

## **Futures of work and skills: some foresight exercises in Europe and USA**

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### **ABSTRACT**

The Knowledge-based society brought a new way of living and working. The increasing decline of work in primary sector and traditional industries, related with the significant increase of employment in the service sector and in the knowledge work, changed the way companies and individuals establish their relations, the way work and life is organised. These changes are usual and fast and so the feeling of insecurity and unpredictability become more and more sharp. In this context, foresight exercises are necessary tools helping in the identification of the key variables and main trends of evolution. This report will present some foresight studies about work and skills in Europe and USA, in order to contribute to think about possible evolutions and trends.

**Key-Words:** Foresight; Work; Skills; Future

**JEL codes:** J24; J44;

### **Introduction**

The western society have passed through significant changes in the last decades, namely in the labour market, production sectors and occupational structure. In this society already known as 'knowledge society', the shaping of future become more and more important, to deal with the fast changes, unpredictability and the fear share by many of 'everything can happen', common in times of crisis and large transformations.

The increase importance of knowledge and flexible work organisation lead to a more adaptable and available workforce, that has to deal with new working hours and new working paces, with the demands of skills and qualifications in a process of long life learning. In this context of structural and technical changes is important to think about the future, trying to understand the main trends and possible paths of work and skills in the knowledge society. But what are the consequences of work restructuring to

skills? What is necessary to an individual become employable? What can we expect from work in next years? The increase of unemployment? The continuous growing of service sector and the gradual disappearance of agriculture and traditional industries in western society? These are some questions that could be though with the help of foresight exercises and prospective studies.

There are several foresight studies that can be used in the analyses of skills and work trends in Europe and USA and also sets of scenarios. This report will present some of these methods using some examples already published, like the case of the report "*Future skill needs in Europe*" prepared in 2008 by Cedefop; the report "*Plan to upgrade skills levels of workers by 2020*" published in 2007 by Eurofound; the European project WORKS (Work organisation restructuring in the knowledge society) that pretend to built a set of scenarios about the future of work in Europe; and finally in USA, the report "*Employment projections: 2006-2016*" prepared by the Bureau of Labor Statistics.

### **Foresight methods and exercises**

The purpose of prospective methodologies is to help in political decisions. The more useful ones describe possible future conditions of the main variables, during a period of time. In this sense, scenarios are a central aspect to the foresight studies, which can be seen as a description of a plausible reality, of what could occur in the future if some specific indicators change. A scenario is not a future prevision but a foresight method that describe trends and paths and their possible evolution.

The future is multiple and undetermined, it is open to the decisions of a set of actors and because of that one should not look to the future as an extension of the past. Michel Godet, working in the Research Centre of Prospective Studies of Paris, presents the foresight exercise as an 'intellectual indiscipline', looking to the future as something clearly different from the past. The problems change faster than can be solve and that is why is more important foresee those changes than find solutions to past problems (Godet, 1993). The past will determine the future, but also our image about the future will change and direct our present. It is this representation, the image of the future that limits the present time. So, prospective is a reflexion to illuminate present action with the light of possible futures.

To Godet, to have credibility and utility, scenarios have to respect four main conditions: relevance, coherence, credibility and transparency. It is possible to construct three kind of scenarios: possible scenarios, that have everything we could imagine; achievable scenarios, everything that is possible taking into account the constraints; desirable scenarios, that are in the possible area, but not all are achievable.

### The WORKS project

The European project WORKS 16 (Work organisation restructuring in the Knowledge society) funded by the European Commission since 2005, under its 6<sup>th</sup> Research Framework Programme, was elaborated with the main purpose of understand the changes that are occurring in work organisation in a globalised context and its impacts in institutions and individuals. It involved partners from 13 countries and studied several business functions (R&D, production, logistic; customer service, IT) which represents labour processes in knowledge society within a variety of sectors (clothing industry, food industry, information and communication technology, public administration, services of general interest) distributed in different European countries.

