and retirement) over the forecasting period. In practical terms, natural wastage is calculated for each factor by making use of the annual wastage coefficients by occupational and age group obtained from the most recent data available. The total demand for new labour is calculated for the forecasting period, also taking account of the current supply of unemployed labour and the estimated unemployment rate for 2020. These results indicate the amounts and types of labour required by the world of work.

Data on changes in demand for labour and natural wastage (number of job openings) is converted into demand for education and training using an instrument known as the correspondence key. Each occupational group currently used in anticipation has a correspondence key, which indicates the types of education and training (field and level) expected to be required in the occupational group in question, as well as the proportion of different programmes as a percentage of the total educational provision required. The correspondence key between occupations and education has been revised to cover about 400 occupations.

The targets set for the efficiency (programme completion rates and further study tracks) and effectiveness (labour force participation rates among qualification-holders) of education and training are taken into account at the next calculation stage, before arriving at specific results on intake needs. The coefficients allow conversion of the educational needs of the world of work into intake needs by field and subfield, i.e. the entrant numbers required to cover demand for new labour between 2005 and 2020.

Intake needs have been calculated taking account of the following targeted coefficients describing the performance of education and training, i.e. factors of efficiency and effectiveness:

- the proportion of entrants completing their qualification (completion rate)
- the proportion of qualification-holders moving on to complete another educational qualification (further study tracks and multiple education)
- the proportion of qualification-holders moving on to the labour market (labour force participation rate).

The completion rate of education influences the relative weightings of different subfields in particular, whereas the effects of further study tracks and multiple education focus on the relative proportions of different levels of education. The coefficient based on these targeted proportions varies considerably by level and subfield of education (1.04–2.46). The coefficient allows translation of the subfield-specific graduate needs into intake needs. An integral feature of the Finnish education system is the fact that some students move from one level of education to the next after completing a qualification. This is why the number of student places available should exceed the figure that the size of the young age group would suggest. The coefficients also cause the structure of the calculated intake needs to differ from that of the qualifications required on the labour market. The proportion of qualification-holders moving on to further studies is highest in upper secondary VET, which is why its intake needs differ the most from the qualifications requirements of the world of work. In addition to the calculation coefficients outlined above, another aspect taken into account when calculating intake needs is the labour force participation rate among qualification-holders, which is not very significant in terms of differences between subfields in this anticipation.

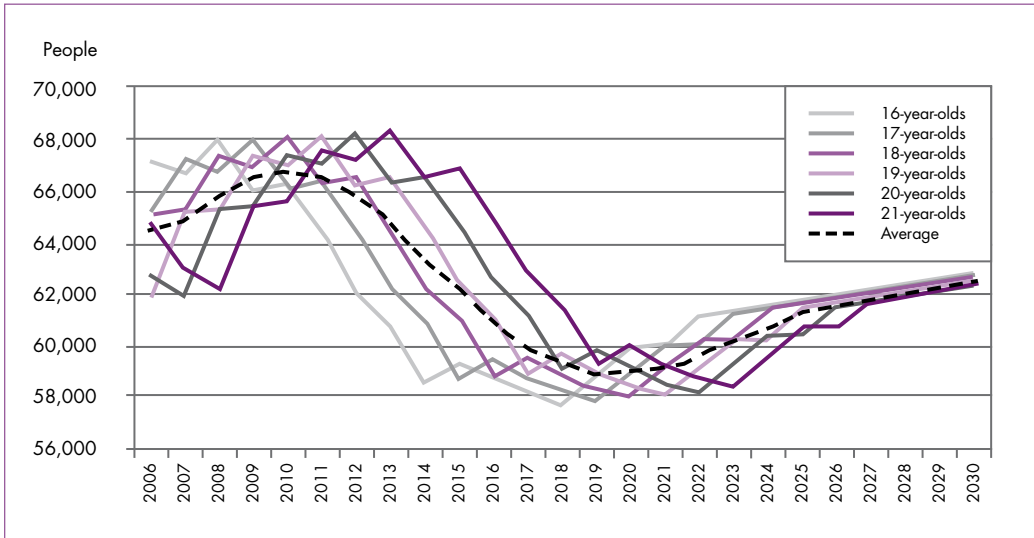
Completion rates vary by subfield of education. Conversely, the proportions of qualification-holders taking further studies and labour force participation rates have been defined consistently by level of education. Table 1 below shows a summary of educational efficiency and effectiveness targets.

Table 1. The targeted efficiency and effectiveness of education used in anticipation calculations (%).

	Proportions of qualification-holders taking further studies	Completion rates of entrants	Labour force participation rates of qualification-holders
Upper secondary VET	23	52.8 – 90.7	91
Polytechnic education	5	60.2 – 89.4	92
University education	3	60.4 – 92.2	93

The intake needs for vocationally/professionally oriented provision can be calculated by adjusting anticipation results of educational needs to the 16–21 age group forecast. In this anticipation, intake needs of young people refer to the intake needs of the world of work adjusted to the average size of the 16–21 age group during the 2011–2015 period. Intake needs adjusted to the young age group mean the average intake anticipated per year that is required to guarantee educational opportunities for the age group. In other words, the required entrant numbers are derived from the size of the young age group, while the distribution of educational needs over different levels and subfields is based on demand for labour. Intake needs are quantified taking account of the average effects of further study tracks and completion rates within the entire education system.

Figure 4. Population forecast (2007) for 16–21-year-olds in Finland for 2006–2030.



Source: Statistics Finland, 2007.

Figure 4 describes development trends in the 16–21 age groups in the Statistics Finland population forecast. On average, the age group size would seem to grow up until 2011 and subsequently decrease all the way to the early 2020's. The forecast suggests that the average age group size would again start to grow at that point and the young age group would comprise about 63,000 people at the end of the period in 2030.

DEMAND FOR NEW LABOUR UP UNTIL 2020

Demand for labour by industry between 2005 and 2020

This chapter deals with Finland's economic development in the early 21st century. The forecasts produced by the then Ministry of Labour extend through to 2025 and are based on estimates included in the 'Labour Force 2025' report (Ministry of Labour 2007). Anticipation is based on the estimated employment rates in different industries by 2020, derived from these forecasts.

The anticipation project has used the industry forecasts produced by the Labour Force 2025 working group. The total number of employed people in 2004 was 2,262,000. By 2020, the basic scenario and the target scenario project an increase of 63,000 and 189,000 people, respectively. Development trends in the number of employed people have been anticipated up until 2020 for a total of 60 occupational groups within all 28 industries.

Finland's economic development took a downward turn in 2001. The downturn damaged the forestry and technology industries in particular, but other manufacturing industries were also affected. The situation also accelerated transfer of electrical and electronics industry subcontracting to lower-cost countries. At the same time, however, development in the domestic sector was exceptionally strong in Finland. The economic growth took an upward turn again during 2004 due to domestic demand and the recovery of the global economy and exports.

Manufacturing industries reduced personnel such that employment at the turn of 2004 and 2005 was about 40,000 people less than at the beginning of 2002. However, total employment did not decrease to any significant extent, because employment increased in services and construction. In late 2005, employment in manufacturing took an upward turn, which contributed to an improvement in the overall employment situation.

Industry developments have been examined over the 2005–2025 anticipation period in terms of two alternative scenarios describing basic and target development. The basic scenario describes the future based on data available at the time

of the analysis (2006) and according to probable trends. The point of reference used for the target scenario, in turn, is better employment and reduction in unemployment to the extent that full employment is achieved. The target scenario involves influencing economic developments and other factors through social and economic policies.

Basic scenario

According to the Labour Force 2025 report, the basic development scenario projects an average GDP growth of 2.2% over the 2005–2025 period, because average growth would remain below 2% during 2010–2025. Growth in export of goods and services is expected to decrease from the average growth (5.9%) projected for the 2005–2010 period, while growth in imports will also decline. Growth in private consumption is expected to decrease, whereas public consumption is projected to increase. Growth in productivity is expected to decline only slightly from the 2005–2010 levels (2.6%). The basic scenario anticipates that the employment rate will rise to 75% during the 2020's, as the working-age population decreases.

Target scenario

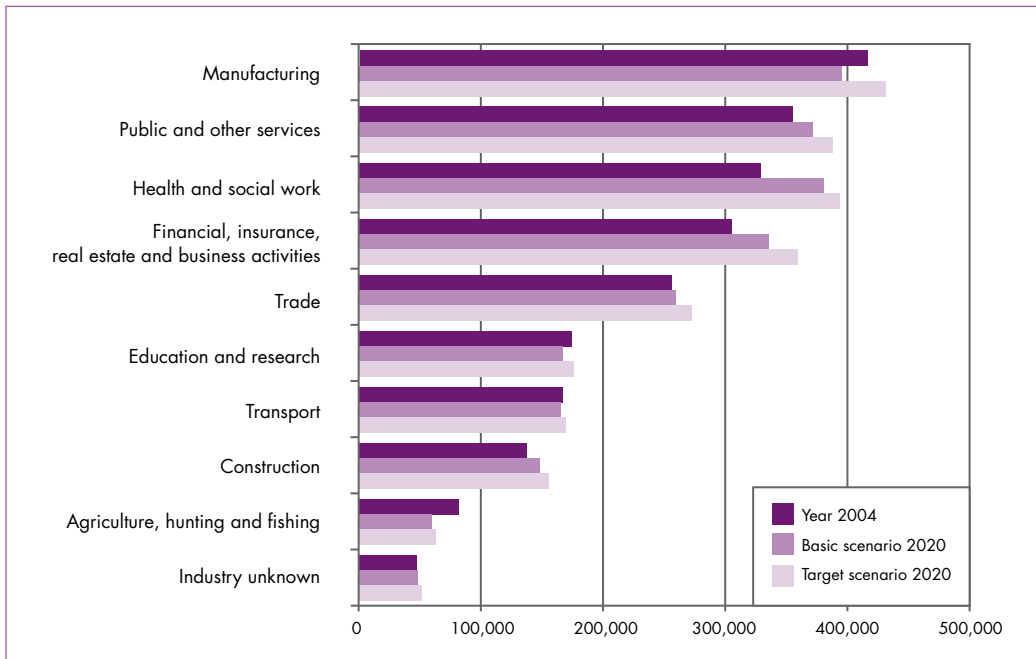
The target scenario anticipates an average growth of 3.4% for the last few years of the current decade. Growth is predicted to slow down towards the end of the forecasting period, such that the average growth for the 2005–2025 period would amount to 2.5%. The average growth in export of goods and services is projected to drop by a couple of percentage points from the 2005–2010 levels (6.1%), while the average growth in imports would fall by one percentage point during the 2005–2025 period. In this scenario, private consumption would only decline slightly, whereas public consumption would show clear growth. Growth in productivity is also expected to decrease to some extent from the 2005–2010 levels (2.5%) in the target scenario due to rapid growth in employment. The employment rate in the target scenario is anticipated to rise close to 80% during the 2020's.

Demand for labour by industry

Figure 5 outlines the distribution of jobs by industry group in 2004 and 2020 in the alternative development scenarios. Both the basic and the target scenario estimate that the number of jobs will increase from the current levels in health

and social work, financial, insurance, real estate and business activities, public and other services, as well as in construction and trade. The only industry where both scenarios indicate a reduction in the number of employed people is agriculture, hunting and fishing. The numbers of people employed in the manufacturing industry and in education and research will increase from the current level in the target scenario but decrease in the basic scenario. Within the manufacturing industry group, the basic scenario suggests that the most significant reductions will take place in the manufacture of food products, beverages and tobacco as well as in the manufacture of basic metals and fabricated metal products. Reductions in the education sector focus particularly on research and development.

