Christa Larsen, Sigrid Rand, Alfons Schmid, Andrew Dean (Eds.)

Developing Skills in a Changing World of Work:

Concepts, Measurement and Data Applied in Regional and Local Labour Market Monitoring Across Europe

Rainer Hampp Verlag

Christa Larsen, Sigrid Rand, Alfons Schmid, Andrew Dean (Eds.):

Developing Skills in a Changing World of Work: Concepts, Measurement and Data Applied in Regional and Local Labour Market Monitoring Across Europe

Rainer Hampp Verlag, Augsburg, München 2018, 487 S.,
ISBN 978-3-95710-215-7 (print), € 42.80
ISBN 978-3-95710-315-4 (e-book pdf), € 39.99

The world of work is changing fundamentally and quickly as a result of technological transformation, demographic development and globalisation. The contributions in the anthology show for ten European countries that not only do the degree and speed vary significantly between occupations, sectors and firm types – the changes take on diverse forms in different geographical locations. Labour market actors at regional and local level need to know which skills, competences and know-how are required from the labour force so that they can set up their strategies in line with the future developments.

Regional and local labour market observatories, which are established in over 550 regions and localities in Europe already, can provide significant support in these processes as they have far-reaching experiences with applying a wide variety of methods to collecting, analysing and combining data. Furthermore, they are embedded in regional/local networks of labour market actors and actively contribute to shaping regional strategy processes evidence-based labour market policies.

The contributions demonstrate from different perspectives the approaches to skills and competence monitoring applied in various European regions and localities. In particular, the authors focus on the methods and sources of data and information, implemented instruments, resulting strategy-building and role of observatories in these processes. The compilation of approaches offers an overview of the state-of-the art in labour market monitoring, which can be used for building up skills and competence monitoring frameworks at regional and local level.

Key words: skills, competences, skills and competence requirements, regional and local labour markets, evidence-based policy-making, labour market monitoring, applied labour market research, labour market observatories

Christa Larsen, Sigrid Rand, Alfons Schmid, Andrew Dean
(Eds.)

Developing Skills in a Changing World of Work:

Concepts, Measurement and Data Applied in Regional and Local Labour Market Monitoring Across Europe

Rainer Hampp Verlag Augsburg, München 2018

Bibliographic information published by the Deutsche Nationalbibliothek

Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the Internet at http://dnb.d-nb.de.

ISBN 978-3-95710-215-7 (print)
ISBN 978-3-95710-315-4 (e-book)
ISBN-A/DOI 10.978.395710/3154
First published in 2018

© 2018 Rainer Hampp Verlag Augsburg, München
Vorderer Lech 35 86150 Augsburg, Germany

www.Hampp-Verlag.de

All rights preserved. No part of this publication may be reprinted or reproduced or utilized in any form or by any electronic, mechanical, or other means, now known or hereafter invented, including photocopying and recording, or in any information storage or retrieval system, without permission in writing from the publisher.

In case of complaints please contact Rainer Hampp Verlag.

Foreword

Globalisation, technological progress and demographic change are having a profound impact on the world of work. These mega-trends do not only determine the number of jobs that are available but, most importantly, affect their tasks and skill content. Technological change is, for instance, contributing to the automation of many industrial processes and increasingly of some service-sector job tasks. Similarly, population ageing is driving new skill needs by increasing the need for health and care-related services.

Although the timing and the speed of these changes differ across countries, empirical evidence suggests that they will continue (or even accelerate) in the coming decades and quickly extend to emerging economies. The ability of labour markets to adjust to such changes and of firms to make most of new technologies and move up the value chain will, to a large extent, depend on the ability of their workforce to adapt and develop labour market relevant skills.

In such uncertain context, measuring all these dynamics becomes crucial in order to provide an evidence-based rationale to labour market policies, contribute to our understanding of these phenomena and develop solutions ensuring that no workers are left behind in a labour market that becomes more inclusive. The analysis of regional and local labour markets is also of paramount importance as these are the functional areas where demand and supply of skills meet.

This volume discusses several new approaches to measuring skill needs across European countries and provides invaluable insights into the fundamental aspects driving skill mismatches. Furthermore, it addresses the various strategies for filling these gaps.

Fabio Manca

Directorate for Employment, Labour and Social Affairs
OECD, Paris

TABLE OF CONTENTS

Introduction
Christa Larsen and Sigrid Rand 11

1. RELEVANCE OF SKILLS AND COMPETENCES IN A CHANGING WORLD OF WORK

Cross-cutting Competences and Soft Skills in Digital Professions: Knowledge-sharing and Social Stratification in the Tomorrow's World
Renato Fontana, Carmine Piscopo and *Erika Nemmo* 25

Smart Working and Organisation: Which Managerial Skills to Lead and Manage Cultural Change?
Patrizio Di Nicola, Alessia Cremonini, Michela Cossu and Stefano Scravaglieri 51

Changing Needs for Soft Skills and Competencies Through Digitalisation: Results of Two Business Surveys in the Federal State of Brandenburg
Carsten Kampe, Daniel Porep and Anja Walter 85

50 Strategies for 2050: Work and the Digital Revolution in Spain
Eugenia Atin, Raquel Serrano and Ibon Zugasti 103

2. DIFFERENT AVENUES TO SKILLS AND COMPETENCES IMPLEMENTED IN REGIONAL AND LOCAL LABOUR MARKET OBSERVATORIES

2.1. Demand for Skills und Competences in Sectors, Occupations and Enterprises

Occupational Barometer as a Tool for Identifying Shortage and Surplus Occupations on Local Labour Markets: Evidence from Poland
Piotr Maleszyk 121

Monitoring Changing Needs in Skills, Competences and Qualifications in Austria
Claudia Plaimauer 167

Current and Future Demand for Professions, Competences and Qualifications in the Context of Sectoral Development of the Regional Economy: The Case of Podlaskie Voivodeship, Poland
Marta Marzena Sosnowska 179

Professional Qualification Mismatches in Preceding Occupations: Comparison of Persons Entering Unemployment in East and West Germany
Pierre-André Gericke and Alfons Schmid 195

Different Skills, Different Gaps: Measuring and Closing the Skills Gap
Dan Restuccia and Bledi Taska 207

Analysing Demand-Oriented Skills in the Commercial Sector: The Swiss Case
Moreno Baruffini 227

Utilising Skills Demands Opportunities to Overcome the Low Professional Status and Attractiveness of a Sector: The Early Learning and Care Sector in Scotland
Aleksandra Webb and Ronald McQuaid 241

Digitalisation and Automation: Insights from the Online Labour Market
Mario Mezzanzanica, Fabio Mercorio and Emilio Colombo 259

2.2. Supply of Skills and Competences and Their Evolution in Different Target Groups of the Labour Market

Generation Z versus the Labour Market: Skills Expectations in a New Era
Ciprian Panzaru and Alina Iotu 283

Motherhood as a Period of Professional Growth
Patrizio Di Nicola and Mariaroberta Cioce 301

Replay-VET: Up-skilling People with Low Qualifications to Improve Their Employability and Cover Future Replacement Positions
Eugenia Atin and Raquel Serrano 315

How to Survive in the Precarious Labour Market: New Skills for the Unemployed and the Employers: A Mutual Approach
Rolf Keil and Bettina Splittgerber 329

2.3. Regions and Localities as Contextual Frameworks for Skills, Competence and Knowledge

A New Regional Labour Market Intervention: The Creation and Delivery of a 'Data Analytics Skills Escalator' in the Exeter SUB-region of SW England
Andrew Dean and Ben Neild 347

Innovative Economy in the Region of St. Petersburg and the Development of Competencies
Nina Oding 365

3. TAXONOMIES AND FURTHER DEMAND FOR DEVELOPMENT

International Systems of Labour Skills Monitoring in the Digital Economy
Vyacheslav Bobkov, Vadim Kvachev and Irina Novikova 385

Monitoring Skill and Competence Needs in Slovenia
Tjaša Žakelj 395

An Open and Data-driven Taxonomy of Skills Extracted from Online Job Adverts
Jyldyz Djumalieva and Cath Sleeman 425

Changing Need for Qualifications and Competencies: Assessment in Mazovian Regional Labour Market Monitoring
Anna Grochowska 455

INFORMATION ON THE AUTHORS 465

Introduction

Christa Larsen and Sigrid Rand

The Starting Point

The world of work is changing fundamentally and quickly as a result of technological transformation, demographic development and globalisation. However, a comparative view on regions and especially localities shows that these changes take on diverse forms in each case: the degree and speed vary significantly between occupations, sectors and firm types in different geographical locations. Accordingly, employees need to acquire skills and competences that enable them to retain their employability during the change processes that affect them. Firms and regions also need to address this issue, as their economic success depends the availability of relevant skills and competences.

Consequently, labour market actors have the task of capturing which skills, competences and know-how the employed and unemployed as well as graduates need in these change processes. The increased transparency serves as a basis for designing appropriate offers and approaches or for changing the existing ones with regard to future developments. Regional and local labour market observatories, which are established in over 550 regions and localities in Europe already, can provide significant support in these processes because of the four characteristics that they display:

- **The application of mixed methods and use of data from different sources (holistic approaches):** statistical data are usually not sufficient for depicting regional and local labour markets and the resources available for generating data are often limited. Therefore, further sources of data and information are used in order to adequately describe the developments in the labour markets. Against this background, elaborate practices have evolved in which statistical data are systematically connected to local expertise and administrative processes of organisations (e.g. Labour Offices), or, increasingly, to Big Data from the Internet (especially online job portals). In these processes, important practical knowledge concerning methods and content has been created. Furthermore, prognostic approaches need to be mentioned here, which contain both quantitative and qualitative elements.