After collecting a large amount of data and analyse it, the project is now elaborating a set of scenarios<sup>17</sup> about the possible futures of work in Europe with the aim of supporting employment policies more efficiently. Scenarios will be constructed with the base of different models of welfare-states in different organisational systems, developing possible visions of work evolution in different models of knowledge societies. The construction of scenarios is developed in different steps:

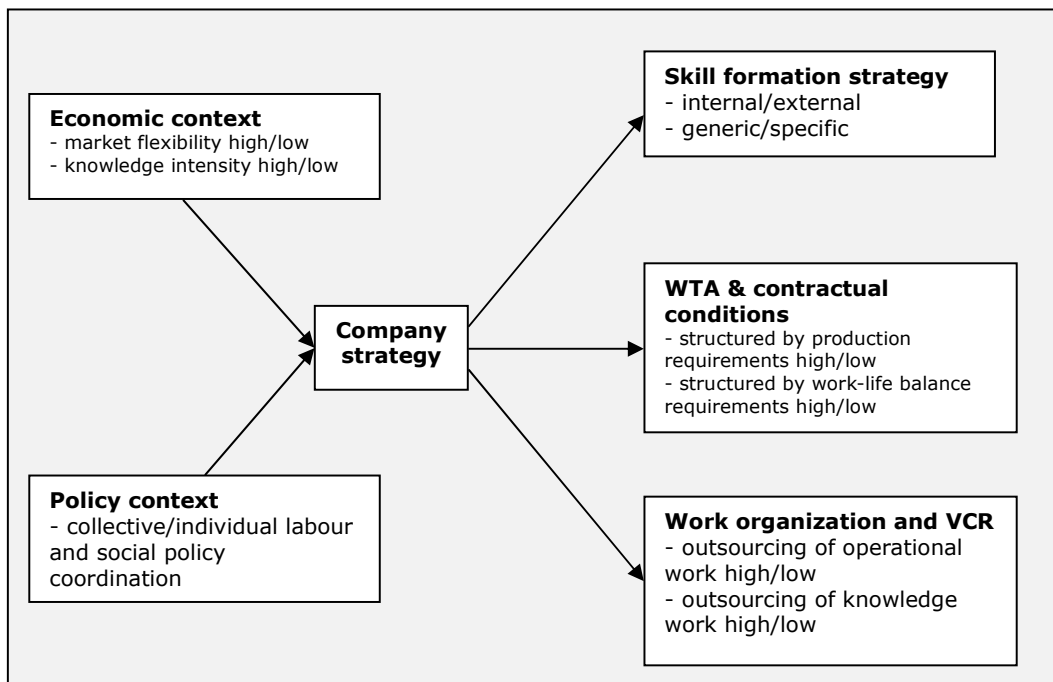
- Definition of a set of dimensions and variables (1 – political context, eg. regulation, bargain, social dialogue; 2 – economical context, eg. globalisation trends, occupational profiles; 3 – business strategies, eg. skills policies, flexibility; 4 – quality of life, eg. work conditions).
- Establishment of a typology of contexts with the illustration of causal relations between national social policies, labour market (political context), economical and technological features (economical context), business policies (business strategies) and the results for the quality of life and work conditions.

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16 <http://www.worksproject.be/>

17 WP12 – Thematic report 8 – *Change processes and methodologies of future perspectives of work* (Moniz, Paulos, Bannink, Ossewaarde, Krings & Nierling, 2008)

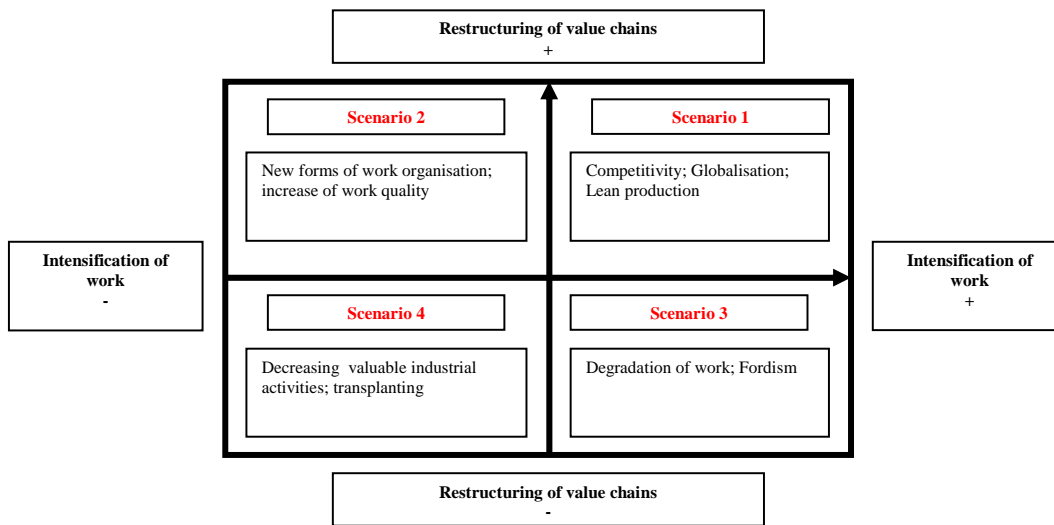
**Figure 1. Model of changes in work in the knowledge society**