Figure 5. The number of jobs by industry group¹ in 2004 and 2020 anticipated in the basic and target scenarios.



1. Agriculture, hunting and fishing: 1; Manufacturing: 2, 3, 4, 5, 6, 7, 8, 9; Construction: 10; Trade: 11, 12; Financial, insurance, real estate and business activities: 16, 17, 18, 19; Public and other services: 13, 20, 21, 25, 26, 27; Education and research: 22; Health and social work: 23, 24; Transport: 14, 15; Industry unknown: 28. See Appendix 3.

Demand for labour by occupational group between 2005 and 2020

Changes in the occupational structure refer both to changes in the relative proportions of people working in different occupational groups and to quantitative changes in the entire labour force over the 2005–2020 forecasting period. Anticipation of the occupational structure involves three stages. The first stage focuses on anticipation of employment trends in different industries. This is followed by assessment of changes in each occupational group within each specific industry. The third stage involves summing up the same occupational groups in different industries, which results in the anticipated occupational structure for the entire labour force that is in line with the industry forecast.

Anticipation of occupational structures in different industries aims to identify changes in skills needs that influence the relationships between and employment rates within different occupational groups. Factors underlying changes in the occupational structure include new products, innovations and production methods, complete with new technologies. There are also variations between industries in terms of introduction of new technologies. In the future, business enterprises are anticipated to focus increasingly on their core functions and outsource some of their other functions. The change in the international operating environment is related to market deregulation, competition and changes in the global division of work, which also influence the occupational structures of different industries. All the above-mentioned changes may have effects on management and organisation of operations. The internal industry structures are also predicted to change to some extent (branches of industry). In addition, changes relating to the population structure have also been taken into account in anticipation of occupational structures.

Anticipation of the occupational structure has aimed to take account of key anticipation efforts covering the entire Finnish society and the views on the future within the Ministry of Education sector. Their general results can be used to make various interpretations relevant to the occupational structure. Anticipation of educational needs has involved interpretation and synthesis of various anticipation results and using these as a basis to produce alternative views on the change in the occupational structure.

Basic and target scenarios for developments in the occupational structure

Changes in the number of employed people by occupational group have been anticipated using two alternative development scenarios, the basic and target scenarios. Background materials used to prepare forecasts include the most recent anticipation data on long-term changes and development scenarios in social and economic operating environments. In addition, the anticipation project has used industry-specific sources and consulted experts from different fields.

The basic scenario for the occupational structure forecast is based on the equivalent scenario for the industry forecast. The projected changes in different branches of industries have been taken into account in the occupational structure forecast. This scenario indicates that the occupational structures of industries will mainly change in line with prior developments in the occupational structures.

The occupational structure forecast in the target scenario, in turn, is based on the industry forecast in line with the target development scenario. This scenario has also taken internal structural changes within the main industries into account when analysing occupational structures. The occupational structure forecast in line with the target scenario is characterised by an occupational structure based on a high standard of technological, business, environmental and service expertise.

Change in the occupational structure between 2005 and 2020

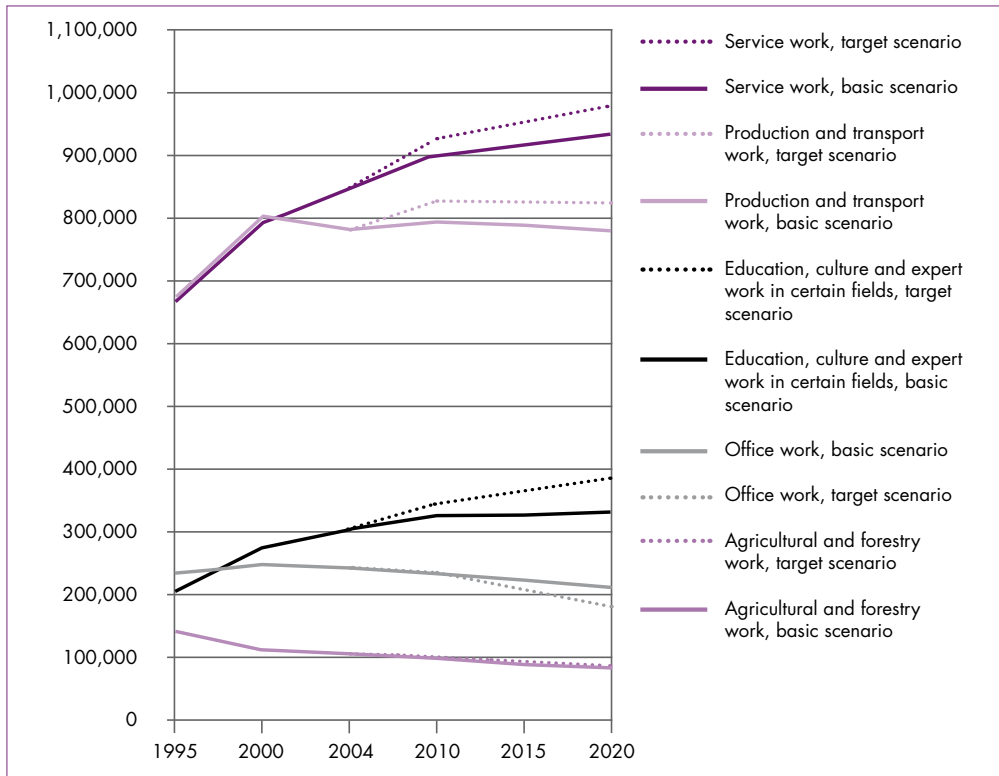
The anticipated changes in the occupational structure are outlined in Figure 6, where the major occupational groups have been combined to form five groups. The number of jobs in various occupations and expert professions relating to services continues to grow. In conditions of favourable economic development, the numbers of manufacturing and transport jobs will remain at the current levels. Job opportunities in agricultural and forestry work and in office work will continue to decrease similar to developments in the previous decade.

The numbers of production and transport jobs are estimated to remain at levels equivalent to the midpoint of the current decade or to increase slightly. Within this group, the overall number of jobs in manufacturing work and transport work will remain unchanged, but their internal structural change would suggest an increase in the number of white-collar employees and a decrease in production jobs. New jobs may be created in construction work.

The numbers of service jobs are anticipated to grow at almost the same rate as in the early years of the current decade. The highest growth within this group will focus on health and social work both in quantitative and relative terms. Growth in other areas of service work is also expected to be significant. Job numbers within rescue and safety work are projected to remain close to current levels.

Job numbers in education, culture and certain expert professions (natural sciences, economics and business administration, law, social sciences, humanities) continue to grow rapidly. Within this group, growth focuses on expert professions and cultural and communications occupations. Within teaching and education, the basic scenario does not suggest any growth, while the target scenario does.

Figure 6. Change in the occupational structure in 1995–2020.²



2. The groups in the Figure have been formed from the following major occupational groups:
 Service work: service work, health and social work, rescue and security work.
 Production and transport work: manufacturing work, construction work, transport and logistics work, occupation unknown.
 Education, culture and expert work in certain fields: teaching and education, cultural and communications work, other executive and expert work.
 Office work: office work.
 Agricultural and forestry work: agricultural and forestry work.

The changes in the occupational structure described above are only indicative of future educational needs in different fields of education. The effects of the decisions made in the occupational structure forecast on the future educational needs at different levels is illustrated in Figure 7, where the 60 occupational groups have been grouped into three classes according to the level of education that the occupations are expected to require. Both the basic and the target scenario anticipate clear growth in the number of jobs requiring a higher education degree. Conversely, jobs available for those with upper secondary vocational qualifications would appear to start decreasing slowly after the turn of the next decade.

Figure 7. Changes in job numbers according to education required for the job between 1995 and 2020.

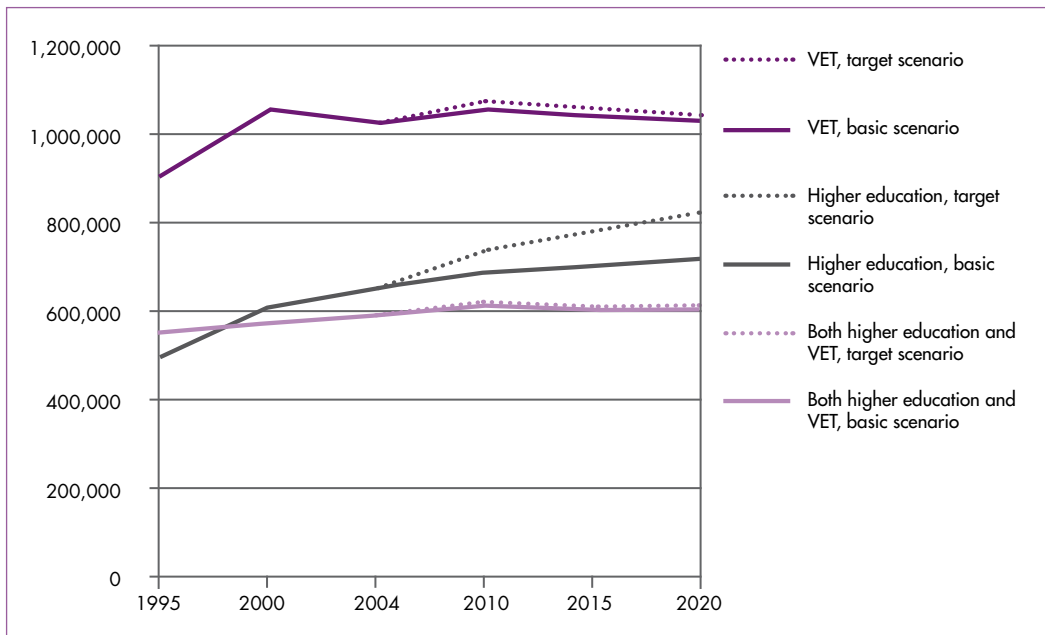
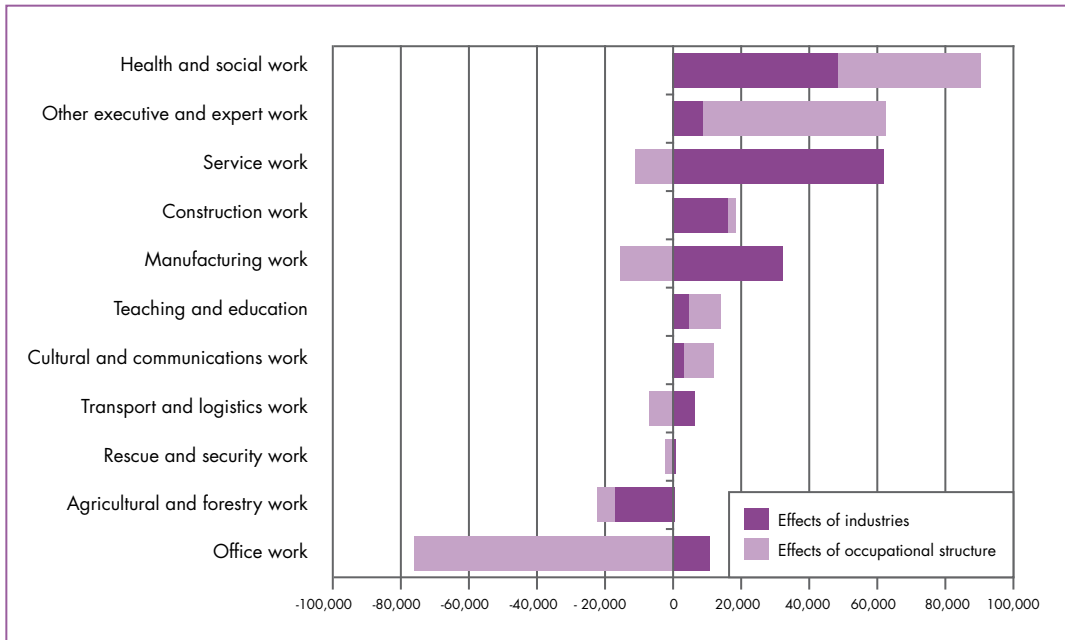


Figure 8 outlines the changes in the occupational structure anticipated for 2005–2020 in terms of two aspects, one describing the effects of changes in employment in different industries and the other the effects of changes in occupational structures within industries on the overall occupational structure. The effects of changes in employment in different industries have been calculated such that the internal occupational structures of industries have been retained at the level of the 2004 reference year throughout the forecasting period. Deducting the resulting change in employment in different occupations from the anticipated change in total employment shows the effect of change in the internal occupational structures of industries on each occupation’s employment trend.

