

THE IMPACT OF THE FOURTH INDUSTRIAL REVOLUTION ON THE JOBS MARKET

Senate of the Italian Republic – 11th Labour and Social Security Committee

*For the victims of terrorism
fallen in the line of work*

Introduction

The issue of the relationship between technology and work has returned to the heart of the public debate. This is by no means a new discussion: fear of jobs being destroyed by the emergence of new tools for producing goods and services, and their new processes, crisscrosses the history of the industrial economy, leaving us with memories of Luddites, Keynesian technological unemployment, and the “the end of work” alarm raised in the early 1990s.

The new Industrial Revolution appears to have been enabled by technologies that are increasingly available at low cost to companies and individuals. These technologies are destined to evolve at an unpredictable pace, in unpredictable ways and with unforeseeable content. Their consequences may impact business models and production processes; above all, they are ushering in new ways of relating to consumers and the markets through more efficient, personalized and immediate channels of coordination enabled by technology.

The hallmark feature of this technology is its way of integrating physical processes and digital technologies as a means of renewing organizational models. Another way of expressing this is to say that production is “smartening up” along a number of different paths, either making a break or evolving from the past. Large factories are looking to go beyond assembly lines and replace them with autonomous “islands”, manned by people and machines – teams of workers and robots. Small companies are leveraging a typically Italian feature of the economy – the fact that they are concentrated in districts, and are specialized in niche output – as they work to combine classical artisanal with digital skills. New

relations with consumers are also revolutionizing the way that labour is organized. Indeed, some academics are claiming that smart factories are to mass personalization what the Taylorist factory was to mass production. Today, managerial approaches cannot take solace from the past; they are required to come up with innovative and experimental solutions that foster the emergence of revolutionary organizational principles capable of rendering the productive environment fluid, competitive and “human”.

All too often, however, people address the issue solely in terms of new technology, confining it to its relationship with investment and industrial policy and neglecting its overweening impact on the jobs market. A recent Chamber of Deputies’ Industry Committee fact-finding investigation found that “... Unlike the previous industrial revolution, in which technology went to work alongside people to enhance human activities and make them more productive, Industry 4.0 represents a paradigm that, albeit partially, is not limited to working alongside but in certain activities replacing human beings.”

Such technological change is not, it appears, neutral in terms of the effects it may have on social and economic relations. In the complex and utopian operation of calculating how many jobs will be lost or created within the framework of this new revolution, many people limit the debate to a deterministic one between optimists and pessimists. This only hampers deciding what to do, because first and foremost, it is up to public policy-makers whether workers who lose their jobs – or perhaps didn’t have a job in the first place – can potentially be taken on as part of these new productive processes.

This is the backdrop to the fact-finding enquiry that the President’s Office of the Senate commissioned from the 11th Labour and Social Security Committee. The enquiry was performed via hearings attended by players from the business world, social organizations, civil and religious institutions, who are tackling the challenges of digitization in the workplace from a multiplicity of viewpoints.

This final document provides a summary analysis of the international economic and technological situation, an interpretation of trends on the Italian labour market, an

identification of the main challenges, and, in consequence, a statement of policy-makers' responsibilities.

2. The International Economic and Technological Situation

Starting in the second half of the 1970s, a number of factors contributed to undermining the foundations of some of the pillars on which the second industrial revolution was based. Investment in research and innovation was one reaction – a reaction that triggered the introduction of information technologies into productive system, generating an initial wave of process digitization and industrial robotics. Concomitantly, the opening up of international markets triggered growth in demand and initiated the process of globalization, ultimately leading to China joining the World Trade Organization in 2001.

The jobs market based on linear paths, on a generational handing on of the baton between new hires and pensioners, leveraging specific skills passed on by technical institutes, drawing on welfare support as a tool for intervention when the market fails, began to enter into a period of crisis.

All of the challenges that arise out of the fourth Industrial Revolution are therefore occurring on the back of a transitional period that has been going on for some decades already.

The definition of Industry 4.0 emerged in Germany as a new economic paradigm in which technology serves merely as a tool for reconsidering the entire industrial economy. The concept is based on leveraging the internet for productive processes in order to optimize integration and coordination on the factory floor and indeed along the entire supply chain, all the way through to relations with suppliers and, above all, consumers.

The paradigm's biggest new development is its ability to offer personalized products ("mass customization") at a price that makes it possible to sell onto broader markets. All of this is possible thanks to a multiplicity of technologies available today to enterprises at sustainable costs. These technologies include: CPSs (Cyber Physical Systems) which, via the Internet of Things, make it possible to assemble flexible and dynamic processes ready to adapt to

consumer demand; the Big Data generated by such systems, which makes it possible to monitor and optimize processes in real-time; and collaborative robotics (including wearable devices and exoskeletons), which helps reduce worker fatigue and enhance their productivity. This is but a small proportion of the technology that is already available; it is likely that future developments will follow a geometrical progression.

These technologies are capable of completely revolutionizing business models and quality of life, particularly when it comes to relations between firms and end-users, and between workers and productive processes. Consumer relations have already expanded way past the design stage to extend to after-sales through the creation of an ongoing connection and relationships via the net. All of this contributes to a dematerialization of the production chain, further enhancing global value chains and internationalizing not just production but also the factors of production, starting with labour.

Most importantly, we find that we are part of an economic model that is contributing to the deconstruction of traditional productive sectors by enhancing opportunities for businesses capable of positioning themselves in new market environments, combining goods and services into new offerings. The hallmark feature of this revolution is its ability to break down barriers, whether they be geographical, sectorial, or even the physical walls of companies themselves. This scenario of interconnectedness goes beyond the support provided by the internet to extend to the possibility of contact between spaces and worlds that before now were clearly separate and distant.