- **Scientific insights concerning overarching developments**: in their work, observatories need to study overarching trends in society and the economy in order to determine how they influence development at the regional or local level. This especially concerns the developments in vocational education and training (VET) and higher education systems or in specific sectors, but also the politics and governance of the labour market. Accordingly, observatories have close connections to scientific research or are located at universities, which enables them to tailor scientific studies to the specific situation in the region or locality.
- **Process-orientation in regional and local monitoring:** the role of regional and local labour market observatories goes beyond generating information. Regional labour market monitoring requires a complex process in which demand-oriented (i.e. suitable and relevant) information is created for regional and local labour market actors. The observatories also support the interpretation of information and ideally ensure that all labour market actors share a common conception of the situation. This is why the observatories do not limit their activities to providing information and instead focus on the knowledge of labour market actors. The observatories provide further support by converting knowledge into action. This concerns the regional strategy processes of evidence-based labour market politics. After the strategies are implemented, the next step is evaluation, which can lead to adjustments. Correspondingly, regional labour market monitoring is an action-oriented cyclic approach. This makes it possible to continuously record changes in the labour market and react to them strategically.
- **A Europe-wide network as a resource for innovation**: the work of many regional and local labour market observatories in Europe is influenced by their limited resources (time, money, personnel) and often geographical isolation. To still enable innovations, the regional observatories have united to build the European Network on Regional Labour Market Monitoring (EN RLMM). In this network, good practices are exchanged, common projects are initiated and the concept of regional labour market monitoring, which addresses the needs for practical implementation of ideas, is systematically developed further. For over ten years, the network has served as a resource for the conceptual and content-based work of many regional and local labour market observatories. Furthermore, it provides them with important support for the application of continuous innovations in their field of work.

These characteristics of regional and local labour market observatories constitute an excellent prerequisite for developing a Europe-wide system for skills

and competence monitoring in regions and localities. Before envisaging what it could look like, changes in firm-based processes and work have to be considered in more detail.

The Changing World of Work in European Regions and Localities

Digitalisation is considered to be the essential driver of changes in the economy. The division of responsibilities is also changing within firms, bringing about new requirements for employees, for example in regard to communication, creativity and flexibility as well as taking initiative and assuming responsibility. Additionally, technical competences for dealing with new digital technologies are required. Firms can benefit from digitalisation only when its employees are equipped with the above-mentioned skills and competences fitting exactly its needs. It has long been clear that even well-qualified professionals do not have the appropriate skills and competences needed for retaining their employability throughout change processes. Furthermore, ever more employers understand that lifelong learning is crucial for employees if the firm is to remain competitive. In this situation, the professional education field, comprising vocational education and training as well as higher education, is confronted with several challenges. Often it is difficult to conceive what types of knowledge and which skills and competences need to be conveyed and practiced. Furthermore, curricula are difficult to change, since VET courses and degree courses last for several years and it is difficult to integrate the dynamic changes arising from digitalisation into them. Especially in the field of professional further education and the training of people who are already employed, aspire to return to their careers or are currently unemployed, there is a need for a suitable, often individualised format as well as opportunities for further education integrated into work processes. Currently, this poses great challenges for the providers of further education in many European regions. Transparency is needed in order to empower actors in the field of education. Regional and local labour market observatories can play a crucial role in creating it.

When talking about skills and competences, the two terms are often used as synonyms. Definitions and demarcations are considered less relevant, especially in the practice of observatories or in sectors and occupations. Instead, the

manifestations of single skills or competences are of greater interest. Moreover, no existing definition has been authoritative enough to establish itself in research as well as among the intermediaries in politics and administration or labour market actors. In Europe, the most frequently used definition is found in the ESCO taxonomy of the European Commission. It differentiates between knowledge, skills and competences. The definition for skills originates from the European Qualification Framework and denotes "the ability to apply knowledge and use know-how to complete tasks and solve problems. Skills can be described as cognitive (involving the use of logical, intuitive and creative thinking) and practical (involving manual dexterity and the use of methods, materials, tools and instruments). […] The term skill refers typically to the use of methods or instruments in a particular setting and in relation to defined tasks. The term competence is broader and refers typically to the ability of a person – facing new situations and unforeseen challenges – to use and apply knowledge and skills in an independent and self-directed way".[1] Accordingly, the term competence "means the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development. Competences are described in terms of responsibility and autonomy".[2] In contrast, knowledge can be clearly demarcated: "Knowledge means the outcome of the assimilation of information through learning. Knowledge is the body of facts, principles, theories and practices that is related to a field of work or study".[3]

OECD definitions are also used in addition to the ESCO taxonomy. In the OECD Skills Strategy – unlike in ESCO – skills and competences are used as synonyms. They are understood as a bundle of knowledge, attributes and capacities that can be learnt. Further concepts of skills and competences are used in many studies: for example, in regard to individuals they often refer to "key competences" as well as work- and organisation-specific competences. Additionally, the use of the term "hard skills" for technical and methodological competences and "soft skills" for social-communicative competences is widespread. Apart from the professional or subject-specific competences, the focus is on those competences that can be used in all professional fields. In the empirical re-

---

[1] https://ec.europa.eu/esco/portal/escopedia/Skill.

[2] https://ec.europa.eu/esco/portal/escopedia/Competence.

[3] https://ec.europa.eu/esco/portal/escopedia/Knowledge.

search literature there is a widespread consensus that these are so-called "transferable" skills or competences. The various concepts of skills and competences are, for example, applied when developing competence profiles for specific occupations or areas of activity.

Compared to the numerous definitions of skills and competences, the description of skills and competence acquisition and development in particular is a "black box". Especially, this concerns their application in the field of education, even though first attempts have been made to explore the learning processes (opportunities for learning as well as willingness and motivation to learn), the framework conditions facilitating learning in organisations (time, support, spaces, financing, voluntariness) as well as the situation in regions or localities (networking of labour market actors, steering of communication, regional and local strategies). However, the insights are rather fragmented and lack descriptions of application processes relevant to practice.

Furthermore, at the moment a process that takes place at earlier stages of monitoring has received heightened attention – the question of how to build up the so-called "signalling". This means that the relevant labour market actors in the field of education, but also in placement services or governance, learn within a narrow time frame which changing skills and competence requirements are currently being developed in individual firms located in a region or locality (cf. Restuccia and Taska in this volume suggesting to orientate towards the Talent Pipeline Management Initiative implemented in the U.S.). This example conveys that in the field of education and in employment services many regional/local actors increasingly orientate towards the skills and competence requirements of the firms. The latter are often seen as customers whose needs are to be met with flexible and appropriate offers. Consequently, some labour market actors, especially those in the field of education, have to re-adjust their self-perception. Eventually, these changes lead to a break-up in the pillarisation of employers and education providers. Education providers especially have been observed to take crucial steps towards leaving the silo mentality behind them. Such processes are not very distinct in countries with highly formalised VET systems (e.g. Germany and Austria), unlike in countries with less complex and locked-in structures (e.g. England, Scotland and Italy). Despite the opening of the field of education in many regions and localities, there is still need for support from third parties to improve the communicative connections between

these two pillars and contribute to the optimisation of skills and competence development. Regional and local labour market observatories assume a special role in this process.

The Role of Regional and Local Labour Market Observatories in Accompanying Skills and Competence Development for the Changing World of Work

Regional and local labour market observatories carrying out labour market monitoring have good prerequisites for building up a regional and local skills monitoring framework. In the first instance, this arises from the experiences that they have with combining quantitative and qualitative methods as well as different sources of information and data when creating transparency for labour market actors. The holistic approaches to depicting the situation in regional and local labour markets have been applied for many years almost out of necessity. Conceptually, most observatories are built on the matching approach from labour market research: they bring together the demand from firms with the regionally and locally available supply in regard to occupations, sectors and qualification levels. Matches or mismatches can be calculated on the basis of structural data. However, this approach does not allow observatories to take into account all changes in the behaviour of firms or employees, graduates and the unemployed, as structural data are essentially observations of the past. Therefore, to position and validate structural data, many observatories resort to local expert knowledge, which enables them to estimate the situation currently as well as in the near future. The perspectives of as many actors as possible are thereby taken into account. In many observatories, very mature practices for extracting expert knowledge have been established that are oriented towards focus group and Delphi methods. By incorporating expert knowledge (bottom-up) it is possible to capture and specify the skills and competence requirements that arise in regional and local firms. As the examples in this anthology demonstrate, experts can make statements related to sectors and occupations, depending on where they are located. At the moment, observatories are systematically extending their expert circles in order to determine and measure skills and competence needs.

Moreover, the examples from European regions presented in this anthology demonstrate that the matching approach is often implemented using instruments known as Occupational Barometers (cf. Maleszyk; Sosnowska for Poland as well as Plaimauer for Austria in this volume). In this approach, experts are of major importance and the information created this way is highly accepted in regional and local evidence-based planning and political decision-making. Other examples show that besides using structural data as a basis for validation by regional and local experts, Big Data from online job-portals is applied as a means of gathering further information increasingly often (Mezzanzanica et al. for Italy and Baruffini for Switzerland in this volume). Especially in the last three to five years, many observatories have tapped into the Big Data from online job-portals and occasionally also social media in order to enhance their understanding of the requirements of firms. Apart from qualification levels and occupations these data deliver information at the level of skills and competences, thus constituting an excellent basis on which local experts can rely on when validating skills and competence requirements. Furthermore, in many cases, further information sources such as observations at job fairs (cf. Oding for Russia in this volume) or simple electronic employer surveys (cf. Sosnowska for Poland and Atin for Spain in this volume) are used to describe skills and competence needs as precisely as possible. Moreover, some observatories capture future skills and competence needs by using foresight techniques or quantitative prognoses, which are validated through qualitative expertise.