Figure 8. Effects of industry forecasts and internal occupational structure forecasts for industries on developments in job numbers within the major occupational groups between 2005 and 2020 in the target scenario.



Jobs in health and social work are concentrated in the health care and social services sectors, which are anticipated to grow significantly. In addition, concentration on core tasks within these sectors is expected to continue, which means that various support services will be outsourced to other industries.

The other executive and expert work group covers those occupations in natural sciences, business and economics, law and humanities that cannot be classified in any of the other occupational groups. The employment trends of industries have fewer effects on the occupational structure in this occupational group than in health and social work. Job numbers in this group are projected to grow in most manufacturing and service industries, which will have a considerable effect on developments in job numbers in terms of the occupational structure.

Similarly, in the occupational groups of service work, manufacturing work and transport and logistics work, it is anticipated that jobs relating to production and services will decrease and be partially replaced by jobs falling within the occupational group of other executive and expert work. Similar developments are anticipated to occur in teaching and education and in cultural and communications work, but these will be less pronounced than in other executive and expert work. The considerable effect of the occupational structure

forecast on the decrease in office work is due to the estimate that traditional office tasks will continue to decrease clearly in almost all industries.

Natural wastage from the employed labour force between 2005 and 2020

In this analysis, 'natural wastage' refers to the permanent departure of people from the labour force over the selected forecasting period resulting from retirement or death. The natural wastage of employed people between 2005 and 2020 was calculated on the basis of the number of employed people shown in the Statistics Finland 2004 register of occupations. Calculations were made using the occupation and age data for that year as a basis for calculating natural wastage for all years within the forecasting period and adding these up to produce the total natural wastage for the forecasting period. These take account of retirement due to pensionable age, retirement based on disability due to illness, accident or some other reason, and death.

The employment pension system has been developed since the early 1990's so as to encourage ageing employees to stay at work longer. The 2005 pension reform³ plays a key role in terms of retaining ageing people at work. One of the long-term objectives of the pension reform is to raise the average retirement age by 2 to 3 years. Some pension forms have been eliminated from the new system, while also raising some age limits. The transitional periods included in the pension reform are different for the private and public sectors.

The pension reform appears to delay retirement in the 55–64 age group. The pension solution contributes to the sufficient supply of labour by alleviating demand due to natural wastage focusing on young people completing their studies during the next decade. The solution will put off some demand for new labour and, in the best case scenario, level it out over the course of several years.

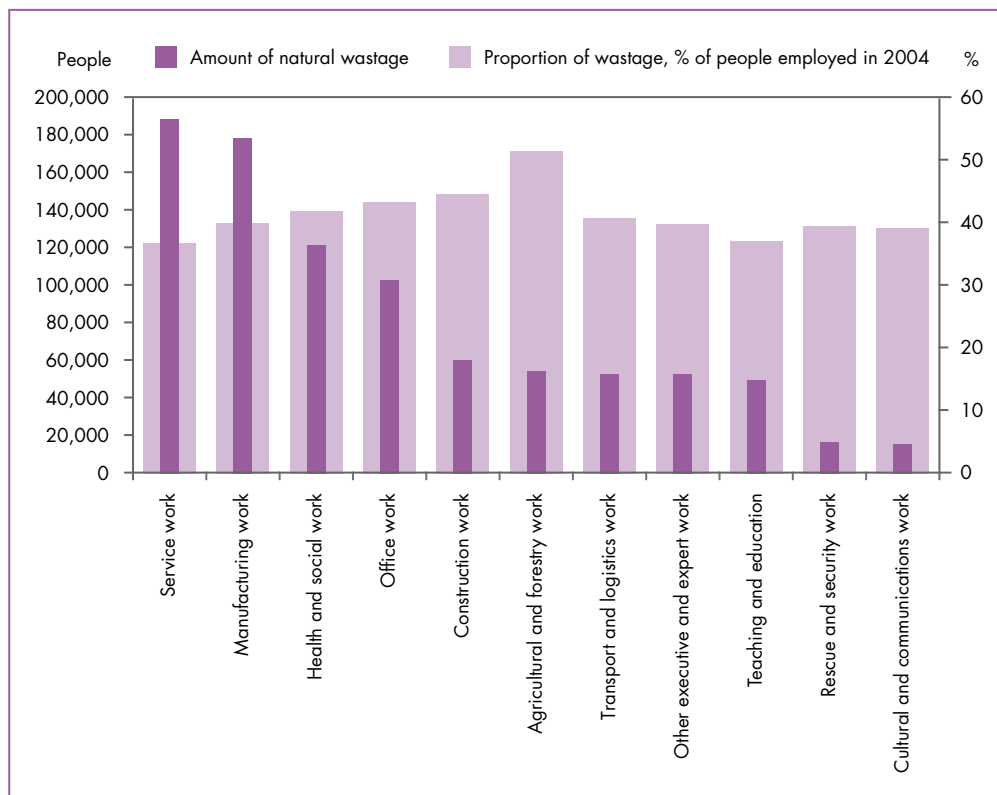
It is anticipated that a total of about 913,000 employees are retiring from the labour market during the period from 2005 to 2020, accounting for 41% of the number of employed people in 2004. The average amount of natural wastage per year is 57,000 people. In practical terms, virtually all employed people aged 50 and over will retire during the 16-year period used in calculation of natural

3. A description of the main features of the 2005 pension reform both in the private and public sector can be found on the website of the Finnish Pension Alliance TELA at www.tela.fi.

wastage. In 2004, this group amounted to 648,000 people. A total of 265,000 employees aged below 50 will leave the labour market. This means that those aged over 50 account for more than 70% of natural wastage, showing a clear increase compared with calculations in earlier anticipation projects. In 2000, the 50+ age group comprised 580,000 people, which means a growth of almost 70,000 people within a four-year period.

In 2004, the baby-boomer age groups born between 1946 and 1950 comprised 420,000 people. Among these age groups, employed people amounted to 282,000 or 67%. The average size of an employed age group was 56,000 people. Since 2000, the number of employed people had dropped by 43,000 people. Baby boomers are starting to retire in the last few years of the current decade, which means a steady growth in natural wastage towards the end of the decade. The growth will continue at a decelerating pace in the early years of the next decade, such that natural wastage would appear to be highest in 2013–2014, amounting to 66,000 people per year.

Figure 9. Natural wastage from the employed labour force between 2005 and 2020 and proportion of natural wastage as a percentage of people employed in 2004.

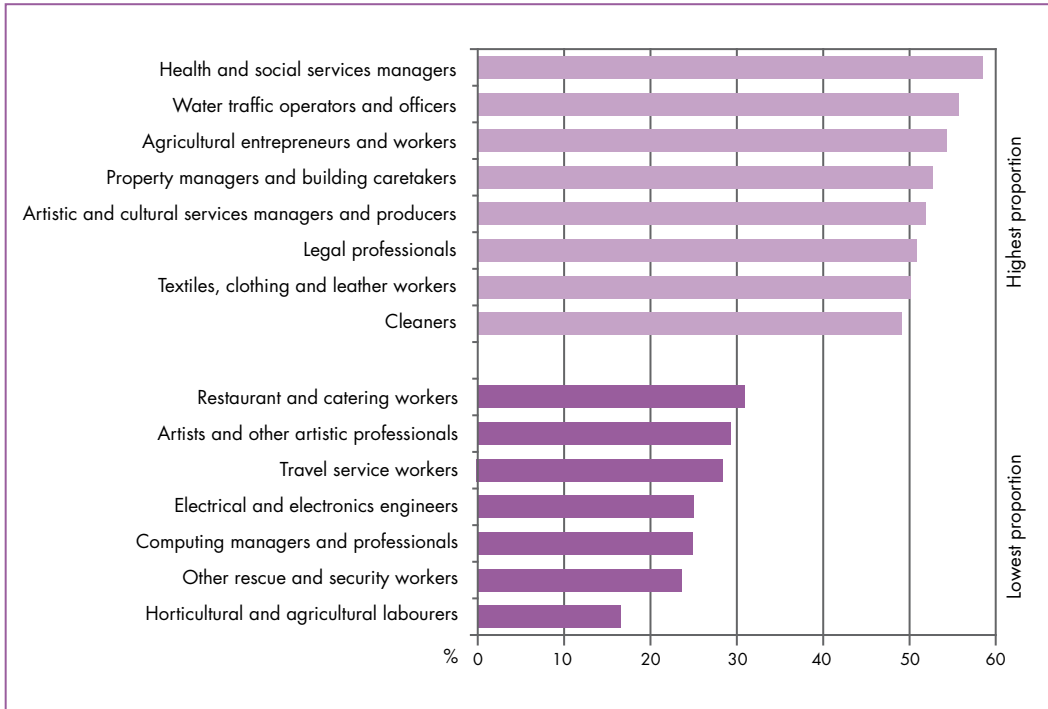


The number of retiring employees is highest in service work and manufacturing work: combined, these two groups account for more than 40% of natural wastage (Figure 9). If a third major occupational group, health and social work, is also considered, the combined amount of natural wastage within these three occupational groups is 490,000 people, which is clearly more than half of the total amount of wastage.

The extent of natural wastage is mostly influenced by the age of employed people. In 2004, the median age of employed people was 42 years. Differences between occupational groups are very pronounced. The median age within the 60 occupational groups included in the occupational classification used in anticipation ranged between 29 and 49 years. The median age is typically low in those occupational groups where growth over the last 10 years has been rapid and where new employees have been recruited from among recent graduates. Conversely, the median age is high in those occupational groups where employment has continued declining since the recession of the early 1990's and where recruitment of new labour has been modest.