3. Impact on the Labour Market and the Scenario in Italy

This transformative scenario has already begun to wreak major changes in the world of work, both in qualitative and quantitative terms. Italy is facing these new developments from the position of a labour market that, despite recent increases in employment recorded by the ISTAT national statistics office, continues to be beset by its twin-speed progress and a number of critical issues. This is clearly evident in comparisons with other European

countries. Italy's employment rate is among the continent's lowest; its unemployment rate is one of the highest, while the number of inactive workers in Italy is particularly high. According to statistics, despite continuous demographic contraction, just a third of the Italian population is employed. In consequence, on average every person in work is maintaining themselves plus two others. There is also the issue of an average ageing of the population over the last twenty-five years; during this time, the average age of Italian workers rose from 38 to 44 years of age. Over this same time period, the number of under-thirty-five year-olds in work fell by 3.6 million, while the number of over 45-year-olds rose by 4.2 million. Lastly, we must not forget generational and gender-based differences, with employment rates for young people and women markedly lower than the European average.

Despite a constant reduction since 1980, the percentage of workers employed in the manufacturing industry in Italy remains one of the highest in Europe. The economic downturn profoundly altered how the Italian jobs market is structured by sector and profession. Since 2007, the number of workers has diminished by more than a million; above all, the number of workers in qualified technical professions has gone down by around 500 thousand. Over the same period, we have witnessed growth in both unqualified workers (480 thousand jobs) and in workers who fill executive roles in sales and services. These numbers might lead one to believe that the employment trend is negative in sectors where Industry 4.0 might develop, but such an analysis fails to take overlap between sectors into account.

It is more interesting to note how a situation is arising in the Italian jobs market that is permeable to transformation, albeit with a tendency to follow rather than lead events, if – as is the case – growth in employees in recent years has been concentrated above all in low added value and low productivity jobs. Productivity figures have remained stagnant for more than fifteen years; it is this factor that makes transition so necessary (it is no longer optional) towards productive models in which innovation – at least in part through digitization – may make our companies more competitive and our workers better skilled.

Many academics consider productivity and two other factors – skills and new models for organizing work – to be closely intertwined. The latest OECD figures show that Italy’s performance on both of these indicators is low. This concerns both basic and digital skills, as may be seen from these charts from the PIAAC investigation of skills among adults in OECD nations.

Literacy proficiency among adults
 Percentage of adults scoring at each proficiency level in literacy

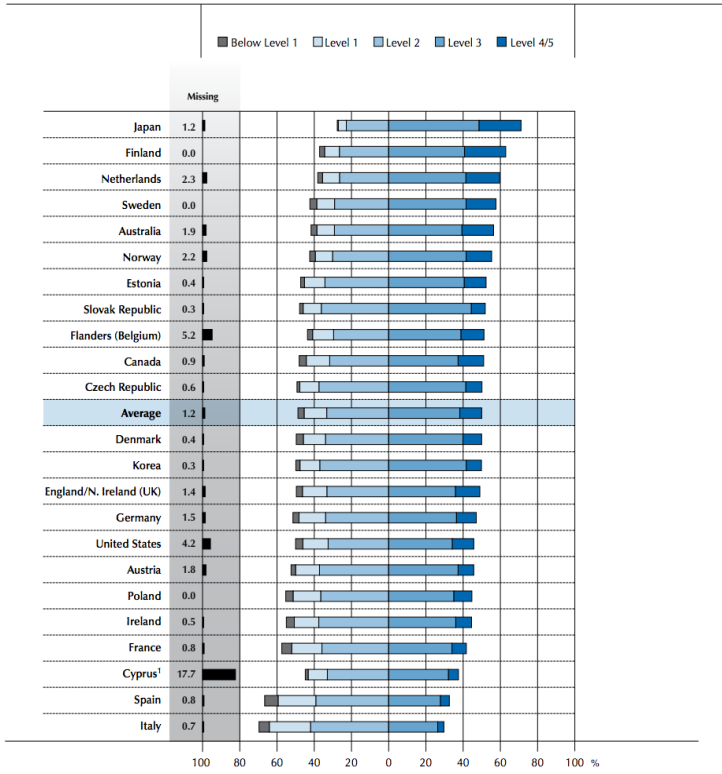
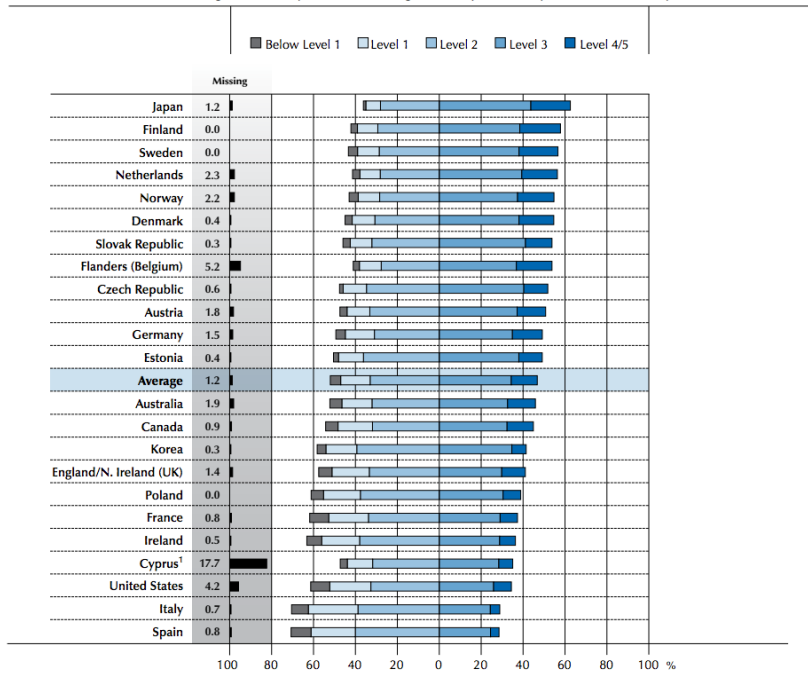
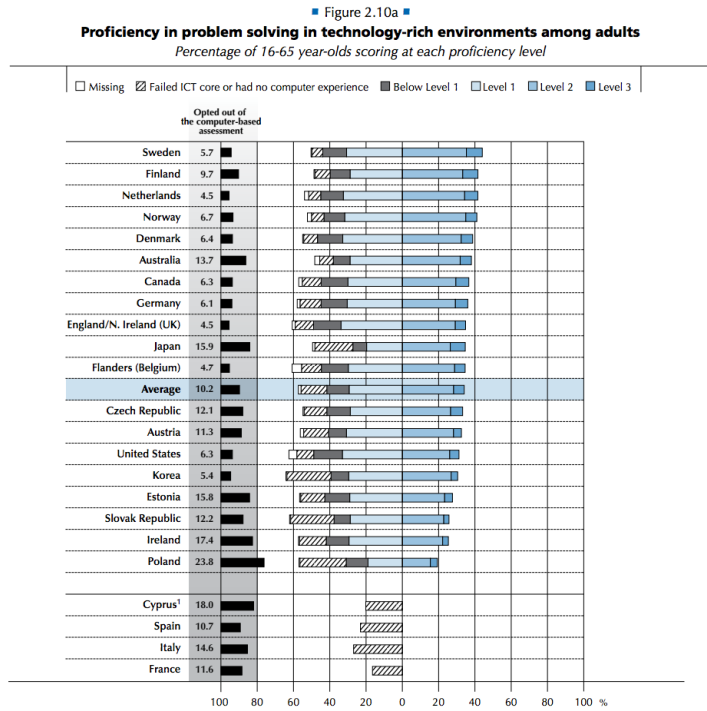