Secondly, the close connection of observatories to research institutions helps them implement regional and local skills monitoring. Scientific insights on overarching trends in particular can be used as reference points. In regard to the demand for and development of skills and competences, scientific studies make clear that the exclusive focus on the labour market is too narrow. On the one hand, the emergence of skills and competence requirements and their development needs a well-founded understanding of the processes of organisational change resulting from digitalisation. On the other hand, the essential role of organisational culture has to be recognised, as it frames the development of skills and competences (cf. Fontana et al. and Di Nicola et al. in this volume).

Besides the organisational processes, the skills and competence needs of specific target groups are important, be it Generation Z, which is gradually joining the labour force (cf. Panzaru and Iotu in this volume) or low- and unskilled em-

ployees, who are supposed to receive additional workplace training. For these groups especially, competences based on attitudes and motivation are partially more important than subject-specific knowledge (cf. Atin and Serrano in this volume). An important target group in the firms are women, especially in regard to their further development and careers. Here, fundamental research insights urge actors to take a broader view on skills and competences (cf. Di Nicola and Cioce in this volume).

The emergence of specific skills requirements within firms is manifested in the labour market as the demand for skills. The other side of the coin is related to the educational sphere. Even there, scientific insights are necessary in order to comprehend why offers for skills development are designed in a certain way. This, for example, is related to the unemployed whose workplace integration is to be supported through skills development (cf. Keil and Splittgerber in this volume). Additionally, important scientific research on how to break up the pillarisation between firms and education providers is carried out in observatories, and these insights enrich our understanding of labour market developments.

Thirdly, the strong process-orientation of regional and local labour market observatories means that they do not perceive themselves just as producers of information and data, but as framers for the development of regional strategies with the ultimate goal of matching supply and demand. Especially in the case of regional and local skills monitoring, the established networks and communication structures of observatories are very helpful for deliberations on skills requirements, skills development and designing suitable approaches, which are often taking place outside of formal structures. Regarding these functional trust-based networks, the region or locality simultaneously sets the framework and constitutes the source for the identity of the actors. Consequently, not only labour market actors, but also other actor groups from civil society as well as representatives of the regional and local politics are often involved. This way, as in the case of the Skills Escalator in Exeter (cf. Dean and Neild in this volume), all training offers can be directed towards the acquisition of specific skills and competences by involving the regional economy and politics. The concept of the Resource Center, which is employed in St. Petersburg, Russia, is slightly different, since it works as a clearing house between supply and demand and offers a broad information base that facilitates the optimal

matching of supply and demand of skills and competences (cf. Oding in this volume).

Fourthly, as the observatories' resources are limited and they are geographically isolated in their localities, they receive considerable impulses for innovation from the EN RLMM. For over ten years, most of the regional and local labour market observatories in Europe have been connected to each other through the network. Correspondingly, a well-established practice of exchange between the observatories and third parties from international organisations, research, administration and politics has been developed. It involves the definition of topics, which need to be framed and developed further through the Annual Meetings, Anthology or network projects. The Anthology serves as a stocktaking on the topic of regional and local skills monitoring and prepares the basis for targeted and focused exchange at the Annual Meeting. These two channels for exchange enable the representatives of observatories to further their insights into concepts and approaches and serve as a platform for presenting the experiences that they have gathered with their implementation. Moreover, many European observatories have implemented innovations in their line of work that emerged from the exchange within the Network and the pooling of available resources. Therefore, a specific focus of the Annual Meeting of 2018 will be on the role of taxonomies in regional and local skills monitoring. In particular, the advantages of top-down and bottom-up approaches regarding the applications in observatories will be explored, since taxonomies need to account for the quickly changing environment shaping the development of skills and competences (cf. Bobkov et al., Djumalieva et al. and Žakelj in this volume). The contributions to the anthology explore the different ways that regional and local labour market observatories can implement regional and local skills monitoring.

The Structure of the Anthology

The 22 articles in the Anthology enable insights into the topic of regional and local skills monitoring at three different levels. Chapter 1 assembles the contributions concerned with change processes in firms and the associated skills and competence requirements, while Chapter 2 explores the different avenues to regional and local skills and competence monitoring as it is currently imple-

mented. Chapter 3 focuses on the fundamental question of the use, necessary adjustments and further development of taxonomies, which are of great importance as dominant sorting structures in regional and local skills monitoring. These pivotal thematic lines need to be taken into account when building up sustainable approaches to regional and local skills monitoring.

Chapter 1 presents research results that can serve as the orientation point for building skills monitoring. Renato Fontana, Carmine Piscopo und Erika Nemmo focus on the so-called digital professions and the relevant cross-cutting competences and soft skills. They impressively elucidate the relevance of fundamental skills and competences in this context, which can also be of importance in other economic sectors and firm types. Patrizio di Nicola, Alessia Cremonini, Michela Cossu and Stefano Scravaglieri explore the central role of management in change processes and stress the importance of taking the role of office leadership during these processes into account. The contribution by Carsten Kampe, Daniel Porep and Anja Walter extends the focus to further sectors and actors in the firm and considers which soft skills and competences are needed in firms. Further perspectives are introduced by Eugenia Atin, Raquel Serrano und Ibon Zugasti from the Basque Country in Spain, who reflect upon future skills developments in relation to the programme ”50 Strategies for 2050“.

Chapter 2 showcases three different approaches to the implementation of skills monitoring in regions and localities. To start with, in Sub-chapter 2.1. the focus lies on economic sectors, occupations and firm types. Three contributions describe the implementation of Occupational Barometers. Piotr Maleszyk as well as Marta Marzena Sosnowska show how different data sources can be connected in two Polish regions, with the aim of capturing information on skills and competences that is as detailed as possible. In both regions, local experts play a very important role in validating data from other sources. For the quality of data it seems to be essential to include as many different expert perspectives as possible. Claudia Plaimauer demonstrates for Austria that the use of expert knowledge goes beyond the validation of structural data and can take on an independent status.

The following contributions apply the matching approach from labour market research to different data. Pierre-André Gericke and Alfons Schmid draw attention to the fact that many newly unemployed people were formally overqualified in their most recent job. They show how competence development in

the workplace affects one's further professional career and analyse the differences between East and West Germany as well as various occupations. Using Big Data from online job portals, Dan Restuccia and Bledi Taska demonstrate which occupations have developed skills gaps in the U.S. In the cluster of articles following sector-specific approaches, Moreno Baruffini demonstrates how a regional labour market observatory can capture skills requirements in a demand-oriented manner for the commercial sector in a Swiss Canton. Aleksandra Webb and Ronald McQuaid turn to the Early Learning and Care sector in Scotland and show how skills development can also be used for improving the attractiveness of a sector. The final contribution in this sub-chapter is by Mario Mezzanzanica, Fabio Mercorio and Emilio Colombo, who show in a very detailed manner how data from online job vacancies can be used to measure the requirements for digital and soft skills within professions and evaluate the probability of job automation in the next step.

Sub-chapter 2.2 covers the supply-side of skills: two contributions focus on socio-demographic definitions of target groups in the labour market while two others concentrate on qualification-based target groups. In the case of the former, Generation Z is in the centre of attention. Ciprian Panzaru and Alina Iotu report on the self-perceptions of Generation Z in regard to their skills and juxtapose them with the expectations and perceptions of employers. Furthermore, Patrizio Di Nicola und Mariaroberta Cioce address women's skills potential for career development as a result of motherhood. Regarding the qualification-based target groups, Eugenia Atin und Raquel Serrano explore the case of low- and unskilled workers and how their employability can be improved through targeted skills and competence development. Rolf Keil and Bettina Splittgerber address the target group of long-term unemployed and consider how to facilitate their re-entry into the labour market. The authors demonstrate how the skills development of this target group can be addressed at the juncture of employers, occupational safety administrations and placement services.

Sub-chapter 2.3 focuses on regional and local approaches. Andrew Dean and Ben Neild demonstrate how in the Exeter region, the Skills Escalator helps to systematically connect different offers in a specific skills field, identify gaps in the skills supply and develop a skills offer precisely fitting the needs of the region, making it attractive not only for employees, but also for employers. Simi-

larly, Nina Oding explores the interplay between the innovative economy and skills development in St. Petersburg, Russia, showing impressively how very different data sources can be brought together with the aim of capturing skills needs. This particularly exemplifies the potential of observatories for skills development.

Chapter 3 is dedicated to taxonomies, which are used to frame regional and local skills monitoring. In their contribution, Vyacheslav Bobkov, Vadim Kvachev and Irina Novikova consider the taxonomies for skills monitoring that are used in different parts of the world. They advocate for the development of an overarching international system, which seems plausible in regard to global labour markets. Tjaša Žakelj argues that the ESCO taxonomy is well-suited for the countries of the European Union and demonstrates which challenges have arisen for Slovenia in the process of establishing a skills monitoring system based on the ESCO taxonomy. Jyldyz Djumalieva and Cath Sleeman point out that the pre-defined, i.e. top-down taxonomies, are too static to take into consideration newly emerging skills and competence needs and therefore cannot do justice to the dynamic developments. They suggest assuming a bottom-up approach that is developed using Big Data from online job portals and involves developing taxonomies on the basis of clustering. Both approaches provide a good basis for further discussion about the possibility of combining pre-defined taxonomies with flexible elements. Finally, Anna Grochowska suggests a possible route outside these taxonomies: the concepts used to frame regional skills monitoring can vary between regions or localities based on their economic structures and development.