Source: Bannink, D. (2008), WP12 – Thematic report 8

- Construction of a typology of work contexts in knowledge society that result from different connexions and combinations of the contexts presented before.
- Fill in the dimensions with information collected from qualitative research and theoretical framework.
- Identification of the main components of the scenarios.
- Application of foresight exercises with quantitative data in order to have a dynamical relation between the variables.
- Establishment of a set of scenarios and application of tests to clarify policies and recommendations – eg. four scenarios based in the evolution of two main variables of our research: value chain restructuring and work intensification.

**Figure 2. Four scenarios of evolution of work**



Another possibility is a dual scenario based in the actual possibilities and alternatives of work organisation restructuring, like flexicurity versus classical social-democratic models, where both assumptions imply an increase of work intensity. Scenario 1 "*The dark side of flexicurity*": Period 1 (short term) – until 2010 - quick growth of globalisation and strong investment on ICT; Period 2 (mid term) – 2011-2020 - Major increase on ICT investments, upsurge of company knowledge requirements, new experiences with work organisation; Period 3 (long term) – after 2021 - continuous investment on ICT, capacity of increased flexibility. Scenario 2 "*The liberal Lisbon process*": Period 1 - quick growth of globalisation, strong investment on ICT; Period 2 - major increase on ICT investments, upsurge of company knowledge requirements, new experiences with work organisation; Period 3 - continuous investment on ICT, capacity of increased flexibility.

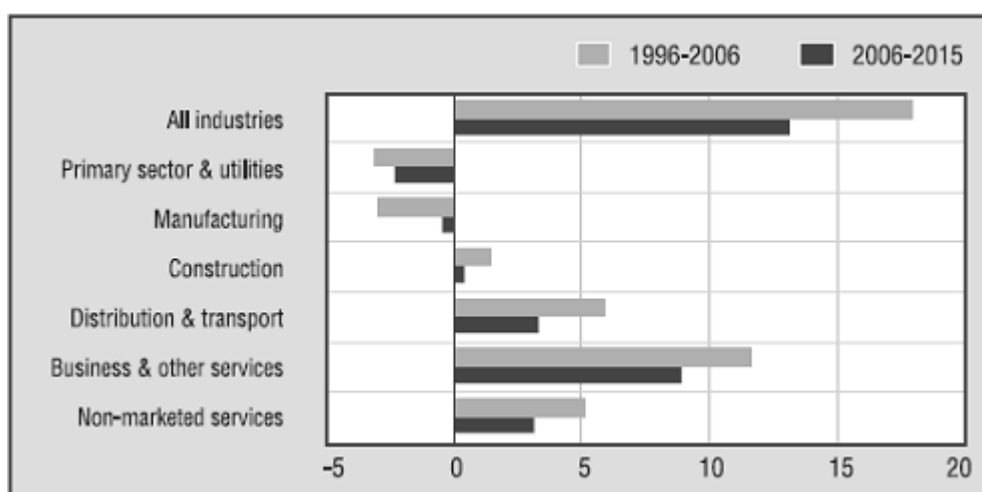
### **"Future skill needs in Europe" – CEDEFOP**

This report presented by CEDEFOP (European Centre for Development of Vocational Training) in 2008 is a pioneer research that presents a prospective exercise in a middle term about the evolution of work and the needs of skills in all European countries. It developed macro-economical projections to each member-state and adds results in a European level, presented data about the development of the future of work in each economical sector, occupation and skills until 2015, given a good example of a foresight exercise.

The main conclusions of the research reveal a continuity of some trends observed in the last years in Europe: a decrease of jobs in primary sector (especially in agriculture) and on traditional industries and an increase in the service sector and also in sectors related with the knowledge economy.

The figure below illustrates the evolution of work until 2015 by broad sectors in EU-25, where is expected that between 2006 and 2015, 13 million of jobs will be created. About the sectors it is estimated that primary sector will lose over 2 million jobs and manufacturing half a million; distribution and transportation will created more than 3 million jobs, as well as education and health sector; the sector that will have a bigger grow is business and miscellaneous services with almost 9 million jobs being created.