Figure 2.5

Numeracy proficiency among adults
 Percentage of 16-65 year-olds scoring at each proficiency level in numeracy

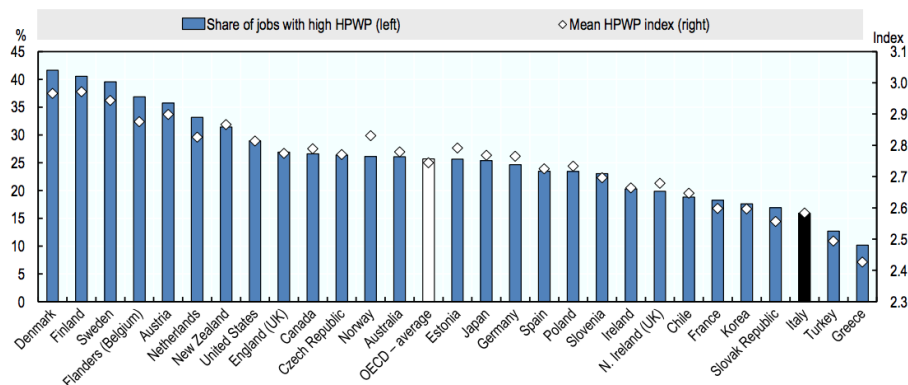




Similarly, when it comes to high-performance work practices, Italy is in last place among OECD countries.

Figure 36. High-Performance Work Practices (HPWP) across countries

Share of jobs with high HPWP (summary HPWP is above the top 25th percentile of the pooled distribution) and mean HPWP score (average value, across jobs, of the HPWP index), all factors, 2012, 2015



Although it is simplistic to take for granted that the relationship between work and technologies is negative, we must nevertheless note that among the origins of chronic low Italian employment rates were choices made by businesses in the post-war years, to invest excessively in labour-saving technological processes. This had the unintended consequence

of slowing down product innovation, owing to the need to amortize plants – an anomaly among industrialized nations attributable to a widely-held mistrust of work, as may be evinced from great resistance to part-time employment as a way of reducing the number of jobseekers.

However, all this does is merely show that political and economic decisions are the true drivers of technology use. The idea that technological development is an uncontrolled and uncontrollable phenomenon, a fate to which we are all beholden, is a convenient way of opting out of the processes that we are all living through. Equally erroneous is to deny that over the last few decades it is indeed technology that has brought about an improvement in the quality of work and in enterprise productivity, not to mention improving all of our lives and at the same time creating new jobs... It has been calculated that between 1999 and 2010, digitization created 11.6 million extra jobs across the twenty-seven European nations.

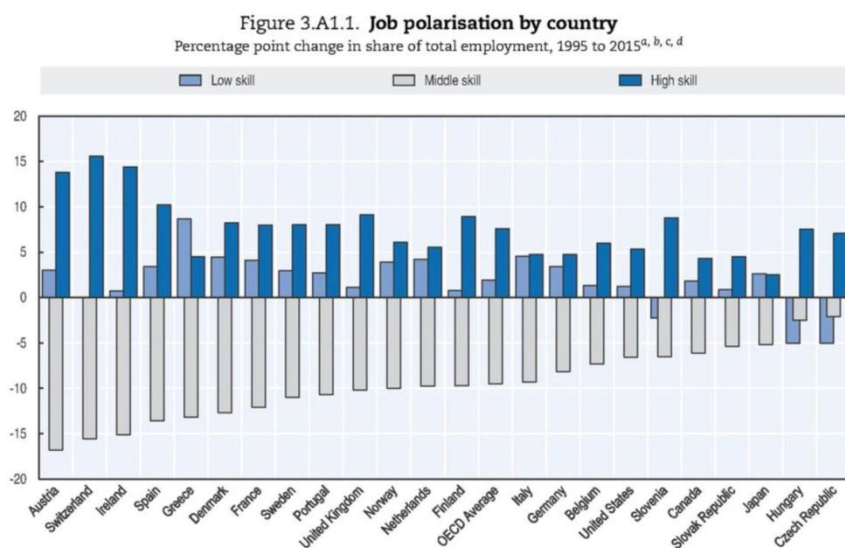
This has of course led to the disappearance of other jobs, in a phenomenon of replacement and transformation rather than outright destruction. According to historical reconstructions, in the late Middle Ages, 65% of the population was employed in agriculture. Today, just 3% of the population in these same European countries works in farming. And yet agricultural output has grown drastically. As for those missing jobs, to begin with they were redistributed to industry, before migrating on to services.

It seems farfetched to claim, as one theory does, that at least 47% of jobs will be automated over the next few years. Or, as the World Economic Forum has suggested, by 2025 five million jobs will have disappeared without being replaced. According to OECD estimates for Italy, 10% per cent of individuals run a high risk of being replaced by automation, and fully 44% of employees can expect their jobs to change radically. This is not to say that it will be plain sailing, or that issues have not already cropped up; it is merely to say that without being apocalyptic, it is possible to face up to the challenge of digitization in the jobs market by acting with determination, out of the belief that it is the individual who is of central importance.

