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Qualification Requirements of European Labour Market

Jan Koucký

Forecasting skill supply and demand in Europe
**SkillsNet Workshop, Thessaloniki, 9-10 June 2009**

Three tasks of Education Policy Centre:

1. **What determines the number of jobs by sectors?**

2. **What affects the occupation structure of jobs (by sectors)?**

3. **What are qualification requirements of jobs (by occupation and by sectors)?**

The EPC combines quantitative and qualitative approaches.

It will be illustrated using the printing and publishing sector as an example.

Economy – Labour Market – Qualification, Education and Training

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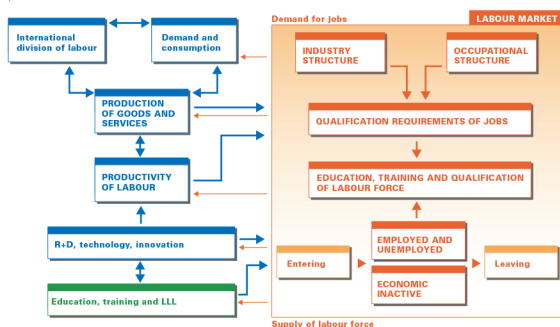
Sources for quantitative approach

International surveys

- **European Labour Force Survey**: Jobs in Europe, by sector (NACE 2nd level), by occupation (ISCO 3rd level), 1995-2008
- **European Social Survey** (4 rounds, every second year, 2002-2009)
- **EURES** (Employers Survey, 2007-2009)
- **CHEERS** 1997-1999 (Graduates on the labour market)
- **REFLEX** 2005-2007 (Graduates on the labour market)
- **OECD project PIAAC** (under preparation, 2011-2012): J.R.A.
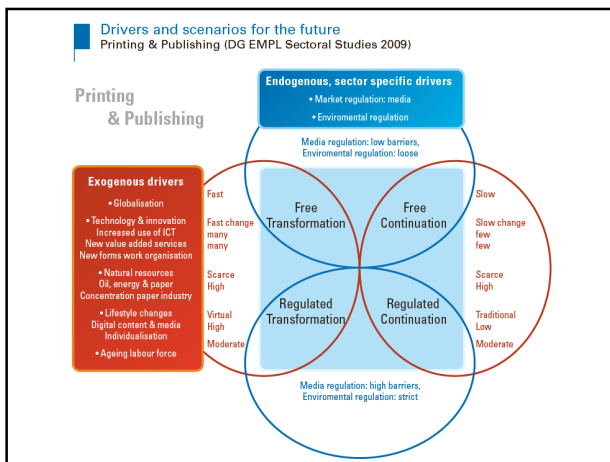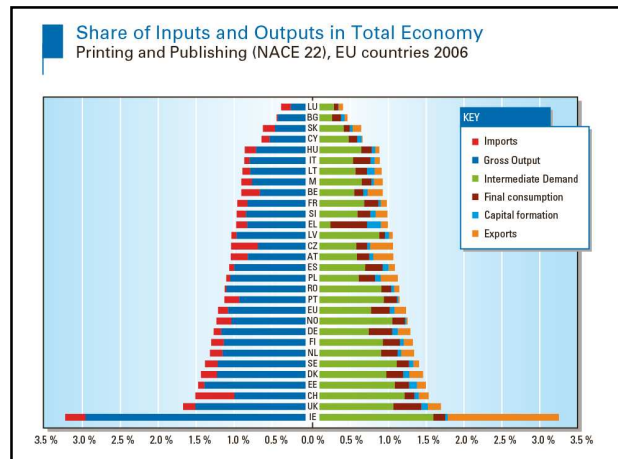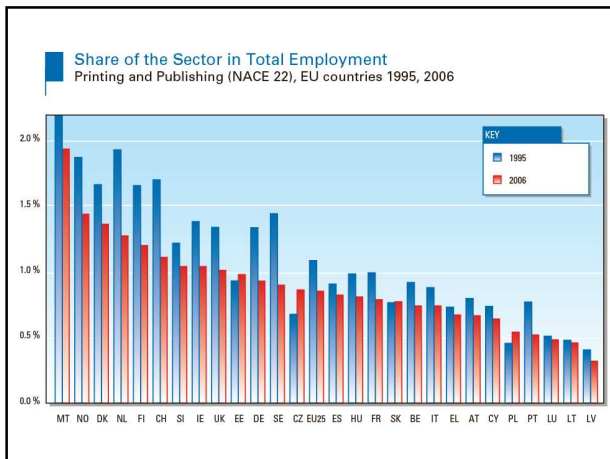
National surveys