**Figure 3 – Employment trends by broad sectors (change in millions), 1996-2015, EU-25**

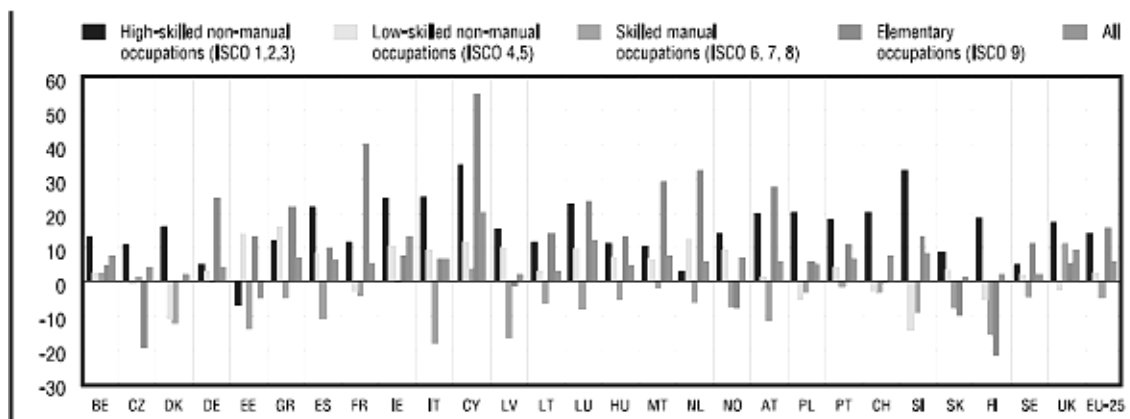


Source: Cedefop, 2008

Work projections by sector illustrate the implications for occupational employment, namely the continuing growth in demand for many highly and medium-skilled workers, but also for some lower-skilled categories. The next figure show us the increase of jobs by country and occupation between 1996 and 2015 in EU-25, where is possible to observe that high skill requirements will increase in almost every sector. Even in areas where employment is expected to fall, there will still be significant numbers of job openings and needs for education and training. The total employment increase in Europe between 2006 and 2015 comprises more than 12,5 million additional jobs at the highest qualification level and a further 9,5 million jobs at medium level. At the same time jobs for those with low qualifications will fall by 8,5 million. It is expect that in 2015 around 30% of all jobs will need high skills and 50% medium qualifications. The demand for low qualifications will fall from a third in

1996 to around 20%.

**Figure 4 – Employment growth by country and occupation (change in %), 2006-15, EU-25**



Source: Cedefop, 2008

According to this report the skill needs will growth in every occupation, even in manual and traditional work it will increase, specially the medium ones. The sectors identified as potential creators of work in the future are: aerospace, audiovisual industry, aviation, banks and insurance companies, defence, ecological economy, information technology, pharmaceutical, safety, media, transports, tourism and travels.

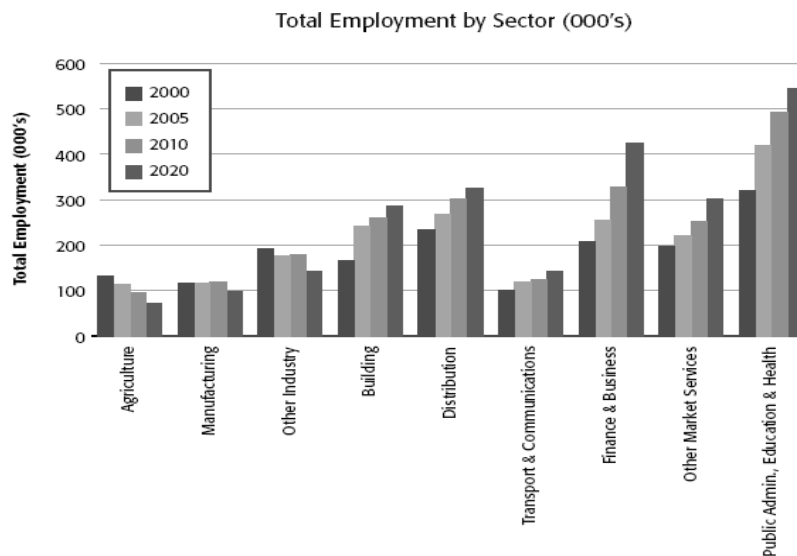
### **"Plan to upgrade skills levels of workers by 2020" – European Foundation for the Improvement of Working and Living Conditions**

This report was developed in 2007 with the main aim of raising the skill levels of over half a million people in Ireland by 2020. According to the study report workers in Ireland will need to increase their skill levels significantly because in 2020, 9% more jobs will require a degree level or higher qualifications; 4% more occupations will require third-level certificates or diplomas; and 2% more will require a minimum secondary school Leaving Certificate standard.