4. The Perils of Professional, Income and Geographical Polarization

In Italy, the transformation of Industry 4.0 is evolving in socio-economic circumstances that are already polarized, perhaps further exacerbating existing trends of polarization in skills, income and geography. The consequences are wealth distribution inequality, broadly paralyzed social mobility, and an increase in extreme poverty.

The figures show that in recent years, employment has grown in Italy, particularly in jobs that require low levels of skill and specialization. At the other end of the scale, there has also been a rise in jobs requiring high levels of professionalism. Over the same period, the number of people employed in mid-level jobs fell by around 10 percent, as a result of how broad the manufacturing industry is, in particular, in terms of repetitive jobs.



Moreover, figures from the European Centre for the Development of Vocational Training (CEDEFOP) reveal that in Italy, the percentage of jobs characterized by tasks of a routine and intermediate nature is higher than the European average, resulting in the risk that a significant proportion of easy-to-replace workers may lose their jobs to automation. This phenomenon would only reinforce existing trends towards polarization.

Polarization is also evident in these new professions' average earnings, and in the reduction of employment numbers among members of the so-called middle-class. Italy is also part of a trend picked up on by many academics, in which a number of drivers (from technology to globalization) have contributed to reducing what was once the core component of the working population, leading to associated socio-economic consequences arising from an overall rise in income inequality.

This trend has been overlaid by a long-term geographical polarization between Italy's North and South, a difference in dynamism between the Adriatic and Tyrrhenian coastal strips, and a number of dangerous trends towards desertification in Italy's mountainous areas. These examples of polarization may be worsening as a result of an inability to harness the flow of technological innovation and digital transformation, even if the nature of innovation itself may make it possible to more rapidly close the infrastructure gap and overcome orographical barriers.

A number of commentators have noted that the advent of a technological step change and widespread outsourcing tend to concentrate value within hubs with a high density of human capital. Partly as a consequence of the economic downturn, this phenomenon has generated polarization within regions, as well as between regions and neighbouring territories, heightening a gap between town centres and the suburbs, and between cities that succeed in intercepting innovation-led investment and those that risk depression because they have been left out of the circle.

These existing gaps, as well as other gaps that may appear in future, are prompting policymakers to adopt an overarching approach to these potential new paradigms, in pursuit of a quality-based economy and ambitious programmes to support such an economy through investments in research and in public demand (such as maintaining and managing local areas, and healthcare). If the opportunities being opened up by digitization are seized and public employees retrained accordingly, government entities could become a factor for competitiveness and a stimulus to innovation. Our future can only be a forward projection of the production heritage we have today, and of the industrial culture expressed through

Italy's enterprises great and small. Our approach to all of the challenges examined below is from the viewpoint of putting people at the heart and as the end-goal of every public action, with the purpose of promoting inclusiveness, social cohesion and well-being throughout our lifetimes.

THE CHALLENGES

1. The Consequences of Technological Innovation on Labour Law

Digital platforms, new approaches to protection, the right to disconnect, and the right to training

The productive fabric and the jobs market are, as we have seen, destined to change rapidly, extensively and pervasively, undermining the dominant characteristics of the last century, on which our labour laws were structured.

One element common to a significant number of these changes is, as a result of technological developments, the drastic reduction in transaction costs. Increasingly, this is resulting in:

- More easily bringing supply and demand for services into contact, giving workers the chance to offer services directly, without requiring an entrepreneur to organize their sale, and for consumers to access them at a lower cost;
- Deconstruction of the forms of protection that apply to traditional jobs, along with an opportunity for working people to reappropriate control over how they use their time;
- Easier coordination of individual jobs performed within a corporate organization, including without any need for such work to be fully subject to hetero-direction and/or limitations on time and space, which may open up to discussion traditional contract types and approaches to protection;
- The spread of ambiguous jobs – although in any event socio-economically dependent – in services offered via digital platforms, with the consequent need for new protective legislation that fosters continuity of income for those concerned, a minimum hourly rate and essential social security contributions;
- Freeing work up from the restriction of working hours, something that nevertheless risks eroding regulations on the maximum number of working hours, hence an apparent need to bring into force a “right to disconnect”;
- More immediate and more penetrating visibility of the various levels of productivity of individual work rendered, with the consequence of exposing workers to more intense and

continuous examination-related stress and, above all, a growing divergence in working income; this is a challenge to the system's ability to ensure equal opportunities for all citizens, and not to leave anyone behind;

- A quickening pace of obsolescence for techniques applied, materials and even products themselves, which is destined to obviate any static protection of workers' professionalism, making dynamic protection based on effective education and ongoing retraining services indispensable;

- Fiercer competition among workers, including but not limited to workers resident in countries that are far apart, reducing the effectiveness of the protection techniques on which labour law regulations were based during the last century, to the detriment of the "lower portion" or the "lower half" of each professional category;

- Conversely, far greater opportunities for workers individually and collectively to find the entrepreneur most capable of generating value from their labour, creating more intense competition on the jobs market between entrepreneurs, and potentially leading to a strengthening of the most highly-qualified workers' bargaining powers.

The existence of claims for unpaid work warrants concerned scrutiny in the light of day. This practice is common at companies that systematically use internships detached from curricular courses, and at institutions that create competition between professionals to work without pay. The underlying assumption is that many contracting parties, particularly young people, are in a weak position that induces them to accept unpaid work in order to gain experience. These practices must be combated not just through legislative instruments and inspections, but first and foremost through a change of cultural viewpoint.

2. Knowledge, Skills and Competencies

The differential between speed of innovation and learning. Teaching methods and sources

One of the Fourth Industrial Revolution's greatest impacts on the market will concern new competency-related needs, and in consequence worker training – something that cuts across

the various consequences of the technological step change itself. In this section, we consider methods of acquiring skills prior to becoming employable on an ongoing basis.