The major differences in the age structures between occupational groups suggest that there will also be considerable differences in terms of natural wastage. Natural wastage among people employed in 2004 varies between 37% and 52% in the major occupational groups (Figure 9). The proportion is clearly highest in agricultural and forestry work and in construction work, while service work and teaching and education account for the lowest proportions of wastage. There may be considerable differences in the proportions of wastage within individual major occupational groups. Figure 10 shows examples of the occupational groups with the highest and lowest proportions of natural wastage.

Figure 10. Proportion of wastage as a percentage of people employed in 2004 by size (60 occupational groups).



As Figure 10 shows, the category with the highest natural wastage includes very different occupations. What is typical of the occupational groups in this category is that their jobs have decreased for a long time (textiles, clothing and leather workers, agricultural entrepreneurs and workers) or that it has been difficult to recruit new labour for the occupation (cleaners). The number of executive and expert jobs, in turn, has long been stable or shown reduction needs.

Natural wastage is lowest among occupational groups where workers are young due to strong and prolonged growth (computing managers and professionals, electrical and electronics managers and engineers), or where recruitment has focused on young people due to the nature and conditions of work assignments (travel service work, other rescue and security workers).

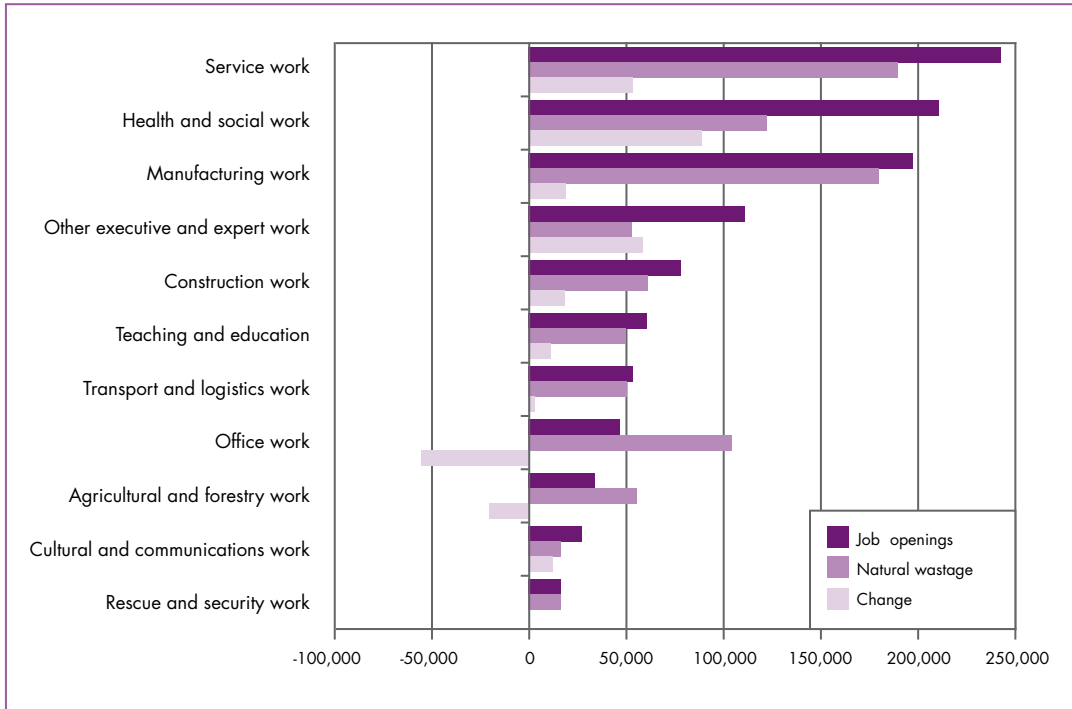
Job openings between 2005 and 2020

Job openings refer to the sum of changes in the amount of natural wastage and in the number of jobs (employed people) during the anticipation period. Job openings are anticipated for each occupational group used in the analysis. If an occupational group is expected to see a growth in the number of employed people, the group will require new employees to satisfy the growth and compensate for natural wastage. If an occupational group is declining, the number of jobs decreases through natural wastage and it is only necessary to replace part of the wastage with new labour. The basic scenario projects that there will be 976,000 job openings over the 2005–2020 period, while the target scenario, in turn, indicates 126,000 more job openings, i.e. 1,102,000 openings in total. Natural wastage accounts for a significant proportion of job openings, standing at almost 94% and at 83% in the basic and target scenario, respectively.

Increasing employment rates in different industries will generate a net amount of 63,000 new jobs in the basic scenario, while the equivalent figure for the target scenario is 189,000. Changes in occupational structures have also been anticipated within industries. When examined by occupational group (60), the basic and target scenarios project that the number of new jobs will increase by a total of about 141,000 and 306,000, respectively, in the growing occupational groups. Correspondingly, the number of jobs in declining occupational groups is estimated to decrease by a total of about 78,000 in the basic scenario and 117,000 in the target scenario.

The target scenario (Figure 11) projects the highest number of job openings in the major occupational groups of service work, health and social work and manufacturing. Combined, job openings in these fields account for 59% of all job openings. The target scenario suggests that the amount of expert work will grow, which can be seen in the anticipated growth in the number of employed people in the main occupational group of manufacturing work (including both skilled workers and professionals), for example.

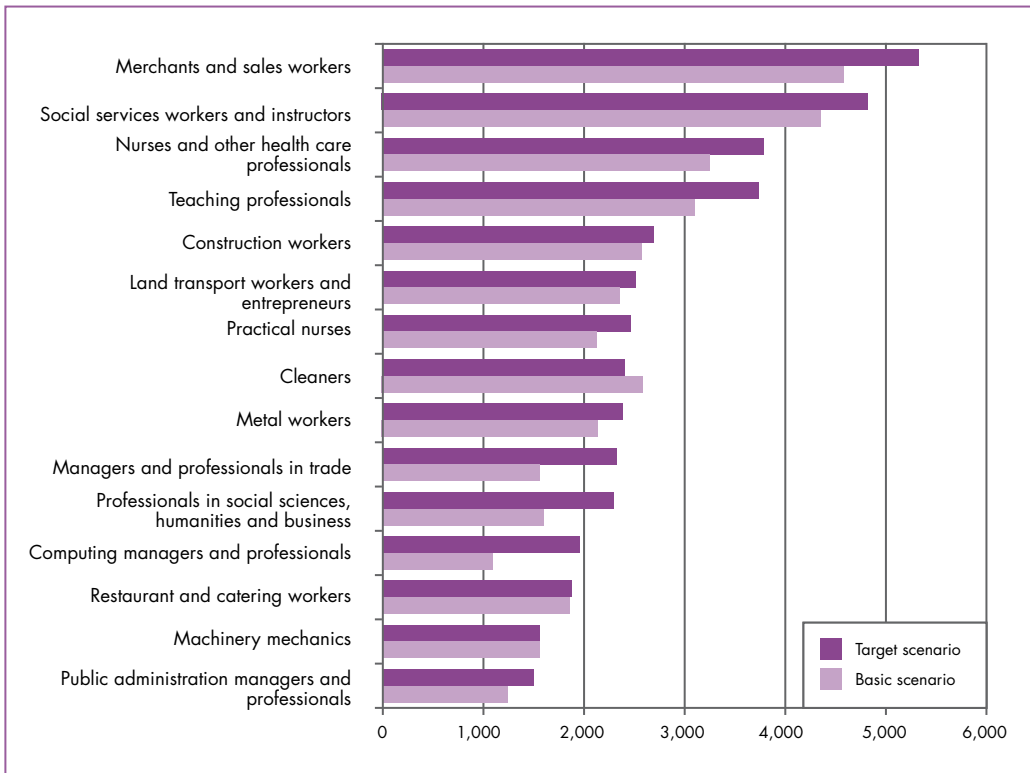
Figure 11. Number of jobs becoming available between 2005 and 2020 by major occupational group in the target development scenario.



The basic scenario anticipates that the highest number of completely new jobs will be created in the growing major occupational groups of health and social work, service work and other executive and expert work. The highest increases in the target scenario are in the same major occupational groups, but they are clearly higher than in the basic scenario and focus more on other executive and expert work. In addition, the target scenario also shows an increase in the number of employed people in manufacturing work, among professionals in particular. Both scenarios anticipate the most considerable decreases in employment rates to occur within office work, agricultural and forestry work and manufacturing work (Appendix 4).

Figure 12 shows a sample of 15 out of the total 60 occupational groups with the highest number of job openings per year. The occupational groups employing the highest numbers include trade, health and social work and expert work in different fields. In addition, positions requiring vocational competence in construction, metalwork and transport provide significant job opportunities. The highest differences between the two scenarios are usually in occupations requiring higher education, where the target scenario projects more job opportunities than the basic scenario.

Figure 12. Average number of job openings per year over the 2005–2020 period in the occupational groups with highest employment in the basic and target scenarios.



INTAKE TARGETS

The objective of this work was to anticipate educational needs on the basis of long-term demand for labour, which has been examined up until 2020. Changes in demand for labour have been used as a basis to derive intake needs for vocationally/professionally oriented provision – i.e. upper secondary vocational education and training (VET), polytechnic education and university education – for the first half of the 2010's. Anticipation work was linked to preparation of the Development Plan for Education and Research adopted by the Government for 2007–2012, which sets out intake targets for 2012. Development Plans for Education and Research are drawn up every four years.

The primary focus of the work was on educational needs in terms of vocationally/professionally oriented provision aimed at young people. In this publication, intake targets have been presented in terms of two alternative scenarios, namely, the basic development scenario and the target development scenario. The results have been expressed in terms of nationwide intake needs. In parallel with national work, both demand for labour and educational needs were also anticipated in all 19 regions, using a corresponding method, for the purposes of regional strategy development and decision-making.

In addition to preparation of the periodic Development Plans for Education and Research, quantitative educational anticipation results are also used when preparing target and performance agreements between the Ministry of Education and individual polytechnics and universities, deciding on authorisations to provide education and training, as well as for the purposes of vocational guidance, employment counselling and guidance counselling. Long-term anticipation data is used to steer education providers' annual provision.

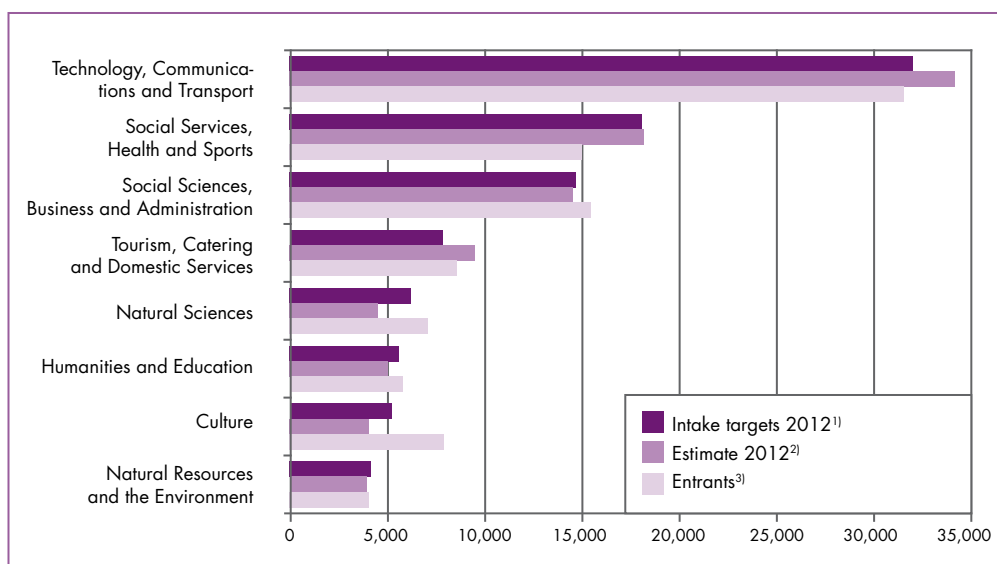
The starting point for Finnish education policy is to provide the entire age groups finishing basic education (aged 15–16) and general upper secondary education (aged 18–20) with opportunities to continue on vocationally/professionally oriented programmes within the VET sector or in higher education. In addition, a sufficient share of vocational qualification-holders will have the possibility to continue in higher education, particularly at polytechnics. According to calculations, this target will be achieved if educational provision is quantified to accommodate

about 95,300 entrants in the early part of the next decade. These calculations take account of completion rates and the proportions of holders of initial qualifications moving on to the next level of education to complete higher qualifications (further study tracks).