The figure below illustrates the forecast employment changes by sector. Overall, employment in Ireland is forecast to increase from 1.9 million in 2005 to over 2.4 million in 2020. Employment will fall in traditional sectors like agriculture (from over 113,000 in 2005 to just 73,000 in 2020), manufacturing and other industries (less 36,000 jobs) and will increase significantly in services based employment, with the largest absolute increases forecast to occur in the 'financial and business services' sector (+170,000 jobs), 'public administration' sector

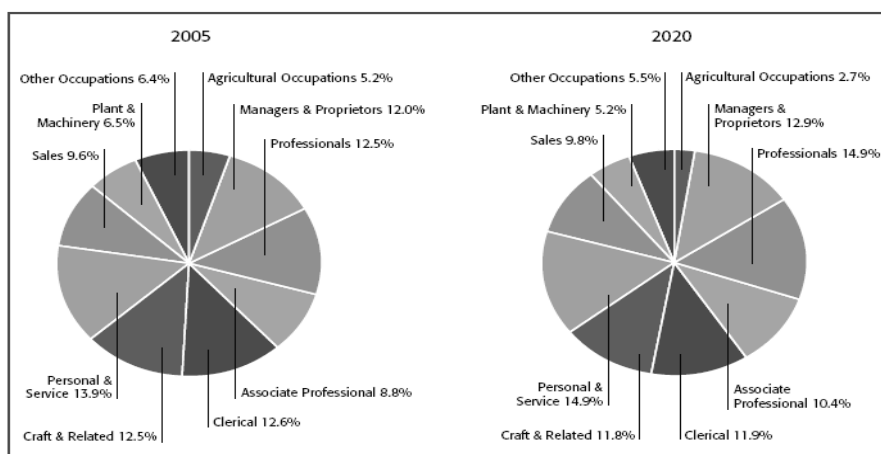
(+125,000 jobs), and 'other market services' (+80,000 jobs).

**Figure 5 – Total employment by sector (unit: thousand workers)**



Occupation trends follow the same evolution, as we can see in the next figure. The largest increase in employment is likely to be recorded in 'professional' occupations (+19,3%), 'associated professional' (+18,8%), 'managerial' (+7,7%), and 'personal & service' (+6,9%) occupations. 'Agriculture (-47,6%), 'plan & machinery' (-20,7%), 'clerical' (-5,5%), and 'craft & related' (-5,4%) are all expected to decline in relative terms.

**Figure 6 – Employment by occupational level 2005-2020**



Source: ESRI



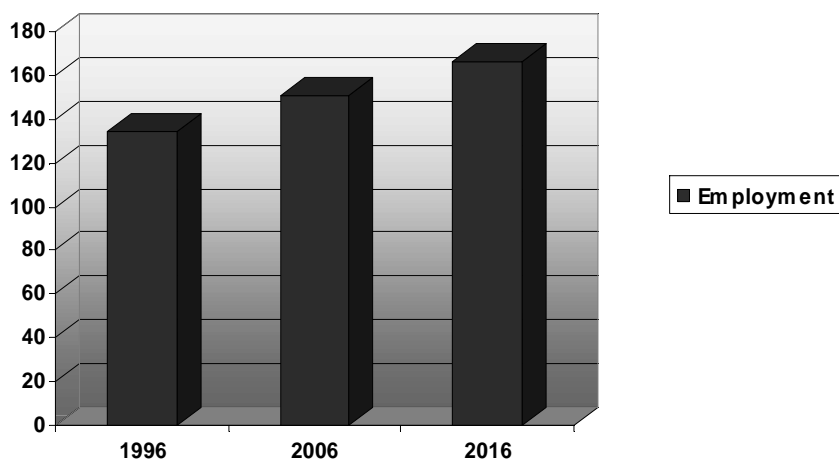
*"World class skills, education and training can provide Ireland with a unique competitive advantage which will allow us to remain ahead of the curve economically, while improving living standards in a participative and truly inclusive society" (p.108).*

### **"Employment projections: 2006-2016" – Bureau of Labor Statistics**

The Employment Projections Program developed by the Bureau of Labor Statistics (BLS), U.S. Department of Labor, gives us information about the labour market for the country as a whole between 2006 and 2016. These projections are about the evolution of industry and occupational employment, labour force, and economic growth. The projections, which are updated every 2 years, continue a 60-year tradition of providing information to individuals who are making education and training choices, entering the job market, or changing careers.