This sphere covers skills of a technical and specialist nature that revolve principally around the digital element as applied to production processes and the design of these processes themselves, as well as to crosscutting soft skills that enable workers to take a better approach to these complex, changing circumstances, including an aptitude for self-entrepreneurship.

Against the backdrop of all this, moral education and basic knowledge are vital if people are to develop the ability to select sources, understand, perform calculations and access technologies. For the first time, informal sources of learning are prevailing over formal sources, prompting us to need appropriate critical, reflection-based tools for the insights required.

Data from the OECD Pisa PIAAC surveys place Italy among nations where both young people and adults are insufficiently endowed with basic skills, in particular with regard to mathematics, scientific and technical content, and even in humanistic subjects. What this means is that before tackling the “high-end” issues associated with Industry 4.0, we must reflect on the education system itself; we must come up with initiatives that restore literacy in adults in order to avoid the risk of people becoming alienated from the jobs market because they suffer from a kind of structural disconnect between the speed of change and the speed at which they are learning. This is underpinned by the goal of a drastic increase in the number of graduates, in part through a review of three-year degree pathways.

It is therefore a matter of reorienting the education system not so much towards enterprises’ contingent requirements but towards ongoing employability in a labour market characterized by rapid and unpredictable change. The twin challenges we must face therefore concern the ability to move in advance of change by adapting content and stylistic approaches transversely across courses, while at the same time tooling up to reskill adult workers. When it comes to online services and products, everyone – without distinction or

discrimination – must be guaranteed accessibility and professionalism. This also extends to cover the rules that every website should comply with to ensure that everyone, including the elderly and disabled, is able to access the site. European harmonization-related requirements require technical regulations that enable the market to understand that technological instruments comply with international standards. The digital dimension must not become a new barrier; it must be an enormous opportunity for human advancement.

Placement offices at schools and universities could become even more useful in this new scenario, as tools for dialogue and partnership with the local economy, in a fecund hybridization of knowledge and ways of learning. Each family of skill sets requires different pedagogical methods and sources of learning. This observation is already a step away from the current scenario, in which traditional lessons still tend to be identified as the only educational option. On the contrary, a significant quantity of pedagogical research shows that in a complex, constantly-evolving productive context, it is even more pressing to expand learning sources and to establish task-based situations (and therefore practical experience, including manual experience) as one of the main channels for acquiring skills it is impossible to convey via any theoretical lesson. Alternation – or, better, integration – between school and work should be acknowledged as a pedagogical method oriented towards learning to learn, that is to say, training the flexibility that is increasingly in demand on the jobs market. Alongside this, apprenticeship agreements oriented towards qualifications that may be redeemed on the jobs market and industrial doctorates achieve this cross-pollination, as well as laying the foundations for ongoing learning.

Analogously, an effective transition to Industry 4.0 requires an ability to review the content and socio-cultural image of vocational pathways through education. Still today, despite high demand on the jobs market, the “vocational” educational route is perceived as a fallback option. On the contrary, re-conceiving these educational pathways, perhaps by strengthening them with a solid grounding of basic knowledge, may help Italy’s great industrial heritage to continue to flourish into the future.

In the midst of such an ongoing and complex transformation, it is impossible to come up with roles and professions on the drawing board. It seems more beneficial to allow companies to assess their skills-related needs on an ongoing basis, without advancing any long-term outlook, and without adapting production to existing professional models or the burden of coming up with ever-new models.

3. Institutions for an Active Life

From proactive policies to the new transitional labour market

With the advent of the new Industrial Revolution, the jobs market cannot stay the same. We have in recent years already witnessed a significant reduction in the average length of employment contracts; moving from one job to another has statistically become increasingly the norm. The number of fixed-length agreements has grown considerably since the early 2000s. In 2015, Italy reached the European average of 14% of all job contracts. At the same time, there has been a considerable reduction in recent years in the average length of open-ended contracts. European figures show that, particularly for the younger generation, the trend towards this transition, including those on open-ended contracts, is frequent. In 1995, 29% of workers between twenty-five and thirty-nine years of age stayed in their jobs for longer than ten years on average; by 2015, this percentage had dropped to 18%, with a concomitant increase in the numbers of people who stay in their job for between one and four years. Closely associated with innovation-led processes, industry 4.0 will only accentuate this trend towards constant transition; indeed, it is possible to imagine that it will expand and enrich this feature.

Old labour policy templates, including more recent approaches such as “flexicurity”, have developed out of an idea of markets tending towards stability; in these approaches, moving from one job to another is an extraordinary and residual phenomenon; this explains why such policies pursue an emergency-inspired approach, providing a safety net when one job is lost. On the new, ongoing transition-based markets, public, private and private/social institutions must be capable of always offering a multiplicity of opportunities for learning

and advancing skills and competencies to match the opportunities opened up by the digital dimension, so that people can avoid becoming trapped in poorly-paid jobs. This boosts people's potential to move jobs and to leverage bargaining ability throughout their working relationships with multiple employers, being able to move rapidly from freelancing to a subordinate role and back again, to participate in exchanges of remote working, to personally (and through one's assets) provide services that guarantee primary or supplementary forms of income. To name but a few, the diminution in product life-cycle, brief duration and interchangeability between business models, as well as developing networks of companies and the take-up of open innovation models, are all aspects intrinsic to the Industry 4.0 phenomenon.

The main risk is that workers are unable to move at the market's pace; they can end up finding their income squeezed, not to mention their psycho-social standing. At the same time, current public and private infrastructure do not look like they have the heft to cope with the stimuli triggered by a generalized and ongoing process of transition. For this reason, the challenge is to establish a new and inclusive model for the labour market that can potentially offer opportunity to all. Every person must be at the heart of all this, not just as a worker but as a whole being, as a source of initiative and relations within society as a whole. The tools that can tangibly implement the centrality of demand, after so much offer-based self-referentiality, are in terms of priority: scholarships for young people; full deductibility for self-training-related expenses regarding all independent workers; tax credits for corporate training; reinsertion benefit (provided that it is system-wide) for the unemployed and underemployed; and trust-based loans. These are measures and opportunities that require everybody to be responsible, within an appropriately-informed framework, to identify the best orientation and training services to cater to one's needs. This is how to aspire to a labour market that enables people to remain active all the time, rather than intervening in a paternalistic way solely when there is a situation of emergency or hardship.