- **USA**: *O.P.T.D.* and *O*NET programmes (every 2 years, ongoing)*
- **Italy**: *Indagine sulle professioni* 2006-2007
- **Czech Republic**: *Qualification Requirements* 2007-2008
- **United Kingdom**: *Skills Survey* 1986 - 2006
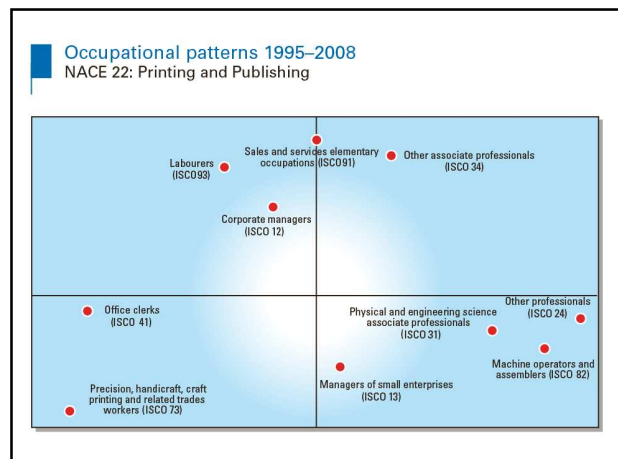

Sources for qualitative approach
DG Employment project Comprehensive Sectoral Studies 2007–2009

Lot	Description	NACE Rev.2	NACE Rev.1.1	Awarded to
1	Textiles, wearing apparel and leather products	13-14-15	17-18-19	Economix
2	Printing and publishing	18-58	22	TNO
3	Chemicals, pharmaceuticals, rubber and plastic products	20-21-22	24-25	TNO
4	Non-metallic materials (glass, cement, ceramic,…)	23	26	TNO
5	Electromechanical engineering	27-28	29-31	Alphametrics
6	Computer, electronic and optical products	26	30-32-33	TNO
7	Building of ships and boats	30.1	35.1	IKEI
8	Furniture and others	31-32-33	36	TNO
9	Electricity, gas, water & waste	35-36-37-38-39	40-41	TNO
10	Distribution, trade	45-46-47	50-51-52	TNO
11	Tourism including hotels, catering and related services	55-79.1	55-63.3	Oxford Research
12	Transport	49-50-51-52	60-61-62-63	TNO
13	Post and telecommunications	53-61	64	TNO
14	Financial services (bank, insurance and others)	64-65-66	65-66-67	Economix
15	Health and social work	86-87-88-75	85	TNO
16	Other services, maintenance and cleaning	94-95-96-97-98	90-91-93-95	TNO

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1. What determines the number of jobs by sectors?

Share of the Sector in Total Employment
Printing and Publishing (NACE 22), EU countries 1995, 2006

KEY
1995
2006

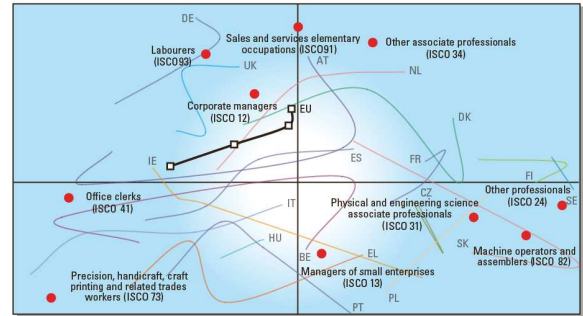MT NO DK NL FI CH SI IE UK EE DE SE CZ EU25 ES HU FR SK BE IT EL AT CY PL PT LU LT LV

Share of Inputs and Outputs in Total Economy
Printing and Publishing (NACE 22), EU countries 2006

KEY
Imports
Gross Output
Intermediate Demand
Final consumption
Capital formation
Exports

LU BG SK CY HU IT LT M BE FR SI EL LV CZ AT ES PL RO PT EU NO DE FI NL SE DK EE CH EI IE

Drivers and scenarios for the future
Printing & Publishing (DG EMPL Sectoral Studies 2009)