Next Steps and Perspectives

The contributions in this anthology not only offer important proposals for those interested in regional and local skills monitoring, but also form the basis for the Annual Meeting in 2018. There, the Network members will discuss the state of the art in skills monitoring and develop further approaches. The Network Meeting gives a good overview of the existing examples of good practices, explores how all European observatories can be further engaged in this discourse and considers which role different European and international organisations could play.

We would like to thank all the authors for their valuable contributions demonstrating that combining various perspectives – both in this anthology and at the Annual Meeting – is necessary when addressing the complex issue of skills monitoring. Therefore, we appreciate the opportunities to approach innovative topics in the EN RLMM and are looking forward to further steps and topics.

Last, but not least, we would like to thank Amelia Wallace for her careful and diligent proofreading of this year's contributions.

1. RELEVANCE OF SKILLS AND COMPETENCES IN A CHANGING WORLD OF WORK

Cross-cutting Competences and Soft Skills in Digital Professions: Knowledge-sharing and Social Stratification in the World of Tomorrow

Renato Fontana, Carmine Piscopo and Erika Nemmo

Introduction

The advent of what has been called the "post-industrial" and "post-modern" society by some (Touraine 1970, Bell 1973, Offe 1985, Lash and Urry 1994) and "network" (Castells 1996) or "knowledge society" (Rullani 1994) by others has deeply changed our way of perceiving, living and relating. At the basis of the various definitions of contemporary society there is a common denominator enabling a transformation that we are still unable to grasp: the advent of Information & Communication Technology (ICT). ICT has become part of our daily life, permeating places and "non-places" of our existence, radically and cross-cuttingly changing the working contents and approaches of almost all professions and, at the same time, creating jobs that did not exist up to a few years ago. It is natural, therefore, to expect from a store man or a waiter the digital skills required to use an app for localisation or registering orders, just as we are not surprised by a friend of ours who works in the field of computer science performing a job we find impossible to understand. If we are not familiar with the job title, we are not even able to form an idea about what they do in their profession or what it is needed for.

The objective of the following considerations is twofold. First of all, we wish to reflect on how skills change and grow; secondly, we aim at understanding the consequences of the on-going changes in terms of social stratification inside the composite aggregate that we call the labour market.

Let's start with the first item. What is the direction taken by skills today? What are the tools we need to dispose of in order to face the *zeitgeist* of knowledge society? In sum, is it easier or more difficult to produce, work and express oneself today than when the Taylor-Ford model prevailed in the industrialised Western world? Do not expect exhaustive answers; we do not have any.

We know, however, that the world of skills is more articulated in comparison to the times mentioned above. In the following pages, we will in particular talk about the on-going transformations in the world of digital economy, reflecting on:

- Technical-professional skills;
- Cross-cutting a-contextual skills;
- Socio-relational skills.

While the first item reminds us of scenarios well-known in literature, the second one makes us think that ICT professions are going through a socio-professional stratification similar to the one experienced by traditional professions and trades during the Second Industrial Revolution in the second half of the 19th century. In this context, the suspicion emerges that the representatives of some medium- to low-profile professions are excluded from acquiring cross-cutting skills that would enable them to work better and manage important discretionary spaces. Unfortunately, training is expensive. This would make us imagine configurations similar to those of enterprise power structures as we have known them so far: a sort of concentration without centralisation (Sennett 2000: 55).

As we shall see, technical-professional skills, i.e. those connected to a specific and delimited working task, are less important in the ambit of the activities carried out in an organised context. On the contrary, acontextual, cross-cutting skills prevail in the various ways of working. In other words, on the Web, tasks are gradually being transferred to machines, while the skills that count are the ones that go beyond the "technicalities" and look at the need to sell to a potential user/client the product of one's intelligence such as goods, services, knowledge, innovation, culture, ideology, etc. In the ambit of the so-called cross-cutting skills, the socio-relational ones are the most important as they get the consumer hooked, make them think that the product is more than necessary to improve their own and/or family's quality of life or social status and get

them to buy it. The socio-relational skills make them feel like the centre of the universe – as somebody who is unique and special.

The purchase is not simply an economic transaction based on mutual gain between the seller and the buyer, i.e. between the subjects who represent the offer and the demand on the market, respectively. It is much more than that and goes beyond it. The purchase of a product often means moving into a new world "full of opportunities" but also becoming part of a "community of intents and values", as happened, for example, to the people who centuries ago knew the meaning of "good neighbourly" relationships, where they shared not only time together, but also customs and traditions day after day.

The enterprises of the sector considered in this paper therefore do not limit themselves to searching for professionals with high technical skills, but instead look for skills consonant with the on-going digitalisation process, where standardised and Taylor-like processes are replaced by de-standardised ones displaying a high rate of uncertainty. The greatest skill today is knowing the starting point of a project without knowing the precise arrival point. The imagination of a path and its re-modulation in reality is certainly an essential phase for organisational systems and their protagonists, especially in the meanderings of the sharing economy. This is done step-by-step to avoid being overcome by anxiety and to try to keep the process under control instead.

The spread of ICT certainly requires a continuous updating of technical-professional skills, but in our view, what counts more is the recognition of the cross-cutting technical-professional skills in sociological terms. As we shall see, work becomes easier for those who willingly accept communication and being part of a team; in contrast, it becomes more difficult for those who do not know how, cannot or do not want to relate to the other actors of the production process, both in- and outside the labour market circuits. We pass from the valorisation of strictly contextual skills to the introduction of skills separated from specific professional codes.

The skills connected to digital platforms seem to have a "soft" connotation, since their main applications are firstly to allow the protagonists of the organisational arena to relate to the outside world and, secondly, to adapt to it. Therefore, enterprises do not simply look for professionals with a sound technical/engineering background; sometimes they search for professionals with strong communicative skills directly. Hence, the hypothesis we aim to follow is

that technical competences are melting in front of the extraordinary opportunities offered by the Web and by the professional profiles connected to social logic, whether real or virtual.

Digital Technology as a Socio-relational Practice

To evaluate and understand in detail digital skills, which are increasingly demanded by the current labour market, we need to step back 20 years to when the debate over digitalisation (it would be more correct to talk about the "Internet") and its impact on the socio-economic sphere was centred on the concept of the "digital divide".

Indeed, at the beginning of the new millennium, the digital divide was considered a critical issue and was at the centre of public and political debate: it was such an important factor that it was able to undermine territorial economic development. The theme was discussed during the G8 held in Genoa in 2000 and an international co-operation programme was introduced[4]:

> "Digital Opportunities for All: Meeting the Challenge, contained a vision of global development based on the power of information technology to promote sustainable growth, advance social justice and strengthen democratic governance" (DOT Force 2002).

Digital development has always been considered the perfect tool to face the criticalities of the modern age, where the gap between rich and poor, personal freedom and oppression, opportunities and injustice flatten our society into two extreme positions between those who have and those who have not. From the scientific point of view, the theme was not yet widespread or developed and the studies proposed various perspectives centred more on the relationship between the man and machine and on the opportunities for being globally connected. For this reason, digital technology had to be managed in a different

[4] "In July 2001, G8 leaders endorsed the Genoa Plan of Action, a product of the work of the Digital Opportunities Task Force. The DOT Force, which was formed following the 2000 G8 Summit in Okinawa, represented both a unique model of international co-operation and a new way of responding to the challenges of development. It brought together committed leaders from government, industry and civil society, drawn from G8 member countries and from the developing world, to conceive a forward-looking action plan designed to expand the use of digital technology and to universalize its benefits" (Digital Opportunity Task Force 2002: 2).

way. Specifically, the Internet had to be a universal tool, a project capable of removing gaps and of favouring inclusion.

However, in the past, the public debate on the Internet was forced to discuss the theme of infrastructural accessibility, using exactly the categories it was trying to fight against: those who have and those who have not. The spreading of digital technology was mainly intended to increase the possibility of access to a personal computer and an internet connection with or without a modem. A few years later, thanks to rapid technological development, the concept of the digital divide started to find other interpretations. Scholars analysed the issue, trying to identify the possible factors that were compromising the spread of digital opportunities, including socio-economic variables. In the mid-2000s, the digital divide was already considered to be more than a problem of access to information. No-one could have imagined at the end of 2000 that new digital devices would have once again changed the social landscape.

Among the categories of products and services that had the economic and cultural strength (and perhaps the luck) to overcome concerns about the access to technology, we can consider mobile devices, social networking sites and Web 2.0 services. Thanks to the extremely wide global diffusion and the high profitability of these three tools, we rapidly overcame the infrastructural limits (connections, lines, and devices), generating a quick multiplication in the opportunities linked to productivity, entertainment and interpersonal communication. We could therefore think of a drastic reduction in or the disappearance of the digital divide, but that would be an incorrect deduction. On the one hand, the problem of Internet access is certainly much smaller today than it was in the past. On the other hand, we cannot consider the digital divide an out-dated concept. Today, the digital divide is no longer linked simply to access but also to the skills and opportunities that technology can generate. The issue is no longer geographic (between rich and poor countries) or technical (related to the availability of lines and connections), but cultural and educational.