In addition to the efficiency factors outlined above, intake needs for different levels and subfields of education are also influenced by the proportion of those entering the labour market after completing their qualification. The targets set for these factors as part of the anticipation project differ from the current situation and achievement of the targets requires an increase in the efficiency and effectiveness of education and training. Raising efficiency and effectiveness targets will lead to a reduction in intake needs in most subfields.

Calculations suggest that intake to upper secondary vocational education and training should be increased, whereas polytechnic entrant numbers should be reduced. Figure 13 below shows the current situation by field of education, results of anticipation calculations and decisions (Development Plan targets for 2012) made on the basis of these. Intake needs have mainly been set in line with anticipation results. More deviations can be found when anticipation results and specified targets are compared by subfield. The classification of fields and subfields of education used in anticipation is included in Appendix 5.

Figure 13. Entrants, anticipation results and intake targets (Development Plan) for 2012 by field of education in provision intended for young people.



1. Education and Research 2007–2012. Development Plan. Ministry of Education, 5th Dec. 2007.
 2. Anticipation results on provision targets for 2012. Target scenario. Finnish National Board of Education.
 3. New students in 2006 (Statistics Finland, AMKOTA database).

The following sections will examine anticipated intake needs by field and level of education.

Humanities and Education

Anticipated intake needs within the field of Humanities and Education will be somewhat smaller than current entrant numbers in both the basic and the target scenario. The target scenario projects that reductions will primarily be required in the largest level of education in terms of entrant numbers, i.e. university education and all subfields, except for Teaching and Education and Theology. Intake needs in Teaching and Education are increasing, while educational needs in Theology will remain at current levels. Similarly, future intake needs within upper secondary VET in Youth and Leisure Instruction and in Sign Language Instruction will correspond to the current situation. In terms of polytechnic education, intake needs will grow slightly within the Degree Programmes in Youth Work and Civic Activity and in Sign Language Interpretation.

Culture

Programmes within the field of Culture have been highly sought-after, because many young people have wanted to find employment in various cultural and communications positions. Current provision within the field is no longer in line with demand for labour in all respects, as it seems to exceed future demand for labour in upper secondary VET and polytechnic sectors in particular. This is primarily due to the fact that provision has increased in the 1990's and in the early years of the current decade. Consequently, provision of upper secondary VET has been restricted since 2003 by making any expansion subject to authorisation from the Ministry of Education. People currently employed in the culture and communications field are relatively young and the rate of age-related natural wastage is low. Conversely, reduction needs in university education provided in this field are not as high as those found in the upper secondary VET and polytechnic sectors. In quantitative terms, needs to reduce intake within upper secondary VET will primarily focus on the largest subfields, i.e. Crafts and Design and Information and Communication.

In percentage terms, university provision seems to be highest in Cultural and Arts Research when compared with future labour demand. Upper secondary VET and polytechnic provision in Music should also be reduced to match demand in the

world of work. Reduction needs in upper secondary vocational provision in Music are also based on education policy targets set for completion rates. The high drop-out rate in this subfield can be attributed, among other things, to the fact that music institutions have for decades provided music education progressing step-by-step in parallel with basic education (comprehensive school). Competencies achieved at music institutions thus reduce completion rates of upper secondary vocational qualifications. Student selection in vocational education and training has focused on musical competencies. Unlike students in other subfields, music students are more capable of continuing their studies directly at higher levels of education due to their prior basic music education.

Social Sciences, Business and Administration

Anticipation efforts based on the basic and target scenarios provide conflicting results in terms of intake needs within the field of Social Sciences, Business and Administration. According to the basic scenario, intake needs would increase from the 2006 level, whereas the target scenario would suggest a decrease.

The basic scenario suggests that intake needs within the upper secondary VET and polytechnic sectors will be higher than 2006 levels. The target scenario, in turn, indicates that intake needs in VET and polytechnic provision will correspond to the current situation. The single most important reason for the differences between the two scenarios is the pace of change in jobs relating to various office duties. The target scenario anticipates a rapid reduction in office work in different industries due to strong development of information systems, increasing self-service and relocation of positions related to business administration to other countries. This is why the target scenario projects that the number of jobs will decrease at a considerably faster rate than in the basic scenario, where reduction in these jobs would be half the amount envisaged in the target scenario. Conversely, sales and expert positions in trade and other services would appear to be on the increase.

The number of jobs relevant to people holding university degrees in Social Sciences, Business and Administration would seem to be continuing to increase, in particular in trade and computing assignments. Job numbers would also remain close to current levels in other expert positions. In recent years, university entrant numbers have, however, been so high that the labour force required on the future labour market can be trained at somewhat lower entrant numbers, provided that completion rates can be improved. Both scenarios indicate that intake needs in university education in the subfield of Business and Commerce will decrease from current levels. The same also applies to smaller subfields, including Economics,

Administration, Statistics and Political Sciences. Conversely, both the basic and the target scenario anticipate some need to increase provision in Law, while the target scenario also projects increase needs in Social Sciences.

Natural Sciences

Anticipated intake needs within the field of Natural Sciences will account for 50–60% of the number of entrants in 2006. The most significant decrease in intake needs is expected to occur in upper secondary VET. Upper secondary VET and polytechnic education in this field are only provided in the subfield of Computing and Software. Here, the focus would appear to shift from upper secondary VET to polytechnic education, where the target scenario anticipates that intake needs will be higher than current entrant numbers.

The number of jobs requiring different degrees of computing competence is anticipated to increase in the future in expert positions that demand higher education. Conversely, numbers of support and maintenance jobs are expected to decrease slightly. As a result of the equally rapid growth in job numbers over the last ten years, employees are mostly young people with long careers ahead of them. This is why natural wastage anticipated for the 2005–2020 period in computing occupations will remain at 25–30%, while the figure for the entire employed labour force is over 40%.

Intake needs in university education in Natural Sciences are also expected to be considerably below the current level. This requires university subfields to be capable of making significant improvements in degree completion rates. The highest number of university degree-holders will find employment in the growing occupational groups of mathematicians and natural science professionals, computing managers and professionals and public administration managers and professionals (both scenarios), as well as in the occupational group of teaching professionals, where the number of jobs is anticipated to remain at the 2006 level or increase to some extent. A similar trend has also emerged in anticipated intake needs in Natural Sciences in earlier anticipation projects.

Technology, Communications and Transport

Anticipated intake needs in provision intended for young people within the field of Technology, Communications and Transport are growing from the current numbers according to both the basic and the target scenario, which forecast a 6% and a 9% increase respectively. An analysis of anticipation results by level of education reveals distinct differences between different levels within this field. Both scenarios project that the upper secondary VET level will require more students, whereas anticipation calculations suggest that intake to higher education (polytechnics and universities) should be reduced from the current level. The target scenario points to considerably lower reductions in higher education intake needs than the basic scenario. While the field as a whole would require more entrants, there are quite significant differences in intake needs between different levels and subfields.

In quantitative terms, increase needs will be highest in upper secondary VET within the subfields of Mechanical, Metal and Energy Engineering, Architecture and Construction, Automotive and Transport Engineering, as well as Process, Chemical and Materials Engineering. Intake needs can primarily be attributed to anticipated development trends in relevant industries and impending natural wastage by occupational group. In terms of anticipated needs to increase provision within the Technology, Communications and Transport field, it has been evident for quite some time now that the significant increase in student numbers has stretched the capacity of education in Engineering and Architecture to the limit. The Development Plan for Education and Research 2007–2012 outlines the intention to enhance higher education in the field by means such as reforming degree programme structures and improving degree completion rates.

The metal and mechanical industry has already suffered from labour shortages for several years. Earlier anticipation calculations by the Finnish National Board of Education in 1999 and 2004 also indicated a need to train more employees with vocational qualifications for the field. In the future, the industry will require a significant number of new skilled workers and, in order to attract young people to take up student places, continued attention also needs to be paid to the field's attractiveness, increasing awareness of the field and factors influencing completion of qualifications. It is anticipated that new job opportunities will open up for holders of qualifications from all levels of education. Demand for holders of upper secondary vocational qualifications is particularly high.

Growth in educational needs for upper secondary VET in Automotive and Transport Engineering is a result of industry forecasts for the key branch of the industry, i.e. transport, where the number of employed people is estimated to increase in

both development scenarios. The prospects for the transport industry essentially depend on future developments in foreign trade transport flows via Finland to Russia. Natural wastage also plays a significant role and will influence the outcome. Educational needs in the field are also increased by the fact that professional drivers will be required to hold the initial qualification for drivers obtained through training in accordance with the EU Directive.

Within Architecture and Construction, both development scenarios indicate that new entrants would be required for both upper secondary VET and polytechnic education. Although growth in manufacturing is estimated to outpace construction in the future, the latter will have higher employment effects due to its low development in productivity. The employment effects of house-building activities are based on the growing proportion of renovations, refurbishments and smaller repairs. Instead of new construction projects, the industry will focus on renovations and repairs. In terms of university education, the anticipation results based on the basic scenario indicate a reduction of about 10% from current entrant numbers. Conversely, the target scenario suggests a need to increase the number of entrants slightly. Raising the completion rate in the subfield will also require continued attention in the future, because those completing upper secondary VET currently account for 70% of entrants, while the equivalent figure for polytechnic and university education is just over half.

Natural Resources and the Environment

Intake needs within the field of Natural Resources and the Environment are expected to increase at polytechnics and decrease within the upper secondary VET and university sectors. There are only minor differences between the basic and target scenarios: the target scenario places emphasis on raising the stage of processing and development of new methods and products, which means that the required intake to polytechnics and universities is higher than the trend shown in the basic scenario, while intake needs in the VET sector are correspondingly lower.

Job opportunities for people with education in Natural Resources and the Environment focus on a few industries, where the effect of anticipated employment trends reflects strongly on intake needs. Among these industries, the most significant ones include agriculture, hunting and fishing as well as forestry and forest industry, where jobs are anticipated to decrease. In addition, different sectors of trade and business activities provide important employment opportunities. Besides job trends, intake needs are also influenced by natural wastage, which plays a more significant role in this than in any other field of education. While natural

wastage from the entire employed labour force will stand at about 40% over the 2005–2020 period, the figure for occupations employing people with education in Natural Resources and the Environment is 50%. This is due both to the high age of employed people and to the health risks involved in the work assignments.