Over the 2006-2016 decade, total employment is projected to increase by 15,6 million jobs or 10%, slightly less than the 15,9 million jobs or 12%, during the 1996-2006 decade, as one can observe in the next figure.

**Figure 7 - Total employment (In thousands)**

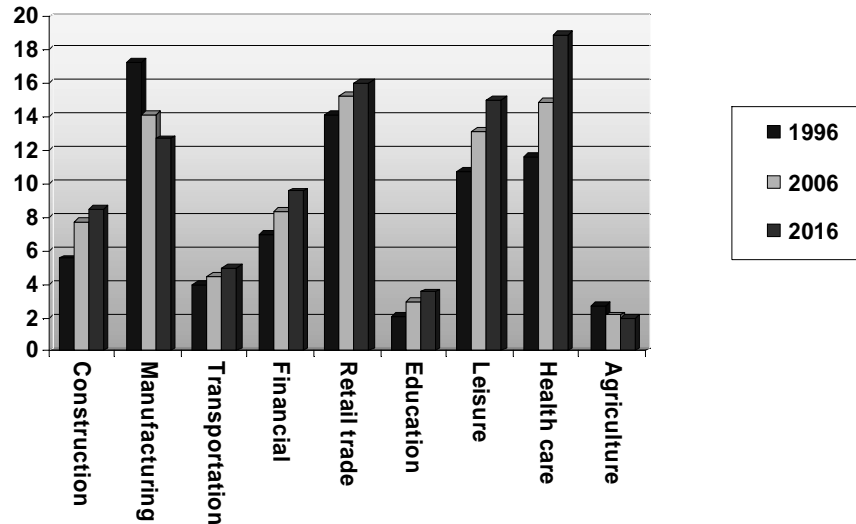


The labour force filling these jobs, while becoming more racially and ethnically diverse, is projected to grow more slowly than in the past, especially because of the aging and retiring.

About employment in industry, projections point out an employment growth in the service-providing sector of the economy, which will provide more than three-quarters of all jobs in 2016. Professional and business services and health care and social assistance are the industry sectors with the largest employment growth, adding 8.1 million of new jobs, more than half of the projected increase in total employment, while in

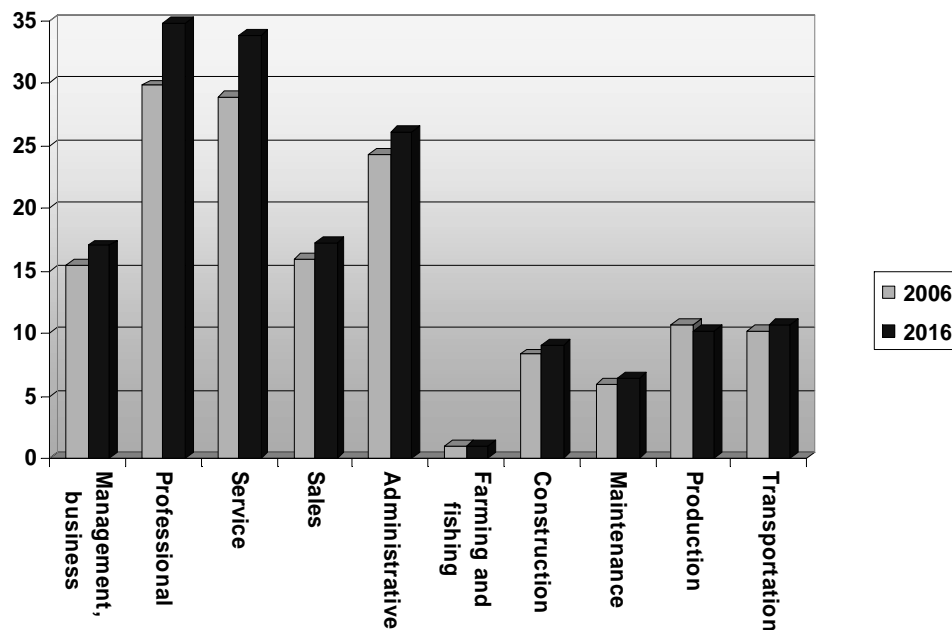
manufacturing employment will decline by 1.5 million jobs, as shown in the next table.