In order for this to happen, it is necessary for all players to be integrated into the national network of employment services to ensure that, while complying with the constitutionally-

acknowledged competencies of Regions and Autonomous Provinces, we can provide homogeneous responses to the economic and social rights of all of the Republic's citizens. The new inclusive labour market must be forged by schools, universities and by firms; by the social partners and their bilateral instruments; by professional associations and their welfare funds; and by local government and services to public and private work. Only by acting with flexibility, on the dimension of proximity (geographically and otherwise), will people not be alone but can choose to be accompanied freely along a process of growth and personal and collective affirmation. It is a matter of leaving behind traditional approaches, for example professional roles, and replacing them with preferential treatment to individual skills that, combined together in various ways, may be flexibly certified.

Against this backdrop, interprofessional funds could have a lead role to play. If they are allowed to become bigger, are regulated in a straightforward and certain manner like the missions of private entities appointed to pursue the general interest, if they are locally decentralized, overseen and monitored pursuant to substantive criteria, they may act as drivers of sound and useful training. Precisely because they are an expression of enterprises and local workers, they may avoid the pitfalls of self-referentiality and, on the contrary, act as guarantors, catering to demand that it is their duty to analyze on an ongoing basis as local jobs markets evolve.

All educational- and training-related activities should be subject to monitoring and assessment on a periodic basis, in order to assess their effectiveness by outcomes.

4. Less Law, More Contract

Adaptive labour relations. Salaries and skills. Tasks and frameworks

Work is changing. It is changing in ways that are difficult to codify through the rigid tool of legislation. With its slow adaptation speed and rigid homogeneity, as a source legislation should leave it to flexible contracts to specifically govern mutual interests in pursuit of

common goals like raising productivity, skills and wages. In any event, laws and contracts must guarantee minimum wage standards for every kind of work, whether as an employee or an independent contractor.

A number of new developments emerged in recent rounds of bargaining in both the services sector and agriculture. In industry, where significant transformation has already occurred, the metalworkers incorporated these changes into their traditional national bargaining contract. Although in the past a somewhat heavy-handed and invasive instrument, telling companies how to act all the way down to minimum levels, today more than ever it has become a framework to ensure high-quality ongoing training that enriches and encourages adaptive proximity agreements among companies, in the local area and along supply chains, so that productivity grows and the associated benefits are shared with workers. Specifically, not just does it indicate the path to increasing wages by linking them to results, including in areas where no union representation exists, encouraging trials that combine tangible access to skills and competencies with a dynamic interpretation of professional jobs organization. The social partners in Italy's largest industrial category were able to move on from traditional centralization-based approaches to an explicitly subsidiary approach that encourages sharing, adaptability and participation.

This was able to happen because awareness prevailed of this epochal upheaval and the trials of transition. Worker participation in the fate of a company is expanding, expressed above all in the fundamental right to know about and be informed of the actual work situation. Worker empowerment is the foundation – indeed, the very precondition – of companies' competitive growth and of workers' employability. Clearly, a substantive enforceability of the right to learn can only exist tangibly in working situations where, in part through an adaptation of general rules, it is possible to share goals on productivity, wages and careers. Professional categories that until recently were a way of defending workers' capabilities from the danger of being insufficiently appreciated must today be dynamically redefined to correspond to the way in which workers' capabilities are evolving. Wisely, the new contract calls for in-company trials to be carried out and their effectiveness monitored, where appropriate through skills-based bonus components.

At last, the wholly and solely defensive approach based on legal formalism and the assumption of a Fordist approach to work has begun to subside. We are duty-bound to accelerate this process in order to foster the dissemination of rights that promote peoples' self-sufficiency. Promotional rights and soft laws are not powerless tools if they are regulated by bargaining, including through civil code penalties. Contract theory and practice open up scope for infinite imagination when it comes to discouraging opportunistic conduct and encouraging a confluence of interests.

The growing significance of bargaining will generate food for thought, particularly regarding article 19 of the Charter, and Constitutional Court sentence no. 231/13 on freedom of organization and representation by union associations/representative entities in the workplace, so as to foster the broadest possible participation of workers and enhance their potential to liaise with their representatives. The issue of worker involvement in corporate life should be pursued with renewed vigour, through one of the many forms of participation that has already been tried, combining it with best practice from industrialized societies in pursuit of ever-more-closely-shared goals.

5. Occupational Health & Safety

Participatory best practice. New techniques. Integrated healthcare oversight

Within this more sensitive regulatory environment – one that is dedicated to preventing workers from suffering risks to their health and safety – we have seen the development of participatory best practice envisaged under the new mechanics' contract, along with ways in which science and technology are evolving to achieve a more substantive approach to results. Major technological innovations are potentially destined to replace jobs, some of which are heavy and potentially dangerous today (exposure to noises and chemical agents, using risk equipment, etc.), to enhance the quality of work, simplify required compliance, and ensure the prevention of illness and injury. Precision agriculture reduces physical labour and the use of chemical agents, making it possible to undertake maintenance remotely to

avert critical issues and make repairs immediately, without having to directly intervene *in loco*. It is also possible that new pathologies emerge associated with the use of next-generation machines. Changes in ways of working, gradually going beyond working hours and a fixed place of work, entail amending provisions that were established on the assumption of traditional industrial production *intra moenia*. Ongoing developments in security technologies would benefit from incentives and disincentives to foster timely adoption. The “liquid” nature of the new economy is above all engendering an integrated approach to healthcare-monitoring in the workplace. While not reducing employers’ specific liability, this approach ceases to consider work as something that is treated differently from the rest of people’s lives. Every year, around 10 million workers see a doctor through work. This enormous number of visits has extraordinary potential as part of a more generalized prevention policy; visits are integrated into the electronic health records of each individual, as well as providing a virtuous example of using private (corporate) resources to the public benefit. Appropriate lifestyles, greater fertility awareness and specific screening tests could all be promoted through work.