Increases in the Agriculture subfield will focus on upper secondary VET and polytechnic sectors. The Forestry subfield is facing needs to reduce intake at all levels of education – provided that the retention rate in forestry occupations of vocational qualification-holders in particular improves. Other subfields will mostly need to reduce their intake.

Social Services, Health and Sports

Educational needs within the field of Social Services, Health and Sports are expected to show the highest growth among all fields of education when compared with the current situation, with the basic and the target scenario projecting a 15% and a 20% increase, respectively. The basic scenario suggests that the increase will mostly take place in upper secondary VET, but also in university education. The target scenario projects increase needs at all levels of education.

This increase in educational needs is primarily due to the significant growth anticipated in various branches within health and social work. The growth can be attributed to the considerable need to increase labour in two branches, namely social work activities and human health activities, which are anticipated to see an average increase of 20% and 15%, respectively. The primary factor underlying growth in these branches is the ageing population trend over the next few years. The different growth rates and staff structures in these branches contribute to the ways in which educational needs will change from current levels in terms of different subfields and levels of education. In quantitative terms, the largest occupational group in human health activities is registered nurses, whereas the largest group in social work activities comprises social workers and instructors.

Based on the anticipation results, there are needs to increase intake to almost all programmes in Social Services, Health and Sports, first and foremost in upper secondary VET in Health Care and Social Services (incl. practical nurses), polytechnic education in Health Care (incl. registered nurses) and in the subfield of Technical Health Services. Reduction needs are highest in upper secondary VET in Beauty Care.

Tourism, Catering and Domestic Services

Intake needs in vocationally/professionally oriented provision within the field of Tourism, Catering and Domestic Services will increase from current levels in both scenarios within upper secondary VET and university education. In the upper secondary VET sector, these additional needs are due to the exceptionally high increases required in the Cleaning Services subfield. Conversely, polytechnic intake needs will be considerably lower than current entrant numbers. Despite the fact that key branches of the industry – such as tourism, hotels and restaurants – are expected to see growing numbers of employed people, demand for provision will decrease in several subfields due to changes in occupational structures and low rates of natural wastage in certain occupational groups.

Anticipation results for upper secondary VET provision in Tourism and Cleaning Services differ considerably from current entrant numbers. Upper secondary VET and polytechnic provision in Tourism, as well as VET provision in Hotel and Catering and in Domestic and Consumer Services appear to exceed future demand for labour. Conversely, demand for provision in Cleaning Services will increase from current levels, as will demand for polytechnic and university education in Domestic and Consumer Services.

USE OF ANTICIPATION INFORMATION AND DEVELOPMENT OF ANTICIPATION

Anticipation of labour and educational needs has been an established part of the development of vocational/professional education and training in Finland for several decades now. The Finnish Government also highlights the significance of anticipation and development of co-operation in anticipation efforts. This stems from a common concern about the adequate supply of labour during the next decade, when employees will retire in much higher numbers than at present. This is why it is absolutely necessary to match the supply of labour with demand as effectively as possible. Vocationally/professionally oriented education and training is required to provide sufficient amounts of labour for different fields and areas. The young age groups entering these programmes (see Figure 4, page 16) will begin to dwindle before the mid-2010's. The difference between demand for labour and the supply of young labour will increase. This means that the adult population will play an increasingly significant role in the supply of labour.

Recent years have seen an increase in the utilisation of anticipation data as part of decision-making processes. The aim is to utilise the results more systematically on national, regional, provider and institutional levels, to further raise the level of anticipation know-how and to develop co-operation and methodologies. Anticipation information on educational needs is required when seeking solutions to challenges due to Finland's demographic development and the increasing impact of the global economy. At a regional level, these effects are often stronger when compared with the perspective of the whole country. Regional demographic changes or a major company's decision to relocate production away from Finland may permanently change a region's conditions for development. Vocationally/professionally oriented education and training aims to meet such future challenges by enhancing the match between educational provision and labour market demand and by paying more attention to development needs in different regions.

Anticipation information on educational needs will cater for preparation of the Development Plans for Education and Research adopted periodically by the Government, steering and regional distribution of educational provision and planning of educational resources, among other things. In addition, anticipation information will steer application for education and work and promote identification and abolishment of bottlenecks related to the labour force. Planning of studies and

steering of the labour force will call for diverse anticipation information modified into a form understandable to students and job seekers.

At the Finnish National Board of Education, anticipation efforts have been carried out as broad co-operation between different administrative branches and regional parties. Within the educational administration, anticipation has been co-ordinated by the Ministry of Education, while practical anticipation work has been carried out by the Finnish National Board of Education, which has also provided support for regional anticipation work managed by the Regional Councils. Anticipation of industry changes has provided the point of reference for anticipation of educational needs. The Ministry of Labour has been responsible for industry forecasts. Continuing co-operation in anticipation work and its consolidation between different administrative branches are prerequisites for successful anticipation efforts, complete with co-operation with regional anticipation bodies. The Finnish National Board of Education is also partially responsible for administration of projects funded by the European Social Fund (ESF).

The intention is to further increase the impact of anticipation on education and training. An investigation is being conducted during 2009 into development of and networking in anticipation of labour and educational needs between different ministries, division of responsibilities, co-ordination and increasing the effectiveness of anticipation on decision-making processes. At a national level, a cross-ministerial Government Anticipation Network has already been set up to promote use and production of anticipation information.

Anticipation projects co-funded by the European Social Fund have contributed to development of anticipation methods, tools and co-operation. In addition, there have been several other development projects aiming to increase anticipation know-how. Anticipation of educational provision is strongly linked to changes in occupations and skills needs, which is why the parties aim to further consolidate co-operation between quantitative and qualitative anticipation. The Finnish National Board of Education has launched an ESF-funded project for the 2008–2011 period, which is geared towards development of national anticipation of vocational and professional skills needs. The objective is to create a permanent system to produce information on skills needs at all levels of education for purposes such as preparation of National Core Curricula and Qualification Requirements as well as education providers' own local curricula. At the same time, anticipation of skills needs will also support quantitative anticipation of educational needs. Alongside national development, it is also important to participate in development of the European anticipation system (within CEDEFOP).

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CONTACT INFORMATION

Further information is available on the Internet at:

www.oph.fi

www.edu.fi

Contacts at the Finnish National Board of Education:

Mr. Matti Kimari, Counsellor of Education (general topics, education and training in Social Services, Health and Sports)

Tel. +358 40 348 7750

E-mail: matti.kimari@oph.fi

Mr. Ilpo Hanhijoki, Counsellor of Education (general topics, natural wastage, education and training in Social Sciences, Business and Administration, Natural Sciences and Natural Resources and the Environment)

Tel. +358 40 348 7805

E-mail: ilpo.hanhijoki@oph.fi

Mr. Jukka Katajisto, Counsellor of Education (education and training in Culture and Humanities and Education, Tourism, Catering and Domestic Services)

Tel. +358 40 348 7949

E-mail: jukka.katajisto@oph.fi

Ms. Hannele Savioja, Counsellor of Education (education and training in Technology, Communications and Transport)

Tel. +358 40 348 7780

E-mail: hannele.savioja@oph.fi

Address:

Finnish National Board of Education

P.O. Box 380

FI-00531 Helsinki

FINLAND

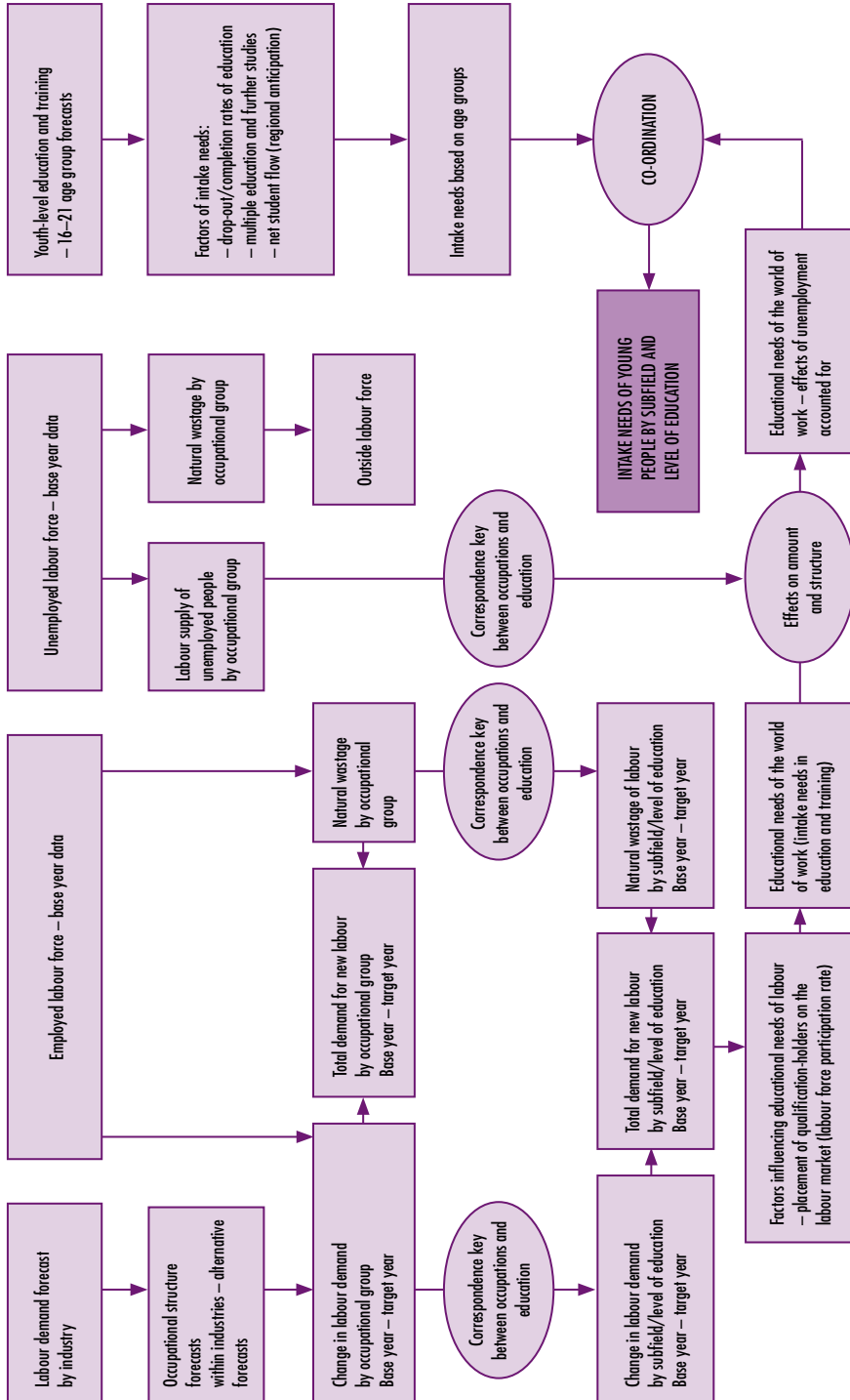
Tel. +358 40 348 7555

Fax +358 40 348 7865

APPENDICES 1-6

Appendix 1

INTAKE NEEDS IN YOUNG PEOPLE'S EDUCATION AND TRAINING AND CO-ORDINATING THESE WITH THE EDUCATIONAL NEEDS OF THE WORLD OF WORK