This important change in the interpretative paradigm requires a considerable intellectual effort to understand a new world that is always connected and in which people work, interact and live using digital contents and tools.

Hence, the analysis perspective is expressed in terms of Digital Literacy (Gilster 1997), that is, the ability of the individual to use digital resources in a context totally immersed in technology.

> "A person who is digitally literate goes beyond just being a digital information consumer to seeing themselves as someone engaged in the activity of digital information creation. In an age of unprecedented opportunities for digital commerce interactions, social and political engagement, and lifelong and life wide learning and collaboration, the digitally literate citizen must be an active and ever-vigilant participant, constantly evaluating those opportunities for their benefits and their downsides" (Meyers et al. 2013: 362).

Information, for example, is just one of the possible activities. In reality, all of the tools that technology makes available are used intensively in the labour market and in most areas of private and family life. However, as Sonia Livingstone (2011) underlines, "they are not yet so embedded in the social practices of everyday life as to be taken for granted". Indeed, on the one hand, new digital citizenship includes new social, communicative and cultural opportunities, but on the other hand, it introduces new rights and duties that up to few years ago were either unknown or not as important.

The new digital era, thanks to the pervasive action of the few relevant enterprises that manage the universe of web services, has to face a knowledge gap in the usage of new digital practices in which the differences between rich and poor, levels of education and work opportunities do not affect the management of the risks associated with these new digital tools. In other words, the technical diffusion caused by leisure and economic opportunities was quicker than the diffusion of the socio-educational knowledge related to digital media usage.

This brief examination of ICT digital technologies are useful for framing the paper's subject from a socio-centric perspective in which ICT cannot and should not be confined to technically-specialised knowledge. It is fundamental to start considering ICT professions not only from the point of view of productivity, but also in terms of the relationship with and responsibility towards consumers. Indeed, ICT professions today are rapidly developing and the debate over the use of digital technologies engages entrepreneurs, computer scientists, consumers, and the political world. In other words, nobody can be excluded from the decision on how to use technology. ICT is a reality that connects places, businesses and people without making distinctions. We can therefore deduct the cross-cutting nature of a theme that is independent from the will of the single individual. To this day, it is hard to identify jobs with no connection to the digital world. ICT skills, or at least a basic consumer knowledge of them, become essential for working in even small entrepreneurial realities (e.g. in a

small suburban pizzeria). The contents we use daily and most of the relationships we cultivate use devices and software connected to the Web and its digital services. Based on this fact, digital skills are transformed into a basic requisite not only to be able to work, but also to socialise. Once again, digital technology proves to be not just a simple programme code, but also a series of socio-relational practices in which both the users and the quality of the connections they establish are a real added value in economic terms.

Additionally, the new ICT production logic place the user and his/her needs at the centre of their development. The product itself is considered more and more secondary and flexible. It is no coincidence if businesses, independent of their sector and size, have finally understood the importance of branding and communication. It is a very slow process of cultural and entrepreneurial growth that puts businesses and, in particular, their employees under strain because of the extremely fast technological development.

A recent study by Capgemini Digital Transformation Institute (2017) observes three particularly interesting phenomena:

- **The digital talent gap is widening**: every second surveyed organisation acknowledged that the digital gap is widening. Moreover, over half (54%) of organisations agreed that the digital talent gap is hampering their transformation programmes and that their organisation has lost competitive advantage due to a shortage of digital talent;
- **Fears of skills redundancy could drive attrition**: overall, 29% of employees believed that their skill set was redundant or would be in the next one to two years, while more than a third (38%) believed their skill set would be redundant in the next four to five years.
- **The talent gap in soft digital skills is more pronounced than in hard digital skills**: the report identified that people with experience in soft digital skills, such as customer-centricity and a passion for learning were most in-demand as these skills were considered increasingly important characteristics of a well-rounded digital professional.

On the one hand, we can observe the rapid obsolescence of specialised skills caused in part by the continuous innovation of products and services; on the other hand, we can notice the ever-increasing relevance of socio-relational aspects known as soft digital skills.

Table 1: Definition of soft digital skills

Change management	Helping an organisation transform itself by focusing on organisational effectiveness, improvement and development.
Collaboration	Processes that help multiple people or groups interact and share information to achieve common goals.
Comfort with ambiguity	Feeling comfortable and confident acting in an environment of uncertainty or constant change and having a higher risk tolerance.
Customer-centricity	Committing to a top-tier level of service for the customer and considering the customer experience above all.
Entrepreneurial mind-set	A state of mind that orientates human conduct towards entrepreneurial activities and outcomes; being drawn to opportunities, innovation, and new value creation and able to take calculated risks and accept the realities of change and uncertainty.
Data-driven decision-making	Using data and insights to develop a theory, testing the theory in practice to determine its validity and making business decisions.
Organisational dexterity	The flexibility to perform varied roles, actions, or activities with skill and grace and the ability to transition between roles, actions and activities quickly and effectively.
Passion for learning	A deeply ingrained enthusiasm for seeking out and acquiring new information and knowledge, often across a variety of fields and topics.

Source: Capgemini Digital Transformation Institute (2017).

In this direction, we find the definition of the concept of "soft digital skills" provided by the AGID (2017) particularly interesting, as it highlights the importance of the topic for the future of enterprises, pointing out that digitalisation will require a more articulated mix of competences. In this mix, technological skills are complementary to soft skills, such as critical thought, creativity, emotive intelligence, leadership and change management qualities. Furthermore, in the report by the Capgemini Digital Transformation Institute (2017), we find points about the critical aspects of ICT skills within businesses. As a consequence of the poor availability of qualified staff, enterprises have adopted innovative recruitment, training and work strategies in order to defend their competitiveness in the market.

Digital Soft Skills in ICT Professions

In 2016, a small normative revolution had the merit of highlighting the quick change taking place in the ICT professional environment. The e-CF[5] became a European standard and was published officially as the European Norm EN 16234-1. For instance, the number of ICT professions listed in the e-CF doubled in comparison to the number listed in the previous 2010 CNIPA manual used in Italy. We moved from 21 professional profiles in 2010, all characterised by a tight connection to computer science jobs (systems engineer, web security expert, analyst, programmer, etc.), to about 40 different professions in 2016.

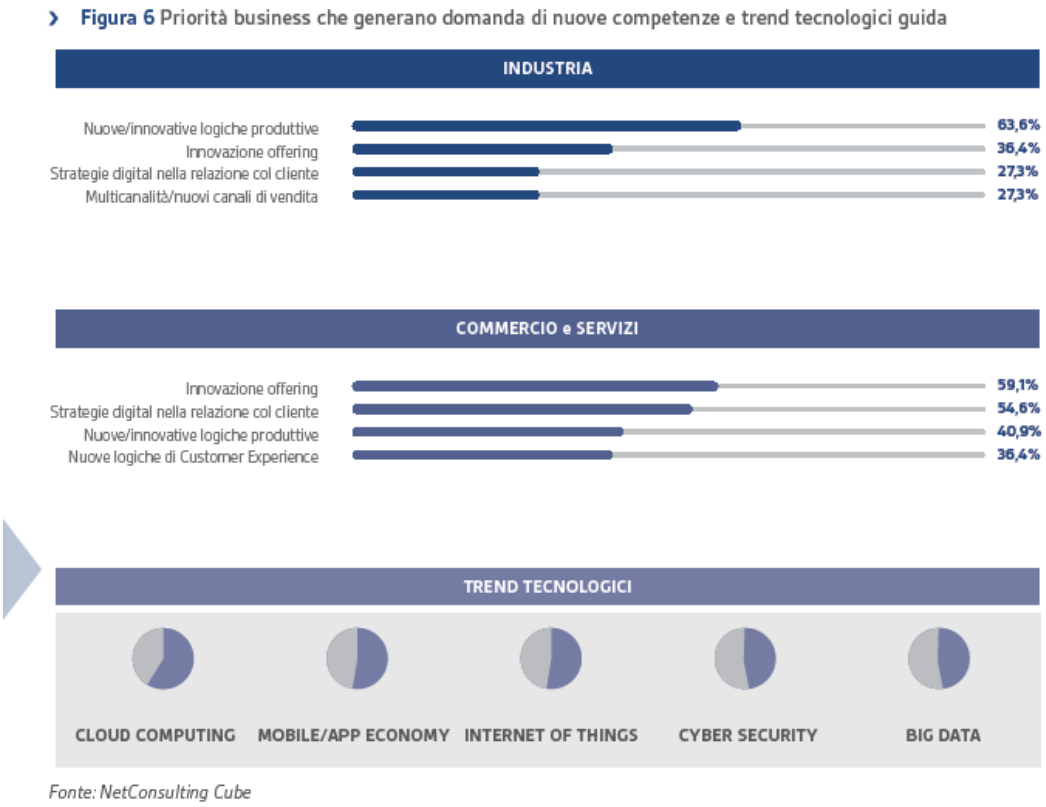
In only a few years, the ICT market has evolved, defining a number of professions, but being especially useful for determining the professional needs requested by enterprises. With a market undergoing such rapid change, the competitiveness of the labour market has become intense and sophisticated. The AgID Report 2017 emphasises this aspect: Italian enterprises suffer in terms of management, creativity and communication skills. The sectors perceived as the most critical are the innovation of the production logic in the ICT industrial sector (63.6%), supply (59.1%) and the digital management of customer care in the ICT sector dedicated to trade and services[6] (54.6%) (AgID 2017: 34).