6. The Good Life

Time for work, time for the people you care about, time for rest

In 20th-century industry, working hours and places of work were dictated from above; workers had to abide by this because they did not own the means of production. The time worked is a parameter through which a salary is established and paid pursuant to an economic model that measures the value of products by the quantity of work that goes into making them. This has made it possible to separate work time from other moments in life, and consequently to protect primary needs such as the people in your life, and having time to rest. Digitization of work and the Fourth Industrial Revolution are helping to break down such separation by making the times in our life more fluid. In many professions, the day is split up into three blocks of eight hours each, even if this approach is unknown to those who work in the more traditional sectors. Academics define this dynamic as a “porous” time of work, one that often overlaps with other times in life. The knowledge economy applies an

intellectual component to the production of a good in a way that is disconnected from the assessment of its temporal duration; rather, it is more closely associated with the subject's competencies and capabilities. What matters is the result achieved, and no specific length of time is necessarily associated with this, as was true in a Taylor-inspired approach to organizing work. No longer do we assume that the number of hours worked corresponds to productivity; it is the quality of work and investments in research and training that generate its economic and social significance. The way that the organization of production has evolved as a result of new technologies encourages a distribution of working time pursuant to the criteria of maximizing employment, while at the same time reconciling the needs of the firm and its workers.

We must also take sustainability into account in personal, family and social terms, what with always-on connections through work tools. Current debate about the "right to disconnect", of workers' right to "switch off" from work including in intangible terms arises out of the risk of people overworking – something that not only worsens workers' psychophysical equilibrium and relationships, but also affects productivity itself. Being always-on is the biggest quantitative and qualitative new development, as opposed to the twentieth century's issues of things like Sunday working practices and overtime.

Even if they are an expression of a flexible contractual source, the rules may be able to bend, but they do not resolve the problem. Rules may, for example, liberate workers from the bond of always being on while away from the office, but they can do nothing to free workers from the desire to continue without cease to achieve the results on which they will subsequently be judged and paid. There's also a need to keep on picking up new information, to stay up-to-date with how things are evolving all the time. It follows that as well the rules, in this new liquid context we must be resolute in our approach; we must follow the principles that have given value to what we know as "a good life", a life that strikes the right balance in terms of work, the people important to you and being able to rest. Once again, in this case, we come back to basic education and, as a part of it, moral training that corresponds to the principles enshrined in Italy's Charter of Fundamental Rights.

7. The Geography of Work

New processes of digital urbanization, and the players that create value

The push towards globalization has not finished. Strong demand for restoring a national economic and political dimension is a proof rather than a dismissal of this. At modern enterprises, globe-spanning value chains are today the norm for the management of approaches to business and the supply chain. At the same time, technology today allows small companies that make high-quality and high-value goods to expand their markets thanks to the potential of the online world. Both of these tensions feature within the push towards technological innovation, catalyzing value and, with it, human capital. Large and small leading-edge companies seek to enhance their processes by placing themselves within a context where infrastructure and highly-skilled workers are abundantly available. As we have seen, this can lead to the development of innovation hubs that attract talent and capabilities, at locations capable of stimulating and boosting this phenomenon. Metropolitan areas are therefore becoming central once more, generating new processes of digital urbanization, as has occurred in San Francisco and Seattle, and now in Milan in Italy. If we undertake an analysis from the standpoint of knowledge density rather than just population density, the geographical dimension emerges as being of particular importance. Firms of the future will themselves be taking on an open dimension, developing as networks through their various value creation stakeholders, for example, universities, research facilities, physical and digital infrastructure, government, services for work, and so on. Developing our cities is key if they are to become magnets for talent; concomitantly, it will be necessary to monitor local areas that could initially suffer from a drain of both brains and capital towards hubs.

There is, however, a more metaphorical way of framing the geographical dimension. Increasingly, the world of work and the professions is characterized by an expanding universe of new jobs that are very different from one another; indeed, they can often be difficult to define and understand. Digitization of traditional professions, the virtualization of service providers in certain areas that previously had only existed physically, the overlap

between productive sectors and, above all, the extremely rapid evolution of needs and lifestyle has produced constant turnover among the professions, as well as a rapid-fire birth and death of jobs. Embracing these jobs, as well as guaranteeing a “geographical” context within which they may develop is a key task today; indeed, it is an initial response to those who fear that technology will spell the end of work as we know it. This can only occur with the disappearance of old jobs and of obstacles to the affirmation of new jobs.

8. Demographic Vitality

Bringing forward life choices, procreation and proactive ageing

If the debate on the future of work today almost wholly revolves around the immediate consequences of technology and automation on employment, we should also not neglect the medium- and long-term changes wrought by innovation in combination with demographic trends like increasingly long life spans and a falling birthrate.

The weakness of the young and shortcomings in the education system have diminished people’s propensity to make high-risk leading-edge investments, something that tends to be more common among people who have a longer perspective ahead of them. High levels of inactivity among the young and delays in accumulating work experience have exacerbated the problem. At the very least, it is necessary to encourage people to take life choices earlier, from work to procreation.

The need for welfare system sustainability has led to a lengthening of working lives; in consequence, firms will increasingly find themselves employing workers with chronic pathologies. This means coming up with solutions capable of striking a balance between treatment and work time, both to protect the worker who wishes to continue in their job if they or their loved ones are ill, or for companies to be sure that they have a margin of security in terms of available manpower. Ageing of the workforce will also require a review of how work is organized, for example tasks being adapted to match physical capabilities.

We should nevertheless not underestimate the potential of technology – already today, and ever more so in the future – to bring security and ergonomic effectiveness to older workers; indeed, to reduce effort and toil by all workers, so that they reach old age with fewer negative consequences.

At the same time, this will also impact the skill levels requested of workers, who will need to professionally retrain at all ages to stay abreast of ever-evolving processes. We must rethink the concept of age from the standpoint of personal empowerment, rather than reducing it to a way (often without a choice) of staying on the jobs market, considering it as an option, one that leverages technology in an approach that begins long before old age, to continue on the path of personal growth by acquiring new skills and capabilities, and putting the irreplaceable value of experience to the service of up-and-coming generations.