Appendix 2

STATISTICAL DATA USED IN ANTICIPATION AND SOURCES

Data	Statistics source
New students, entrant data (youth-level education and training)	Finnish National Board of Education, The Ministry of Education, Statistics Finland
New students' progress, student and qualification data, expected completion rate (completion of education)	Statistics Finland, The Ministry of Education
Qualification-holders by subsequent education (multiple education and further study tracks)	Statistics Finland
Main occupation of the population (labour force participation rate)	Statistics Finland
Retirement and mortality statistics (natural wastage)	Statistics Finland, Finnish Centre for Pensions
Population forecast (size of the young age group)	Statistics Finland
Unemployment data	The Ministry of Employment and the Economy
Occupational and educational data of employed people (correspondence key)	Statistics Finland
Industry and occupational data	Statistics Finland

Appendix 3

NUMBER OF EMPLOYED PEOPLE BY INDUSTRY

INDUSTRIES	Number of employed people				Basic scenario			Change % 2004– 2020	Target scenario			Change % 2004– 2020
	1995	2000	2004		2010	2015	2020		2010	2015	2020	
1 Agriculture, hunting and fishing	119,234	97,313	80,489		71,600	63,700	59,200	-26	72,100	66,400	61,800	-23
2 Forestry	76,239	80,308	76,107		75,000	72,300	70,400	-7	77,400	75,700	74,300	-2
3 Manufacture of food products, beverages and tobacco	42,811	40,777	38,372		34,500	32,200	29,800	-22	35,700	34,100	32,300	-16
4 Manufacture of basic metals and fabricated metal products	50,968	61,974	61,180		69,500	68,400	66,700	9	73,100	74,000	72,600	19
5 Manufacture of chemical and other such products	33,604	39,148	36,889		31,900	31,000	30,000	-19	32,800	32,500	32,300	-12
6 Manufacture of machinery, equipment and transport equipment	78,114	82,637	77,937		89,500	88,000	86,000	10	94,100	95,500	94,100	21
7 Manufacture of electrical and optical equipment	48,258	67,995	63,416		61,600	59,300	57,600	-9	66,100	66,900	66,400	5
8 Other manufacturing	47,403	49,488	46,617		44,000	42,600	41,300	-11	45,100	45,700	46,200	-1
9 Electricity, gas and water supply	21,665	18,902	15,459		15,100	13,600	12,300	-20	15,200	14,000	12,800	-17
10 Construction	94,261	134,474	136,916		147,500	146,700	147,000	7	151,700	152,900	154,100	13
11 Wholesale trade and commission trade	78,883	94,702	94,488		86,000	82,700	79,700	-16	89,600	88,200	86,300	-9
12 Retail trade	131,493	151,781	161,064		173,900	175,100	179,200	11	180,000	182,500	184,900	15
13 Tourism, hotels and restaurants	55,052	71,513	74,184		82,200	85,900	89,500	21	84,700	89,600	93,300	26
14 Transport	99,083	113,704	117,004		120,500	120,800	121,200	4	123,300	123,400	123,400	5
15 Post and telecommunications	41,726	47,691	48,555		48,200	45,500	43,200	-11	49,100	47,200	45,500	-6
16 Financial and insurance activities	48,221	44,644	43,561		40,900	37,500	34,400	-21	43,600	40,700	36,700	-16

INDUSTRIES	Number of employed people				Basic scenario			Change % 2004– 2020	Target scenario			Change % 2004– 2020
	1995	2000	2004	2010	2015	2020	2010		2015	2020		
	17 Management of real estate, combined facilities support activities, cleaning, sewage and refuse disposal, sanitation and similar activities	45,943	57,225	63,432	68,500	71,000	73,800	16	70,000	72,300	75,000	18
18 Technical business activities	64,488	97,553	103,944	118,800	119,500	120,700	16	126,200	128,300	131,000	26	
19 Commercial and administrative business activities	50,006	81,609	93,758	105,200	105,800	106,900	14	111,600	113,500	115,900	24	
20 Public administration and compulsory social security	73,928	76,931	75,028	69,000	68,500	67,600	-10	69,800	68,800	68,100	-9	
21 Defence activities and public order	46,179	48,526	49,377	48,900	48,600	48,100	-3	49,500	49,000	48,700	-1	
22 Education and research	144,408	166,111	173,261	169,200	169,400	166,700	-4	175,200	175,400	174,400	1	
23 Human health activities	136,933	154,285	165,635	174,800	182,700	187,300	13	179,200	185,500	193,000	17	
24 Social work activities	117,271	151,174	162,983	185,200	190,300	193,000	18	186,100	192,900	200,200	23	
25 Activities of membership organisations	26,797	35,719	39,080	39,100	39,200	38,500	-1	40,300	40,700	41,400	6	
26 Recreational, cultural and sporting activities and publishing	65,622	75,294	75,843	79,600	80,700	81,300	7	81,500	82,500	83,700	10	
27 Other service activities	36,485	38,243	41,686	43,900	45,400	46,500	12	46,900	49,800	52,500	26	
28 Industry unknown	57,677	48,836	46,094	47,700	47,500	47,400	3	49,300	49,700	49,900	8	
TOTAL	1,932,752	2,228,557	2,262,359	2,341,800	2,333,900	2,325,300	3	2,419,200	2,437,700	2,450,800	8	

Sources: Statistics Finland (years 1995, 2000, 2004), The Ministry of Labour (years 2010, 2015, 2020)

Appendix 4

NATURAL WASTAGE, CHANGE IN THE NUMBER OF EMPLOYED PEOPLE AND JOB OPENINGS BY OCCUPATIONAL GROUP, 2005–2020

OCCUPATIONAL GROUPS	Median age ¹⁾	Number of employed people ¹⁾	Natural wastage	Basic scenario		Target scenario	
				Change	Job openings	Change	Job openings
				2005–2020	2005–2020	2005–2020	2005–2020
IAGRICULTURAL AND FORESTRY WORK	2004	2 004	2005–2020	2005–2020	2005–2020	2005–2020	2005–2020
1.1 Agricultural and horticultural workers	46	105,400	54,600	-23,400	31,200	-21,100	33,500
1.2 Horticultural and agricultural labourers	47	85,700	46,500	-23,700	22,800	-24,000	22,500
1.3 Forestry workers	19	2,800	500	1,700	2,200	2,400	2,900
1.4 Agricultural and forestry professionals	44	9,600	4,600	-700	3,900	-500	4,100
2 MANUFACTURING WORK	44	7,300	3,000	-700	2,300	1,000	4,000
2.1 Food workers	41	448,700	179,300	-10,700	168,600	18,300	197,600
2.2 Textiles, clothing and leather workers	38	22,400	8,100	-2,700	5,400	-3,900	4,200
2.3 Metal workers	46	16,300	8,100	-4,600	3,500	-3,300	4,800
2.4 Machinery mechanics	42	71,600	31,400	2,700	34,100	6,600	38,000
2.5 Mechanical engineers	41	61,100	24,800	-200	24,600	100	24,900
2.6 Construction and industrial equipment operators	44	31,300	13,200	2,400	15,600	8,100	21,300
2.7 Wood-processing workers and technicians	44	21,000	10,000	100	10,100	-1,200	8,800
2.8 Chemical process workers	42	29,700	12,300	1,600	13,900	6,700	19,000
2.9 Chemical process engineers	41	45,900	18,700	-6,900	11,800	-8,600	10,100
2.10 Electrical and electronics workers	43	9,900	4,000	-400	3,600	2,100	6,100
2.11 Electrical and electronics engineers	39	47,000	17,400	100	17,500	-900	16,500
2.12 Graphics workers	37	36,200	9,000	600	9,600	9,300	18,300
2.13 Packaging and assembly workers	42	14,100	5,700	-1,400	4,300	-200	5,500
2.14 Managers and other professionals in manufacturing	40	12,700	5,300	-2,300	3,000	-2,800	2,500
	42	29,500	11,300	300	11,600	6,300	17,600

OCCUPATIONAL GROUPS	Median age ¹⁾	Number of employed people ¹⁾	Natural wastage	Basic scenario		Target scenario	
				Change	Job openings	Change	Job openings
				2005–2020	2005–2020	2005–2020	2005–2020
3 CONSTRUCTION WORK	2004	2004	2005–2020	2005–2020	2005–2020	2005–2020	2005–2020
3.1 Construction workers	43	132,500	59,300	9,000	68,300	18,100	77,400
3.2 Heating, plumbing and ventilation fitters	41	78,000	34,000	6,800	40,800	8,700	42,700
3.3 Building painters	42	12,900	5,800	1,900	7,700	3,500	9,300
3.4 Managers and professionals in construction	43	5,700	2,600	100	2,700	900	3,500
4 TRANSPORT AND LOGISTICS WORK	46	35,900	16,900	200	17,100	5,000	21,900
4.1 Land transport workers and entrepreneurs	41	129,200	52,900	-1,000	51,900	500	53,400
4.2 Water traffic operators and officers	43	76,600	35,200	2,300	37,500	4,800	40,000
4.3 Air transport managers and professionals	46	3,300	1,900	-400	1,500	-300	1,600
4.4 Warehouse workers and forwarding agents	39	1,300	500	100	600	200	700
5 SERVICE WORK	36	48,000	15,300	-3,000	12,300	-4,200	11,100
5.1 Property managers and building caretakers	40	511,200	189,100	27,300	216,400	53,100	242,200
5.2 Cleaners	46	28,700	15,100	1,400	16,500	-1,300	13,800
5.3 Merchants and sales workers	45	85,500	41,900	-700	41,200	-3,700	38,200
5.4 Managers and professionals in trade	38	198,400	62,800	10,300	73,100	22,200	85,000
5.5 Restaurant and catering workers	43	52,900	20,400	4,300	24,700	16,500	36,900
5.6 Hotel, restaurant and catering managers and professionals	35	68,200	20,900	8,800	29,700	9,000	29,900
5.7 Travel service workers	43	22,400	9,500	4,900	14,400	7,700	17,200
5.8 Beauty care workers	39	6,100	1,700	1,000	2,700	3,300	5,000
5.9 Other service workers	40	14,400	5,000	500	5,500	3,100	8,100
	36	34,600	11,800	-3,200	8,600	-3,700	8,100