**Figure 8 - Employment by major industry sector (In thousands)**



In what concern occupations it is expected that 'professional and related occupations' and 'service occupations' will grow fast adding the most jobs, accounting for more than 6 of 10 new jobs created over the 2006-16 decade. 'Production occupations' and 'farming, fishing, and forestry occupations' are the two major occupational groups projected to lose employment over this decade.

**Figure 9 - Employment by major occupational group (In thousands)**



It is also possible to observe the portion of jobs gain and lost in the next figures. These jobs are projected to be concentrated in a small number of detailed occupations. The 30 occupations with the largest numeric increases will account for more than half of all new jobs (See figure 10). On the other hand, the 30 occupations with the largest numeric declines will account for more than two-thirds of all job losses from declining occupations (See figure 11).

Nineteen of the occupations with the largest job growth are in professional and related occupations and service occupations. In terms of job decline, the large reduce will be in the 'sewing machine operators' with almost less 30% of jobs in 2020, 'machine feeders' (-16%) and 'cutting, punching, and press machine setters and tenders' (- 14,9%).

**Table 10 - The 30 occupations with the largest employment growth (In thousands)**

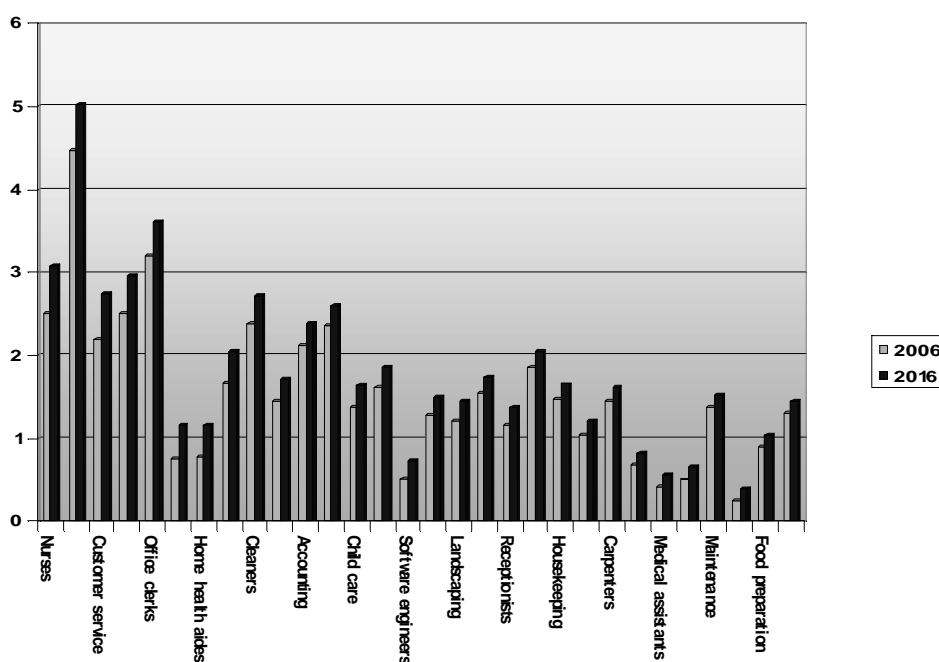
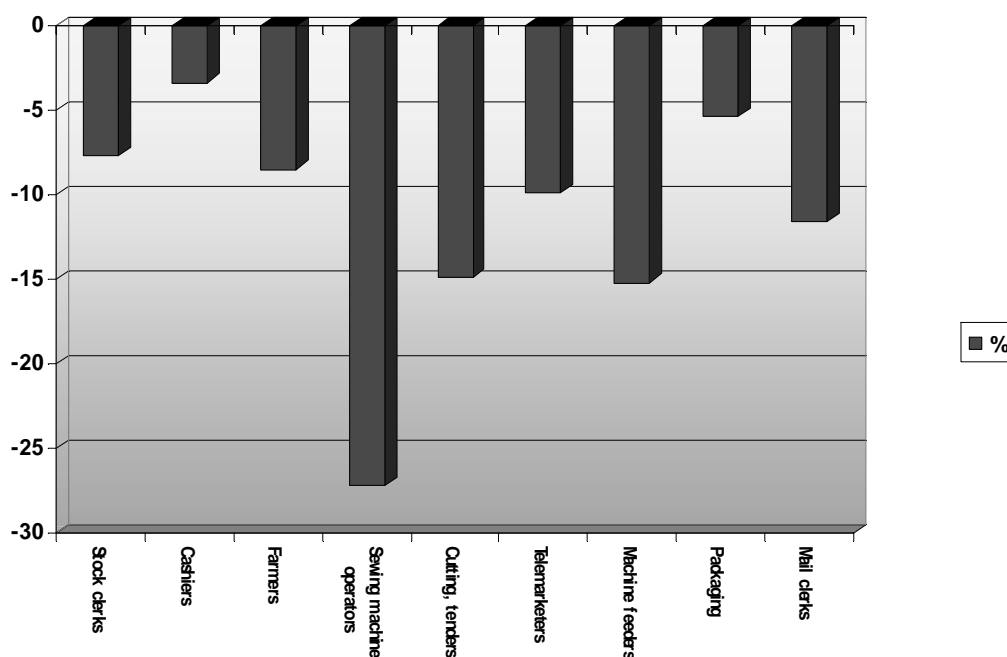