With reference to the ICT profiles, the AgID report (AgID 2017: 32) instead notices a particularly critical situation for project managers and security analysts and advisors.

[5] European e-Competence Framework (e-CF) version 3.0.

[6] For the research methodology see AgID (2017).

Figure 1: Business priorities creating a demand of new skills and technological trends



Source: AgID (2017).

From the data of the AgID report it is clear that the professional figures connected to the creation of relationships B2B or B2C are almost more important than the product itself. In particular, in terms of security, a significant part of the real offer is dedicated to training procedures and practices that guarantee the offer itself. In other words, the creation of engagement and education processes are milestones, especially in high profile ICT offers.

As indicated in the report by the Capgemini Digital Transformation Institute (2017), AgID (2017) also confirms that recruitment strategies are strongly geared towards the search for new professional figures with complementary skills and soft skills. Not incidentally, nearly all enterprises (AgID 2017: 33) report making use of synergies with universities in the search for or training of flexible professional profiles capable of easily adapting themselves to market requirements.

Besides the statistics, what we are observing in this period of technological development is the need enterprises have to provide reliable services and prod-

ucts. To be made, sold and used, these products require complex professional profiles that never existed before. Technical and ICT skills are only one part of the requisites because socio-relational skills have an increasingly essential role. The competitiveness of the offer is continuously increasing and the diversification of supply must be accompanied by a process of demand education. In other words, the consumers, and the enterprises in the B2B market need to be educated on the usage of the new services, creating requirements and new productive opportunities. Concretely, what is needed is communication, training, assistance and more networking in general. It is in this framework that the figure of the "digital maker" is born, not only as a result of the work flexibility that characterises our age, but also as a professional figure inserted into the process of ICT production growth in terms of creativity and quality. These digital makers are practically the bridge between the abstraction of digital imagination and the new consumer of the future.

ICT, Skills and the Labour Market

When studying the social and cultural phenomena that characterise post-modern society, we cannot but accept their growing level of complexity and the subsequent impossibility of fully understanding interconnections and scenarios of development. With this premise, which is necessary in order not to confuse certain thematic choices with a reductionist attitude, we think it is possible to identify two "reflection paths", or macro-transformations in the relationship between ICT, work and skills:

- The transformation of computer science and digital skills from technically-specialised skills to skills required for the majority of professions (especially in the service sector but also in the industrial sector). Being able to use ITC tools is no longer the prerogative of certain professions, but at a basic level it has become a sort of "cognitive technology" (Calvani 1999) that redefines socio-relational skills exactly because they are used with tools that have changed their ontology (Ferraris 2011);
- The birth of new ITC professions characterised by a considerable "volatility" of technically-specialised skills and by a variety of cross-cutting skills typical of "knowledge professions".

Setting aside the first aspect, which is important to mention for its socio-cultural effects yet to be fully outlined, this short paper focuses on the second

aspect with the aim of exploring the relationship between technical and soft skills with regards to the self-perception of ICT professionals and the organisational context of the enterprises in this sector. ICT workers are, in our opinion, a particularly interesting target of analysis for at least two reasons:

- Their profession has an easily recognisable, technically-specialised nature, but at the same time, it is "new" in the labour market and, in our eyes, does not have a strong connotation in terms of cross-cutting and socio-relational skills;
- They are professionals who we imagine can fully incarnate the paradoxes of the knowledge society since they are both "producers" and, at the same time, "products" of the New Economy. Using the words of Arendt (1958), ICT workers are *homines fabri*: they create the world of mankind.

The considerations that follow are based on research carried out by five Italian universities. It lasted three years and was financed by the Italian Ministry of Education, University and Research at the PRIN (Projects of Relevant National Interest). In this regard, the unit based in Rome, directed by Renato Fontana, placed its attention on the new makers:

> "The main question […] on which our reflection is based is if there is and to what extent a connection between pre and post-industrial society, or – more modestly – what are the similarities and the differences between the conventional craftsman and the digital maker, to provide a profile significant from the sociological point of view to the many workers who work in close contact with the new technologies and in particular with the ICTs (*Information & Communication Technologies*)" (Fontana 2013: 78).

The research made it possible to interview 40 ICT professionals (mainly computer scientists and graphic designers), of whom 95% worked in organised contexts (especially small and medium-sized enterprises). The interviews – each one hour long and based on a biographical questionnaire – developed a *corpus* of around 400 pages. Here it is possible to make interesting conclusions based on the theme of cross-cutting skills necessary for professions characterised by "cognitive dexterity"[7].

[7] "We talk about 'cognitive dexterity' rather than simply of 'cognitive activity' because the interviewees clearly recognise the difference between a purely mental activity and one which implies something tangible, even if only through the screen of a computer, with actions that have practical consequences: 'I don't have hammer and chisel, but I have a mouse and my software tools, so I create something' (computer scientist)" (Fontana 2013: 131).

Analogic Skills, Digital Professions and Hybrid Organisations

They are sitting at a desk. Their toolbox is a computer. Their work consists of creating virtual objects. They deal with the speed of innovation, the time and space of globalisation (or the absence thereof) and the culture of personalised consumption. They find meaning in their job in the possibility of being creative, the capability of making something useful for others and the satisfaction of having built a good quality product. They are digital makers, who have a lot in terms of values and skills of the traditional craftsman, but are also emblematic of the post-industrial era because of their privileged relationship with technology. What changes are the tools and procedures, but not the essence of the job.

Here is what one computer scientist of a medium size says: "In my opinion, a craftsman is somebody who works using tools, as we do, if we have to make a comparison, on one side there is a hammer, an electric saw […] on the other side, there is a mouse, a computer, there are programmes". In response to the question: "What capabilities should a person have to do your job well?", the answers surprisingly do not concern the technical-professional skills, i.e. knowledge of any particular programming language but instead mention skills that are fully defined by the ISFOL (Di Francesco 1998) as cross-cutting skills:

- The ability to diagnose (diagnose one's skills and attitudes; diagnose problems);
- The ability to relate (communicate, work in team and negotiate);
- The ability to face problems, strengthen self-learning processes and find solutions.

Moving from the premise that a skill is distinctive of a profession only when it is a factor that allows employees to perform the profession itself (and not just to facilitate it), an analytical reading of the interviews allowed us to identify three core skills in the ICT profiles:

- Possessing passion and quality-oriented attitudes;
- The ability to learn how to learn from the Internet;
- The ability to communicate and work in team.

In the following pages we will try to summarise, using the words of the interviewees, the distinctive self-perceptive elements of these skills by connecting the necessary competences to the organisational contexts that should favour

their development. The professional dimension of these emerging figures clashes, in fact, with the reality that enterprises seem only partly capable of seeing the need to grow professionally for the digital craftspeople to create opportunities for organisational development. Equally important is the fact that it also clashes with an educational system still resistant to the concept of "skill didactics". Hence, interesting paradoxes are created between the rhetoric of innovation and actual practices, between the needs of the single individual and the production processes, and between the characteristics of labour demand and the real needs to be satisfied by who is hired. To create a picture, even if approximate, of this market sector, we will see how the vision of "time" and market forces work as a counter-balance to the skills mentioned above.

According to our research, the first distinctive soft skill of ICT professions is "being quality-oriented". It is a sort of cornerstone on which the points of contact between traditional craftsmen and digital makers are placed. "Total Quality Management" is certainly a concept unknown to traditional craftsmen. The attention to quality that characterises both the traditional craftsman and the digital maker is not connected to the efficaciousness with which they answer the customers' requests or the efficiency of the production process, but is linked to factors related to one's deepest professional identity.

A craftsman is intrinsically interested in the quality of the product because it is not simply an object (whether material or immaterial), it is the result of his personality and creativity; it is a sort of extension of his identity. In other words, the craftsman "cares that the work itself is well done. […] his work is not simply a way to obtain another order. […] The craftsman is the representative figure of a specific human condition: that of being personally engaged in what one does" (Sennett 2008: 28). This concept appears in many of the interviewees' declarations:

> "I basically see myself as an artist, I see myself as a painter, I have my software tools and I shape things. Indeed, my work has a common style, all of it has something in common that is mine. Even if I am making a tutorial video to explain how to use a cream for haemorrhoids – It happened to me! - […] in any case I try to add something of mine […] I can express different feelings in my work and I realise this when I look at it: when I'm sad I use a much duller palette of colours; when I'm happy everything is intense, oversaturated. I follow my instinct, my sensations. I am aware that work done in another moment would be completely different. It is like freezing a part of me in that moment. I think that all craftsmen do the same."

Being quality-oriented is not, therefore, a cold organisational asset but the "visible face" of the passion for one's work. Craftsmanship in a digital profession can be found exactly in this attention to detail as an expression of the value of aesthetics in one's work.

Modern enterprises consider quality to be an aspect imposed by competitiveness and the customer, who, unlike in the past, is capable of comparing goods and expressing their specific needs. This different connotation of being quality-oriented is a source of intrinsic tension: if quality is an identity-related element, it cannot be sacrificed or compromised; if instead it is only one of the elements of a product, it has to be commeasured and negotiated according to the customer's needs and the time one has at their disposal. In the words of an interviewee:

> "The difference between us and real carpenters is that if you go to a carpenter and ask for a piece of furniture, he will tell you that he will give it to you in a month's time, and he has to give you it in a month. He won't give it to you before. If you come and ask us for a product and we tell you that we will give it to you in a month and you tell us 'No, you must give it to me in 15 days', we answer 'Yes', compressing a series of activities that cannot be done and that you have to take away because they seem superfluous in comparison to the production".