APPENDIX 4

OCCUPATIONAL GROUPS	Median age ¹⁾	Number of employed people ¹⁾	Natural wastage	Basic scenario		Target scenario	
				Change	Job openings	Change	Job openings
				2005-2020	2005-2020	2005-2020	2005-2020
6 OFFICE WORK	2004	2004	2005-2020	2005-2020	2005-2020	2005-2020	2005-2020
6.1 Office workers in business administration	44	237,800	103,000	-26,300	76,700	-56,400	46,600
6.2 Other office workers	46	121,100	57,100	-17,400	39,700	-38,600	18,500
6.3 Office work managers and professionals	40	84,600	31,400	-8,400	23,000	-17,000	14,400
7 HEALTH AND SOCIAL WORK	45	32,100	14,500	-500	14,000	-800	13,700
7.1 Practical nurses	43	290,700	121,600	59,100	180,700	88,700	210,300
7.2 Nurses and other health care professionals	43	56,900	24,100	9,500	33,600	14,900	39,000
7.3 Medical doctors and other health professionals	42	81,100	29,000	22,800	51,800	31,400	60,400
7.4 Social services workers and instructors	44	24,300	9,800	4,100	13,900	7,500	17,300
7.5 Social work professionals	43	115,400	52,400	17,100	69,500	24,500	76,900
7.6 Health and social services managers	44	8,100	3,500	5,800	9,300	9,800	13,300
8 TEACHING AND EDUCATION	49	4,900	2,800	-200	2,600	600	3,400
8.1 Teaching professionals	42	131,900	49,100	300	49,400	10,500	59,600
9 CULTURAL AND COMMUNICATIONS WORK	42	131,900	49,100	300	49,400	10,500	59,600
9.1 Crafts and design workers	42	39,100	15,200	4,100	19,300	11,500	26,700
9.2 Artists and other artistic professionals	43	1,400	600	0	600	600	1,200
9.3 Artistic and cultural services managers and producers	39	11,100	3,200	800	4,000	3,100	6,300
9.4 Librarians, archivists and curators	46	6,400	3,300	1,800	5,100	1,900	5,200
9.5 Public relations professionals and journalists	46	3,800	1,800	300	2,100	1,000	2,800
	42	16,400	6,300	1,200	7,500	4,900	11,200

OCCUPATIONAL GROUPS	Median age ¹⁾	Number of employed people ¹⁾	Natural wastage	Basic scenario		Target scenario	
				Change	Job openings	Change	Job openings
				2005-2020	2005-2020	2005-2020	2005-2020
10 OTHER EXECUTIVE AND EXPERT WORK	2004	2004	2005-2020	2005-2020	2005-2020	2005-2020	2005-2020
	43	131,600	52,500	20,900	58,200	110,700	
10.1 Mathematicians and natural science professionals	42	4,600	1,700	900	2,600	4,400	6,100
10.2 Professionals in social sciences, humanities and business	46	35,900	17,300	8,000	25,300	19,000	36,300
10.3 Legal professionals	46	10,400	5,300	600	5,900	2,400	7,700
10.4 Public administration managers and professionals	44	41,300	17,700	1,900	19,600	6,100	23,800
10.5 Computing managers and professionals	37	35,600	8,800	8,400	17,200	22,100	30,900
10.6 Research and development managers	46	3,800	1,700	1,100	2,800	4,200	5,900
11 RESCUE AND SECURITY WORK	37	40,500	16,100	200	16,300	-600	15,500
11.1 Police officers, fire fighters and prison guards	39	21,000	8,800	-600	8,200	-1,500	7,300
11.2 Armed forces	36	11,400	5,400	-500	4,900	-800	4,600
11.3 Other rescue and security workers	29	8,100	1,900	1,300	3,200	1,700	3,600
12 UNKNOWN	35	63,400	20,700	3,500	24,200	7,600	28,300
12.1 Unknown	35	63,400	20,700	3,500	24,200	7,600	28,300
TOTAL		2,262,000	913,400	63,000	976,400	188,400	1,101,800

1. Source: Statistics Finland, 2004.

Appendix 5

CLASSIFICATION OF FIELDS, SUBFIELDS AND LEVELS OF EDUCATION ¹⁾

- 0 General Education
 - 001 Pre-primary education
 - 002 Basic education
 - 003 General upper secondary education
 - 099 Other general education

- 1 Humanities and Education
 - 101 Leisure Activities and Youth Work
 - 102 Languages
 - 103 History and Archaeology
 - 104 Philosophy
 - 105 Educational Sciences and Psychology
 - 106 Teaching and Education
 - 107 Theology
 - 199 Other education in Humanities and Education

- 2 Culture
 - 201 Crafts and Design
 - 202 Information and Communication
 - 203 Literature
 - 204 Theatre and Dance
 - 205 Music
 - 206 Visual Arts
 - 207 Cultural and Arts Research
 - 299 Other education in Culture

- 3 Social Sciences, Business and Administration
 - 301 Business and Commerce
 - 302 Economics
 - 303 Administration
 - 304 Statistics
 - 305 Social Sciences
 - 306 Political Sciences
 - 307 Law
 - 399 Other education in Social Sciences, Business and Administration

- 4 Natural Sciences
 - 401 Mathematics
 - 402 Computing and Software
 - 403 Earth and Space Sciences and Astronomy
 - 404 Physics
 - 405 Chemistry
 - 406 Biology
 - 407 Geography
 - 499 Other education in Natural Sciences

- 5 Technology, Communications and Transport
 - 501 Architecture and Construction
 - 502 Mechanical, Metal and Energy Engineering
 - 503 Electrical and Automation Engineering
 - 504 Information and Telecommunications Technology
 - 505 Graphics and Communications Technology
 - 506 Food Sciences, Food Industry and Biotechnology
 - 507 Process, Chemical and Materials Engineering
 - 508 Textiles and Clothing Technology
 - 509 Automotive and Transport Engineering
 - 510 Industrial Management
 - 599 Other education in Technology, Communications and Transport

- 6 Natural Resources and the Environment
 - 601 Agriculture
 - 602 Horticulture
 - 603 Fishery
 - 604 Forestry
 - 605 Nature and the Environment
 - 699 Other education in Natural Resources and the Environment

- 7 Social Services, Health and Sports
 - 701 Social Services
 - 702 Health Care
 - 703 Health Care and Social Services (common programmes)
 - 704 Dentistry and Other Dental Services
 - 705 Rehabilitation and Sports
 - 706 Technical Health Services
 - 707 Pharmacy and Other Pharmacological Services
 - 708 Medicine
 - 709 Veterinary Medicine
 - 710 Beauty Care
 - 799 Other education in Social Services, Health and Sports

- 8 Tourism, Catering and Domestic Services
 - 801 Tourism
 - 802 Hotel and Catering
 - 804 Domestic and Consumer Services
 - 805 Cleaning Services
 - 899 Other education in Tourism, Catering and Domestic Services

- 9 Other Education
 - 901 Military and Border Guard
 - 902 Fire and Rescue Services
 - 903 Police Services
 - 904 Correctional Services
 - 969 Other education outside the Ministry of Education sector
 - 998 Other education in the Ministry of Education sector

APPENDIX 5

Levels of education

00	Pre-primary education
(20	Primary and lower secondary education)
21	Basic education
22	Additional basic education
(30	Upper secondary education)
31	General upper secondary education
32	Vocational upper secondary education and training
50	Post-secondary non-higher vocational education
(60	First-cycle higher education and professional tertiary education)
61	Professional tertiary education
62	Polytechnic Bachelor's degree
63	University Bachelor's degree
(70	Second-cycle higher education)
71	Higher polytechnic degree (Master)
72	Higher university degree (Master)
73	Professional specialisation in Medicine, Veterinary Medicine and Dentistry
(80	Third-cycle higher education)
81	Licentiate's degree
82	Doctoral degree
90	Level of education unknown

1. Ministry of Education Decision No. 29/400/2004 of 25th March 2004,
Ministry of Education Amendment Decision No. 4/500/2006 of 11th April 2006

Appendix 6

ENTRANTS IN YOUTH-LEVEL PROVISION, INTAKE NEEDS AND DEVELOPMENT PLAN TARGET

FIELD OF EDUCATION LEVEL OF EDUCATION	Entrants in youth-level provision			Average intake needs 2011–2015				Develop- ment Plan target for youth- level provision in 2012
				Youth-level provision		Total needs		
	2004	2005	2006	Basic scenario	Target scenario	Basic scenario	Target scenario	
Humanities and Education	6,094	6,001	5,792	4,600	5,100	5,000	5,900	5,480
Upper secondary VET	893	919	844	800	800	900	900	850
Polytechnics	269	268	284	300	300	300	400	350
Universities	4,932	4,814	4,664	3,500	4,000	3,800	4,600	4,280
Culture	7,894	7,827	7,779	3,400	3,800	3,700	4,500	5,170
Upper secondary VET	3,907	3,943	3,901	1,500	1,600	1,600	1,900	2,270
Polytechnics	2,331	2,296	2,334	900	1,000	1,000	1,200	1,600
Universities	1,656	1,588	1,544	1,000	1,200	1,100	1,400	1,300
Social Sciences, Business and Administration	15,158	15,249	15,331	16,200	14,400	17,600	16,900	14,620
Upper secondary VET	5,314	5,122	5,238	6,800	5,200	7,400	6,100	5,200
Polytechnics	5,238	5,232	5,274	5,900	5,200	6,400	6,100	4,800
Universities	4,606	4,895	4,819	3,500	4,000	3,800	4,700	4,620
Natural Sciences	7,524	7,187	6,913	3,600	4,300	3,900	5,000	6,100
Upper secondary VET	2,314	2,303	2,177	800	500	900	600	1,500
Polytechnics	1,474	1,449	1,421	1,100	1,500	1,200	1,800	1,500
Universities	3,736	3,435	3,315	1,700	2,300	1,800	2,600	3,100
Technology, Communica- tions and Transport	31,367	30,901	31,511	33,500	34,200	36,700	40,200	31,950
Upper secondary VET	18,764	18,612	19,655	25,000	23,500	27,400	27,700	21,500
Polytechnics	8,468	8,285	7,972	6,100	7,500	6,700	8,700	6,950
Universities	4,135	4,004	3,884	2,400	3,200	2,600	3,800	3,500
Natural Resources and the Environment	4,300	4,149	3,912	4,000	3,800	4,300	4,500	3,940
Upper secondary VET	3,085	2,924	2,741	2,900	2,600	3,100	3,200	2,700
Polytechnics	800	809	765	800	900	900	1,000	900
Universities	415	416	406	300	300	300	300	340
Social Services, Health and Sports	14,564	14,904	14,987	17,300	18,000	18,800	21,200	18,000
Upper secondary VET	6,849	7,029	6,885	9,100	9,400	10,000	11,100	9,000
Polytechnics	6,166	6,305	6,445	6,300	6,600	6,800	7,700	7,150
Universities	1,549	1,570	1,657	1,900	2,000	2,000	2,400	1,850

APPENDIX 6

FIELD OF EDUCATION LEVEL OF EDUCATION	Entrants in youth-level provision			Average intake needs 2011–2015				Development Plan target for youth- level provision in 2012
				Youth-level provision		Total needs		
	2004	2005	2006	Basic scenario	Target scenario	Basic scenario	Target scenario	
Tourism, Catering and Domestic Services	8,455	8,426	8,408	10,100	9,400	11,100	11,100	7,600
Upper secondary VET	6,747	6,690	6,677	9,100	8,300	10,000	9,800	6,200
Polytechnics	1,665	1,672	1,671	900	1,000	1,000	1,200	1,300
Universities	43	64	60	100	100	100	100	100
Fields of education, total	95,356	94,644	94,633	92,700	93,000	101,100	109,300	92,860
Upper secondary VET	47,873	47,542	48,118	56,000	51,900	61,300	61,300	49,220
Polytechnics	26,411	26,316	26,166	22,300	24,000	24,300	28,100	24,550
Universities	21,072	20,786	20,349	14,400	17,100	15,500	19,900	19,090
Other education or no vocational qualification ¹⁾				2,600	2,300	2,700	2,600	
Levels of education and other education, total	95,356	94,644	94,633	95,300	95,300	103,800	111,900	92,860

1. Other education includes programmes in the Military and Border Guard, Fire and Rescue Services, Police Services and Correctional Services subfields.