Printing & Publishing

Endogenous, sector specific drivers
• Market regulation: media
• Enviromental regulation

Media regulation: low barriers, Enviromental regulation: loose

Exogenous drivers
• Globalisation
• Technology & innovation Increased use of ICT New value added services New forms work organisation
• Natural resources Oil, energy & paper Concentration paper industry
• Lifestyle changes Digital content & media Individualisation
• Ageing labour force

Fast
Fast change many many
Scarce High
Virtual High
Moderate

Free Transformation
Free Continuation
Regulated Transformation
Regulated Continuation

Slow
Slow change few few
Scarce High
Traditional Low
Moderate

Media regulation: high barriers, Enviromental regulation: strict

2. What affects the occupation structure of jobs (by sectors)?

Education structure of most frequent occupations
Printing & Publishing, EU 1995 and 2007

KEY
High education
Medium education
Low education

Share of occupation in Printing & Publishing

1995 2007 1995 2007 1995 2007 1995 2007 1995 2007 1995 2007 1995 2007 1995 2007
Precision, handicraft, printing and related trades workers (ISCO 73) | Other profession-als (ISCO 24) | Other associate professionals (ISCO 34) | Office clerks (ISCO 41) | Machine operators and assemblers (ISCO 82) | Sales and services elementary occupations (ISCO 91) | Corporate managers (ISCO 12) | Other occupa-tional groups

Occupational patterns 1995–2008
NACE 22: Printing and Publishing

Labourers (ISCO 93)
Sales and services elementary occupations (ISCO 91)
Other associate professionals (ISCO 34)
Corporate managers (ISCO 12)
Office clerks (ISCO 41)
Physical and engineering science associate professionals (ISCO 31)
Other professionals (ISCO 24)
Machine operators and assemblers (ISCO 82)
Precision, handicraft, craft printing and related trades workers (ISCO 73)
Managers of small enterprises (ISCO 13)

Slide 1

Occupational patterns 1995–2008
NACE 22: Printing and Publishing

Slide 2

Occupational patterns 1995–2008
NACE 22: Printing and Publishing

Slide 3

Changes in number of jobs, by occupation 2008–2020
Printing & Publishing (DG EMPL Sectoral Studies 2009)

Occupation / Scenarios	Free Transformation	Regulated Transformation	Free Continuation	Regulated Continuation
Managers	D M	M M	D M	D M
ICT & engineering	I I	I I	M M	M M
Business & finance	I I	I I	M M	M M
Journalist, editors	I I	I I	D D	D D
Support staff	D D	D D	D D	D D
Pre-press workers	D D	I I	M M	M M
Production workers	D D	D D	D D	D D

D = decrease; I = Increase; M = maintain;

Slide 4

3. What are qualification requirements of jobs (by occupation and by sectors)?
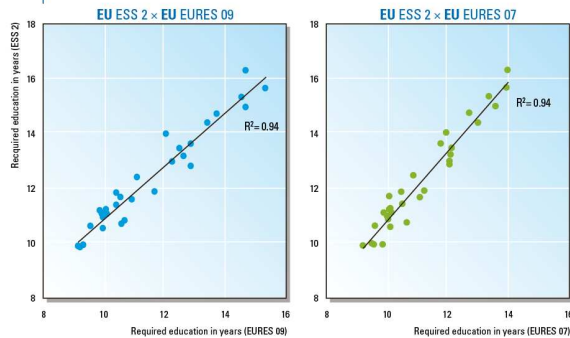
Slide 5

European Qualifications Framework (EQF)
Descriptors defining 8 levels of qualification

	Knowledge	Skills	Competence	Education required
Level 1				ISCED 1
Level 2				ISCED 2
Level 3	Each of the 8 levels is defined by a set of descriptors indicating the learning outcomes relevant to qualifications at that level in any system of qualifications.			ISCED 3C
Level 4				ISCED 3AB
Level 5				ISCED 4
Level 6				ISCED 5 Bc
Level 7				ISCED 5 Mgr
Level 8				ISCED 6

Slide 6

Education required, by occupation in Europe
Printing & Publishing, most frequent occupations