Another interviewee reports:

> "If you have few days to present work, some things have to be optimised as well as possible because you don't have time, and that is something I miss because you are forced to work without stopping most of the time. Sometimes you say 'this is a nice project, I would like to dedicate more time to the details and do further research', but you really haven't got the time to do it and you have to rush".

Instead of a quality that could be reached through what Mintzberg (1996) calls "input standardisation", or the homogeneity of skills for those who add value to the production process, enterprises are more oriented towards "process or output standardisation", the creation of uniformity in work procedures and/or the final product. Besides the fact that ICT professionals are not able to create the quality of work they are capable of creating as craftsmen, one interviewee, a project manager, says that in his experience at a big ICT enterprise: "[t]he main goal is to make sure that people can be as interchangeable as possible so that a person who is missing in a certain position can be easily replaced. Thus, discretion is kept to a minimum in each activity". "Competitiveness", as Sennett (2008: 43) underlines, "has taken away initiative from the workers and has de-

moralized them, while the ethic principle of a job well done for the pleasure of it that is typical of craftsmanship is not rewarded or even noticed". What can then happen is that a skill that could be of value for the market even becomes an obstacle because being quality-oriented in terms of craftsmanship transforms itself into lack of motivation for the frustration of the working process.

"Learning how to learn" is one of the eight key skills identified by the European Union that all citizens should have for full social and work integration (Recommendation 2006/962/CE). It is therefore a strongly cross-cutting skill that should be possessed by all citizens at a basic level. The ability to learn is defined as "the ability to persevere with learning, to concentrate for extended periods and to reflect critically on the purposes and aims of learning" (European Parliament and the Council of the European Union 2006). In addition, "[t]his competence includes awareness of one's learning process and needs, identifying available opportunities, and the ability to overcome obstacles in order to learn successfully" (European Parliament and the Council of the European Union 2006).

In the ambit of ICT professions, however, this skill, in addition to being cross-cutting, becomes an enabler as much and even more than specialised technical knowledge; having this skill is connected to the closeness of these professions to the "engine" of knowledge society: technological development. The tools used by digital makers are continuously developing a speed unprecedented in labour history. Our interviewees create new software for other makers and consumers of every kind, and to create them, they use the most advanced programmes and languages available on the market:

> "The programmer has to continuously update him/herself because the programming languages change and the way of programming changes […]. You have to keep up with the times. New things are continuously created and you have to use and assimilate them".

This process of continuous regeneration of technical skills makes the competence "learning how to learn" a vital skill, especially given the speed with which specialised skills become obsolete because of the "autocatalytic character" of technological innovation (Longo 2003: 53), which, especially in the world of communication and information, leads to an accelerated hybridisation process, creating maladjustment and tension. "In short", a programmer summarises, ''in my job sector, ten years are nothing, […] but technologically incredible things will happen". The ability to learn how to learn in a purposeful and aware way is

a "must" for digital makers, most likely because of the "object" of their work. The Third Industrial Revolution, as it has been defined by some, was informal, born from the strength of a spontaneous innovation and based more on "testing by doing" than on a linear process of knowledge acquisition and application. The interviewees develop and use their ability to learn continuously by solving concrete problems and following mainly informal and non-formal processes.[8] In this regard, the interviewees have pointed out a wide mismatch between the skills and knowledge acquired during their formal training and those requested and used in their current job position:

> "[...] an intellectual worker, a digital maker cannot make use of the theoretical training that Italy's educational system seems to be permeated by and needs learning modules that also include the practical aspects of the job he/she will go on to do. As Sennett (2008) puts it, we need "expressive instructions", with reference to the need to transfer knowledge and skills not only through language […], but also with the help of a 'corporeal form' […]" (Chiappini 2013: 152).

Hence, workers mainly learning two ways:

- **Gaining access to knowledge spread on the Internet** with "self-learning training activities". According to one interviewee: "We train using the Internet. I buy many books […] also in English". Another interviewee, a graphic designer, adds: "If you have a problem doing anything, the solution is on the Internet. […] You spend a lot of time using the Internet because nowadays it is the only tool that keeps you updated on the new technologies." Learning how to learn in this context acquires a particular connotation because it is the object of a specific modality: "learning how to learn from the Internet", that is, from what has been defined as our "widespread teacher" (Fontana 2013: 187), thanks to which we can make use of the knowledge of others without them being present as long as we know how and where to search;
- **Through a social exchange of knowledge in the workplace** that, as claimed by a programmer with about ten years of experience, is often based on: "stealing with one's eyes […]: for me it is normal that a person who is next to you has the ability to learn simply by being nearby. Yes, al-

[8] Consistent with what is defined in the European *Memorandum* on Education and Lifelong Learning (European Commission 2000), we refer to learning processes that occur in organised contexts (companies, cultural and sport associations, etc.) differently than the structures traditionally dedicated to education and training (non-formal learning) or through daily life experience with modalities, which are not necessarily conscious (informal learning).

> so seeing the work done by others is important because you should have a sensitivity that allows you to understand certain things."

"Workplaces" or, more precisely, the ways and times in which work processes are organised, create tension and opposite poles. Theoretically, in fact, present day enterprises should know and recognise the importance of time for learning and socialisation as prerequisites for innovation and quality. At least when we consider the technological market, we should be surrounded by what Butera (1984) dubs "organism" enterprises or what Mintzberg (1996) refers to as "adhocratic organisations".

The makers we have interviewed should mostly be employees of companies that adopt a "culture of complexity", creating structures based on autonomy rather than mandate, as well as on spaces of social interaction, quality and the principle of re-unification of the creational phase with the executional one. All these elements were confirmed to a part of the professional identity of the interviewees but were not characteristics of the workplace in which the interviewees operate. In fact, the production process suffers strongly from the precept "just in time", producing results quickly in order to respond to the customers' equally rapid requests: "Once," a programmer claims, "there was also the time and budget to study, experiment, reflect and test. Today, there is a different approach; there is the metaphor of the "iPhone" and the "touchscreen". One can receive a product at the touch of a button." Here an identity-related need of these professions is inevitably frustrated: "If you ask me the question 'What are you missing in this moment?' I will tell you I miss having the possibility of studying new things because I don't have time! I haven't got the time to study new languages or methods." There is also the full awareness that the ability to learn by oneself cannot replace *in toto* learning by collaborating with others:

> "In any case it is hard to grow professionally because I often find myself working alone, and I can increase my skills studying, willingly and often, some tutorials on the Internet, but I can't compare my ideas with people who do the same job as me. So, if I grow, it is only because I have succeeded in finding some sources from which I can get inspiration and learn some extra skills".

The **ability to work in a team and communicate** has also been recognised as an indispensable soft skill in digital professions, but notwithstanding this, the op-

portunities for its practice and development are present in organisational contexts only as a function of the production process:

> "It is curious to notice how nearly all the workers interviewed seem to be aware of the importance of working in project teams and of keeping a high level of sharing and communication with their colleagues: 'In computer science team work is very important. Because certainly, or probably, another person knows what you do not know. If there is this way of working, this exchange of information, in the end we can find a solution to the problem. This is essential also for the creation of new products.' However, the speed imposed by the market on both production and consumption times forces the organizations to give in to these dynamics, sacrificing in concrete the production process. This is how one of the interviewees described the problem: 'Lately the market has changed a lot; there isn't much time to reflect; you have to work quickly and try to reduce all the possible bottlenecks to immediately find a solution. It is a market situation in which the customer needs answers immediately'. The anxiety connected to the project deadlines, and at the same time, to the need of keeping high quality outputs, risk to render ineffective the innovation process and to reduce the constellation imagined by Mintzberg [adhocratic structures] to a sort of assembly line […]." (Ungaro 2013: 146)

In the above text, the reference to the "assembly line" can only clarify the dichotomies in which the ICT professions are operating: proceduralisation against creativity; discretion against mere operability. These tensions between professional impulses and organisational and procedural requirements transform the makers into a middle class half way between the "new class of creatives" imagined by Florida (2002) and specialised workers with more advanced technical skills than twentieth century workers, but at the same time, they are similar to the latter in terms of the absolute secondariness of the soft skills.

If we were to carry out a "selective" reading of the interviews, we could outline the possibility of a new culture of soft skills: a culture in which it is normal for the market to ask for capabilities related to creativity, communication, learning, and attention to quality, not only for those who have managerial positions, but also for those who create something new or considerably improve something that already exists using their "cognitive dexterity". An in-depth reading of the words of the interviewees, on the other hand, reveals the lights and the shadows of a way of organising work that does not abandon the old temptation to divide, classify, stratify and, especially, follow the market instead of trying to change it. Leaving aside any rhetoric, the makers live in a reality in which they perceive and are aware of the centrality of soft skills, but at the same time, they live in environments and conditions that do not favour the development

of these skills, and from a certain point of view are not even ready to admit their importance.

Nothing is permanent in this age of great change and our conclusions are far from being final. It seems, however, that the ITC sector of the labour market is fascinated by the organisational logic that prevailed in the factory life of the 20th century, as we can see in the ever-increasing specialisation and fragmentation of work. The likely unconscious result of this choice is the reintroduction of the typical pyramids, where those who "do" – the makers – are positioned at the bottom while those who "organise, coordinate and decide" are placed at the top. The former only need to have technical skills, often ignoring how important it is for them to have soft skills to keep their technical competences updated; the latter need instead to have a long list of "managerial skills" in which socio-relational skills assume a respectable position.