Table 11. Occupations with the largest employment declines, 2006-2016



## Conclusions

Contexts of change are always viewed with more suspicion and fear on the part of states, companies and individuals. The knowledge-based society has brought with it several changes, some radical, which continue to exist and to have profound impacts on life's structure in society. The increase importance of service-based sectors, the power of knowledge and 'knowledge workers', the information and communication as central features of development, in one hand, and the quick diminishing of traditional and more manual sectors, like agricultural, fishing, manufacturing on other industries, introduce new ways of seeing work and life, new forms of organise work, new skill needs and also new fears and opportunities.

It is therefore increasingly important to think about work and skills in a long term, to build policies and strategies that address the nature of rapid and continuous changes in our daily life. In this sense, foresight exercises become crucial as a tool to visualize possible futures, emphasizing and highlighting the benefits and constraints that present policies can have in a near or a more distant future. The 'knowledge age' puts the increase of skills at the heart of the economic success and competitiveness of businesses and individuals, but those measures have impacts in its nature that should be analysed. Prospective exercises about the future of

employment and skills are tools used by politicians and companies as part of decision-making strategies, and so it is increasingly important that they become more frequent in national and international contexts.

## References

BLS (2006), "Employment projections: 2006-2016", U.S Department of Labor, in <http://www.bls.gov/news.release/ecopro.nr0.htm>

Castells, Manuel (2002), *A Sociedade em Rede. A Era da Informação: Economia, Sociedade e Cultura*, Lisboa, Gulbenkian.

CEDEFOP (2008), "Future skill needs in Europe", in [http://www.trainingvillage.gr/etv/Upload/Information\\_resources/Bookshop/485/4078\\_en.pdf](http://www.trainingvillage.gr/etv/Upload/Information_resources/Bookshop/485/4078_en.pdf)

Esping-Andersen G. (1990), *Three worlds of welfare capitalism*, Polity Press, London.

EUROFOUND (2007), "Plan to upgrade skills levels of workers by 2020", in <http://www.eurofound.europa.eu/ewco/2007/04/IE0704019I.htm>

Freire, João (2002), *Sociologia do Trabalho: uma introdução*, Porto, Edições Afrontamento.

Giddens, Anthony (1994), *Reflexive modernization*, Cambridge, Polity Press.

Godet, Michel (1993), *A Handbook of Strategic Prospective*, Paris: UNESCO.

Godet, Michel (1990), "Integration of Scenarios and Strategic Management: Using Relevant, Consistent, and Likely Scenarios." *Futures*, Vol. 22, No. 7, September.

Huws, Ursula (coord.) (2005), *The Transformation of Work in a Global Knowledge Economy: towards a conceptual framework*, Leuven.

Kovács, Ilona (coord.) (1994), *Qualificações e Mercado de Trabalho*, Lisboa, IEFP

Moniz, António B. (org.) (2002), *Futuros do Emprego na Sociedade da Informação*, Lisbon, DGEFP-MTS.

Moniz, António B. and Paulos, Margarida R. (2007), "Methods for scenario construction: a revision proposal of WORKS Portuguese Team", *WP 12 - Thematic report 8: Change and Future Perspectives*, version 2.7, WORKS.

Moniz, A.; Paulos, M.; Bannink, D. Ossewaard, N.; Krings, B.; and Nierling, L. (2008), "Change processes and methodologies of future of work", *WP 12 - Thematic report 8*

Shell International (2003), *Shell International: Scenarios: An Explorer's Guide*, Global Business Environment.

Touraine, Alain (1979), *A Sociedade Pós-Industrial*, Lisboa, Moraes Editores.