Employers' (EURES) and employees' (ESS) view	ISCO 24	ISCO 34	ISCO 41	ISCO 73	ISCO 82
EURES 2007					
Education/qualification required by employers for the job:					
Compulsory Education / Professional Initiation	12.7 %	12.7 %	15.4 %	24.5 %	25.9 %
Vocational Training / Apprenticeships	16.0 %	18.0 %	31.0 %	58.2 %	50.2 %
Higher Technical Training	26.1 %	38.7 %	34.7 %	8.2 %	16.5 %
Advanced Technical Training	12.3 %	14.9 %	13.4 %	6.5 %	6.9 %
Higher Training, Including Academic	32.9 %	15.8 %	5.5 %	2.5 %	0.5 %
EURES 2009					
Education/qualification required by employers for the job:					
Compulsory Education / Professional Initiation	5.3 %	4.5 %	4.7 %	11.6 %	10.7 %
Vocational Training / Apprenticeships	3.5 %	9.9 %	12.0 %	43.0 %	70.6 %
Higher Technical Training	37.8 %	53.6 %	70.7 %	39.2 %	17.2 %
Advanced Technical Training	17.6 %	22.3 %	9.0 %	3.3 %	1.5 %
Higher Training, Including Academic	35.8 %	9.6 %	3.6 %	3.0 %	0.1 %
European Social Survey (ESS 2, 2004/2005)					
Years of education beyond compulsory needed by the applicant for the job (according to job holders):					
None	6.4 %	15.5 %	26.1 %	31.5 %	53.3 %
Less than 1 year	1.8 %	3.4 %	6.8 %	7.2 %	9.5 %
About 1 year	3.9 %	4.6 %	7.1 %	3.6 %	7.7 %
About 2 years	4.6 %	10.2 %	10.3 %	7.2 %	8.6 %
About 3 years	12.2 %	20.5 %	22.0 %	28.8 %	13.0 %
About 4–5 years	27.6 %	27.4 %	20.0 %	18.0 %	6.4 %
About 6–7 years	20.4 %	10.1 %	4.9 %	0.9 %	1.1 %
About 8–9 years	15.4 %	5.7 %	1.7 %	2.7 %	0.0 %
10 years or more	7.8 %	2.4 %	1.1 %	0.0 %	0.4 %

Education required, by occupation in Europe
Employers' (EURES) and employees' (ESS) view

EU ESS 2 × EU EURES 09 — $R^2 = 0.94$

EU ESS 2 × EU EURES 07 — $R^2 = 0.94$

Required education in years (ESS 2)
Required education in years (EURES 09)
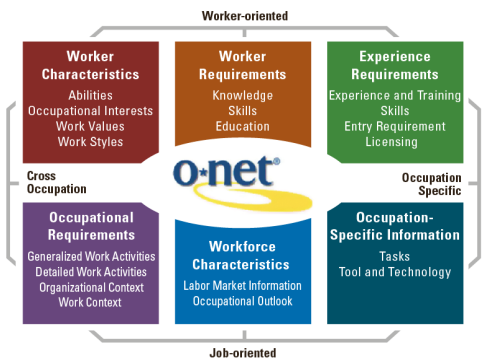Required education in years (EURES 07)

How to make EQF empirically operational ?

By using three national surveys
- **USA**: *O*NET programme (ongoing)*
- **Italy**: "*Indagine sulle professioni*" (2006-2007)
- **Czech Republic**: "*Kvalifikace 2008*" *(2007-2008)*
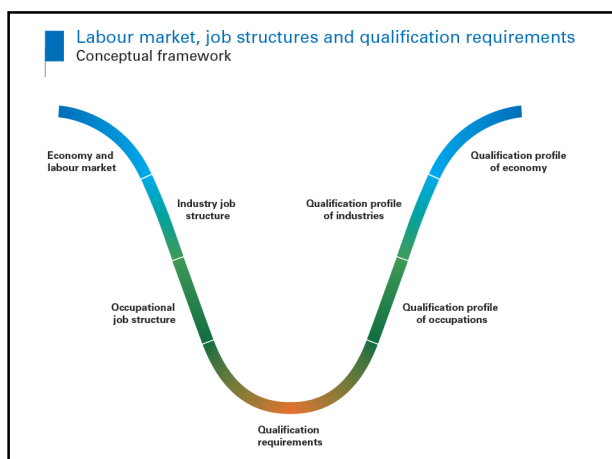