Conclusions

The observations we have just made do not allow us to draw conclusions on a topic that is so complex and in continuous development. We can, however, try to grasp two or three fundamental points that can be deduced from the information we have collected so far. To conclude, we will mention the digital divide, access to information, cross-cutting skills, and the professional profile of digital makers through the semantic path of knowledge sharing and social stratification.

The keyword that sums up the different angles from which we have tried to examine the direction followed by ICT professions is knowledge, or rather, knowledge-sharing. This is based on the widespread belief that, on the one hand, knowledge is more accessible now than it was in the past, and on the other hand, it is the most important factor on which the economic, industrial and production strategies of modern enterprises in the sharing economy are based. In the present-day literature, important scholars like Jeremy Rifkin (2001) claim that in this age, the wider spread of knowledge is possible and, therefore, so is the spread wealth and democracy. It is more than legitimate to have some doubts in this regard.

Let's consider the digital divide, even if *en passant*. In the previous pages, we observed how it intersects especially with the cultural and educational dimensions. For a long time, education and the possibility to adapt to new cultural perspectives have been powerful instruments for dividing the populations of yesterday and today according to the historical needs of the predominant enterprises.

From this point of view, little seems to have changed. In a nutshell, education works as a, vehicle of exclusion, which leads to inequality among ICT professionals. The ones who count are those who have managerial skills with the ability to coordinate, mediate and communicate. If this is true, as we have tried to claim so far, knowledge sharing is simply a production factor like all the others. Its extraordinarily innovative cogency breaks up an organisational layout that tends to confirm the structure of the historically consolidated hierarchy. The digital divide, therefore, has not been replaced, but has been added to the factors that contribute to determining social stratification among the various types of professional figures.

The fact that more or less everybody has access to information does not necessarily mean that there are not disparities when it comes to converting information into knowledge. As a consequence of the redundancy of information workers need to separate what is useful from what is useless. This means adopting an interpretative key capable of enabling enterprises and professionals to cultivate the most satisfying strategies. Reading data with a theoretical conceptual framework is necessary for preparing efficacious decisions and following the most satisfactory paths from a competitive point of view.

The ability to decode information is an important part of the learning process that defines the cross-cutting skills of the digital economy. The makers, as we mentioned above, learn while they are working. Many intellectual professions work this way, even more so in areas where the compulsive urgency of innovation does not always permit knowing the output features (products or services) of the production line.

Most of the time in the digital world, the path to follow is unstructured and *in fieri*, so we feel we can affirm that enterprises look with greater interest at the standardisation of the output, that is, at guaranteeing the final result, while professionals care more for the standardisation of the input, that is, the possibility of professional growth while they are preparing or providing the final

product: learning by doing. In this sense, knowledge is the drive in ICT professions. The distinction between enterprise requirements and people's training needs is not of secondary importance. But it is not enough.

We focus our attention on those we have called makers or, more generally, knowledge workers. This merely refers to a socio-professional aggregate of privileged people. And what about all the others? The others are in worse condition, but for reasons rather difficult to grasp, they are excluded from the analysis of the best research projects: We know little about them; their profiles have evaporated in the blinding light of the very strong on-going organisational transformations. They are weak, confusing and extemporaneous profiles for which the current literature shows no interest.

With regards to skills, we have already stressed how today, cross-cutting skills are the most important because they even define a new sociological subject and a new way to relate with the product of one's work. The individual is defined by their ability to relate to other people (especially when communicating) and the ability to diagnose, face and solve problems or moments of *empasse* in the production process. They are also defined by the ability to strengthen various ways of learning, including the self-learning process typical of those who work on the Web. The abovementioned research by the Capgemini Digital Transformation Institute (2017) conveniently points out that soft digital skills such as the ability to learn and customer orientation are the most requested on the market and that they represent the most significant characteristics of a typical digital worker.

Thus, our professionals are inserted into the logic and practices of the Web. In a recent book, Niall Ferguson (2018) explains in a precise and compelling way that the network society contrasts the society of hierarchy. As an example of this, he takes the *Torre del Mangia* and *Piazza del Campo* in Siena, considering the former to be a vertical, centralist mode land the latter to be an horizontal, communicative one.

> "Six centuries ago, in Siena, the Torre del Mangia of the Palazzo Pubblico cast a shadow over Piazza del Campo, that space of the shape of a fan that was, from time to time an outdoor market, a meeting place and, twice a year, a racetrack. The height of the tower had a precise meaning: it reached exactly the same height of the town cathedral, which was on top of the highest hill in Siena, to symbolize the same level of the temporal and spiritual hierarchies […].

> On the contrary, today's technological companies, equally domineering, avoid verticalization. Facebook's headquarters at Menlo Park, designed by Frank Gehry, is a campus of offices without partition walls and leisure areas: 'a single room hosting thousands of people', to quote Mark Zuckerberg, or (maybe more accurately) an immense *kindergarten* for geeks." (Ferguson 2018: 463).

The same logic can be applied to the new Apple Park in Cupertino designed by Steve Jobs and his entourage and also to Google's new headquarters in Mountain View made up of a series of light structures as if they were made of Lego. To sum up:

> "Silicon Valley prefers to stay low, and not only for the fear of earthquakes. Its horizontal architecture mirrors a real fact, that it is the most important hub of a global net: the central square of the World." (Ibid.: 464).

The conclusions reached by the author, after underlining that we have been living in the "network age" since the 1970s, show how what many see as the ultrademocratic and equal regime of the web is a pious aspiration yet to be confirmed by the evidence of history (Ibid.: 458-464).

To sum up, we wrote in the introduction that we did not have answers, and indeed, we have not given any. In a certain sense we have kept our promise. In this paper we have tried to identify ourselves with the questions we have made understanding their meaning and tracing a direction to follow. We have tried to do it in a research sector that is still very slippery and full of empty spaces to fill up but is also of extraordinary interest for understanding how well-laid the hopes of cultural, social and political emancipation in the network society are in contrast to what one thinks of when we order society based on hierarchy.

We believe that digital technology is not only a tool, but also an expression of our society. For this reason, ICT professionals are closer to the concept of "knowledge workers" than to that of simple "technicians", if only because technological development occurs exclusively thanks to the network that exists between individuals, intelligence and machines.

References

Agenzia per l'Italia Digitale [Agency for Digital Italy] (AgID) (2017): Osservatorio delle Competenze Digitali, Scenari, gap, nuovi profili professionali e percorsi formativi, http://www.agid.gov.it/sites/default/files/osservatorio_competenze_digitali_2017.pdf, last accessed 26 June 2018.

Arendt, Hannah (1958): The Human Condition, Chicago: The University of Chicago Press.

Bell, Daniel (1973): The Coming of Post-Industrial Society: A Venture in Social Forecasting, New York: Basic Books.

Butera, Federico (1984): L'orologio e l'organismo: il cambiamento organizzativo nella grande impresa in Italia: cultura industriale, conflitto, adattamento e nuove tecnologie, Milano: Franco Angeli.

Calvani, Antonio (1999): I nuovi media: perché, come e quando avvalersene, Roma: Carocci.

Capgemini Digital Transformation Institute (2017): Digital Talent Gap: June-July 2017, https://www.capgemini.com/wp-content/uploads/2017/10/dti_the-digital-talent-gap_20171109.pdf, last accessed 21 May 2018.

Castells, Manuel (1998): The Information Age: Economy, Society and Culture, Vol. III, Oxford: Blackwell Publishing.

Chiappini, Patrizia (2013): Formazione e apprendimento nella società della conoscenza, in: Fontana, Renato (Ed.): Oltre l'uomo artigiano: Capitale sociale e condivisione delle conoscenze, Milano: Mondadori Università.

Centro Nazionale per l'Informatica nella Pubblica Amministrazione (CNIPA) (2010): Dizionario dei profili di competenza per le professioni ICT, ver. 1.3, http://open.gov.it/wp-content/uploads/2017/03/linee-guida-competenze-digitali-ict.pdf, last accessed 21 May 2018.

Di Francesco, Gabriella (1998): Unità capitalizzabili e crediti formativi: Metodologie e strumenti di lavoro, Milano: Franco Angeli.

Digital Opportunity Task Force (2002): Digital Opportunities for All: Meeting the Challenge, http://www.g8.utoronto.ca/summit/2002kananaskis/dotforce_reportcard.pdf, last accessed 26 June 2018.

European Commission (EC) (2000): A Memorandum on Lifelong Learning, https://www.hsu-hh.de/wb/wp-content/uploads/sites/647/2017/10/Anthology-Memorandum_on_Lifelong_Learning-EU-2000.pdf, last accessed 21 May 2018.

European Committee for Standardization (2016): e-Competence Framework (e-CF): A common European Framework for ICT Professionals in all industry sectors, Part 1: Framework, https://standards.cen.eu/dyn/www/f?p=204:110:0::::FSP_PROJECT,FSP_ORG_ID:41798,1218399&cs=17B0E0F8CABCDBDDB8066A46FA937510B, last accessed 21 May 2018.

European Committee for Standarization (2014): European e-Competence Framework (e-CF) version 3.0, http://ecompetences.eu/wp-content/uploads/2014/02/European-e-Competence-Framework-3.0_CEN_CWA_16234-1_2014.pdf, last accessed 21 May 2018.

European Parliament and the Council of the European Union (2006): Recommendation of the European Parliament and of the Council of 18 December 2006 on key competences for