The O*NET® Content Model

Worker-oriented

Worker Characteristics
Abilities
Occupational Interests
Work Values
Work Styles

Worker Requirements
Knowledge
Skills
Education

Experience Requirements
Experience and Training
Skills
Entry Requirement
Licensing

Cross Occupation

Occupation Specific

Occupational Requirements
Generalized Work Activities
Detailed Work Activities
Organizational Context
Work Context

Workforce Characteristics
Labor Market Information
Occupational Outlook

Occupation-Specific Information
Tasks
Tool and Technology

Job-oriented

O*NET – Importance — Occupation group (ISCO 2nd level)

Subgroup characteristic	Element Name	ISCO 24	ISCO 34	ISCO 41	ISCO 73	ISCO 82
Knowledge						
Business and Management	Administration and Management	51 %	52 %	44 %	39 %	38 %
	Clerical	46 %	56 %	61 %	29 %	23 %
	Economics and Accounting	32 %	37 %	34 %	23 %	15 %
	Sales and Marketing	34 %	38 %	25 %	35 %	19 %
	Customer and Personal Service	59 %	70 %	61 %	53 %	40 %
	Personnel and Human Resources	38 %	34 %	28 %	21 %	23 %
Manufacturing and Production	Production and Processing	22 %	25 %	27 %	56 %	59 %
	Food Production	3 %	5 %	4 %	2 %	10 %
Engineering and Technology	Computers and Electronics	51 %	50 %	45 %	36 %	33 %
	Engineering and Technology	17 %	17 %	7 %	36 %	31 %
	Design	20 %	19 %	9 %	46 %	30 %
	Building and Construction	8 %	14 %	5 %	22 %	17 %
	Mechanical	13 %	16 %	12 %	54 %	54 %
Mathematics and Science	Mathematics	42 %	48 %	48 %	44 %	47 %
	Physics	8 %	9 %	4 %	19 %	20 %
	Chemistry	8 %	11 %	6 %	26 %	27 %
	Biology	10 %	10 %	2 %	4 %	5 %
	Psychology	46 %	39 %	20 %	18 %	17 %
	Sociology and Anthropology	39 %	26 %	9 %	8 %	9 %
	Geography	23 %	21 %	13 %	8 %	6 %
Health Services	Medicine and Dentistry	14 %	13 %	8 %	7 %	9 %
	Therapy and Counseling	25 %	20 %	6 %	6 %	8 %
Education and Training	Education and Training	49 %	43 %	30 %	36 %	41 %
Arts and Humanities	Native Language	75 %	69 %	61 %	46 %	44 %
	Foreign Language	19 %	16 %	9 %	8 %	8 %
	Fine Arts	27 %	10 %	2 %	20 %	4 %
	History and Archeology	26 %	12 %	4 %	7 %	4 %
	Philosophy and Theology	27 %	16 %	7 %	6 %	7 %
Law and Public Safety	Public Safety and Security	27 %	36 %	27 %	29 %	36 %
	Law and Government	43 %	49 %	26 %	18 %	15 %

Consistency between the three national approaches
US (O*NET), Italian (Indagine sulle professioni), Czech (Kvalifikace)

Correlation coefficient	USA (O*NET) and Italy (ISP)		USA (O*NET) and CR (Kvalifikace)		Italy (ISP) and CR (Kvalifikace)	
	Importance	Level	Importance	Level	Importance	Level
Knowledge	0.853	0.848	0.861	0.859	0.884	0.824
Skills	0.766	0.789	0.777	0.832	0.780	0.804
Competence	0.754	0.865	0.819	0.854	0.817	0.873
Total	0.860	0.863	0.872	0.855	0.875	0.865

Emerging skills and competences, 2008–2020
Printing & Publishing (DG EMPL Sectoral Studies 2009)

Occupation / IT professionals & engineers	Transformation		Continuation	
	Free	Regulated	Free	Regulated
Knowledge				
Legislative / regulatory knowledge				
e-skills				
Technical knowledge (new media and products)				
Programming and mark-up languages				
Digital workflows				
Database (publishing), design, management				
Systems integration				
General Management				
Environmental management				
Social				
Team working skills				
Social perceptiveness				
Communication				
Networking				
Language				

Labour market, job structures and qualification requirements
Conceptual framework

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