9. New Personal Welfare at a Time of Ongoing Transition

Ongoing payments, second pillar integration, less tax burden on work

Italy's social model was built on the assumption of more or less stable demographic and economic progress. The very idea of passive policies was justified within the context of brief transitions. We have already considered many of the elements that have brought this system to crisis point: demographic change, international competition, a reduction in the product life-cycle, persistent professional mobility, and much else besides.

Our biggest challenge is to build a new model of protection and security for every individual, for all people, that is both economically and socially sustainable at a time of ongoing transition and a trend towards ever-rising inequality. This does not, however, refer solely to employment-related transitions; it extends out to the more general change and transformation that is a cipher of the complexity of living today. The new welfare system must therefore – and in particular – promote active living, not just in terms of work but also education, looking after those around you and birth rates.

Reform can and must pursue the ambitious goal of guaranteeing greater efficiency than in the past (and indeed the present) for all, and the condition of self-sufficiency throughout our lifespan as a way of offering new certainties to counter emerging areas of fragility, adopting a more substantive universal standpoint. This entails considerations regarding sources of funding and a possible shift in the proportions of what is paid in as taxes to the general taxation account. For example, the albeit recent reform of the welfare system appears to have been based on the assumption that the formerly stable jobs market would continue, allowing many people to reach a level of paying-in that would enable them to bring forward the moment of payout. It would, however, be consistent with long-term sustainability requirements and a system that splits the pot on the basis of contributions to consider potential public sector contributions for socially significant times of life such as apprenticeships, healthcare and procreation. It could also be possible to fiscally encourage voluntary payments by employees and/or workers during periods when somebody is out of work, particularly if old age is not too far into the future. Non-welfare payments for the purpose of assessing correct tie-ins with work rendered is also worth looking into. This would make it possible to proceed with a structural reduction of labour costs by postponing a number of expenses to general taxation. The National Budget, which every year registers transfers to the National Institute of Welfare, and therefore funds not just benefits like state pensions, a social inclusion allowance and any other support measures based on the concept of citizenship, as well as a portion funded by contributions or charges corresponding to tax incentives, voluntary and negotiated welfare payments, the costs of joining supplementary funds, and the deductibility or write-off of personal or corporate expenses as and when legislators deem them worthy of encouragement.

People are not isolated entities: we belong to a dense web of social relationships that outline our needs and potential solutions in subsidiary terms. This leads to the idea of a combination compulsory pillar with a second supplementary pillar, to be negotiated but in any event tending towards the universal, implemented using bilateral funds to supplement welfare, healthcare and support with separate accounting, protecting citizens from the cradle to the grave, based on a modular approach that can therefore be adapted to the needs of all,

at every stage of the life-cycle. One example would be helping with primary care for lack of self-sufficiency, above all when no family framework is in place.

Scope for free bargaining is on the return, within professional categories as a way of joining collective projects, at associations of employers and employees, and within the corporate dimension. It is worth remembering the contract signed by Italy's metalworkers, with its commitments to developing welfare and complementary healthcare whose services – in the absence of a tax take – help to increase of workers' purchasing power.

As a result of a separation of significant wealth from the scope of the State, the inevitable reduction in the traditional tax base means that it is necessary to identify new ways of raising funds from tax, and more in general, review the system with a view to the stability of public finances, reducing inequality, bringing down fiscal pressure on enterprises – especially small- and medium-sized companies – and on employment, with a special focus on innovation- and training-related processes.

10. Conclusions

In conclusion, the “New World” with which policymakers and the industrial relations system will have to reckon displays structural characteristics that differ considerably from those that prevailed last century. The consequence is of a more or less extensive erosion of the effectiveness of traditional approaches to protection. There is a strong need to be able to create an “environment” that is protective overall, equipped to offer ongoing opportunities for active life and new forms of security, as well as a legislative framework re-conceived to provide more effective fundamental protections. The salient characteristic of how we may expect the future productive fabric to evolve is not going to lead to an “end to work”. In the coming years, as was the case during the last two centuries, marked as they have been by never-ending technological progress, technological progress will not make human labour obsolete. If we are able to make the most of it, technological progress will continue to offer broad areas of conquest, catering to the living needs of individuals and society alike. Indeed,

it will be the availability of human labour freed up by the disappearance of old jobs that stimulates the capability to invent new ones. The advent of robotics and artificial intelligence brings with it a risk of replacing not just low skilled jobs, but also highly skilled professions. This might make the transition from old to new jobs longer and more demanding.

It is indispensable to drastically improve the effectiveness of education, careers orientation, and professional training services by incorporating the teaching of ongoing learning. It is also indispensable for them to receive significant financial support from the incomes of those involved. We should be envisaging a widespread, on-the-ground set of welfare and support services, along with a major boost to the pace of reconversion for people involved in the change. Italy lags far behind in these arenas.

This Report was conceived above all as a form of political sharing at a time of entrenched views – and in the run-up to a general election – on the divisive issue of work. Its lack of a specific analysis of recent legislation or of current proposals for future regulation is not a weakness; it is a premise for presenting a converging overview of the dangers implicit in the major upheavals wrought by new technologies, the associated challenges and the responsibilities held by the institutions, social bodies, enterprises and individuals. The Report is an attempt to build a kind of foundation for the nation, for future political and social debate leading to a virtuous competition for solutions. That is no small ambition. There is no better way for this Parliamentary Committee to conclude its term – a committee that has seen frequent divergences, dense and well-documented discussions, as may be evinced from the many majority and opposition documents filed; it has also had its moments of constructive convergence.

ANNEXES: Dissenting positions.

Annex 1. - Note from Senator Maria Grazia Gatti (*Art.1 - MDP*)

Although I appreciate some of the amendments made to the initial draft of the final document for this fact-finding enquiry (I thank the Chairperson for his willingness to make these changes), given that the document has in any event remained assembled cohesively around an analysis of the Italian situation and its causes – not to mention a potentially “obligatory” evolution with which I do not agree – I shall not be voting in favour of this document.

This brief note serves to illustrate the main reasons for my dissent:

- As far as the analysis on the key point is concerned, inequalities that have worsened in recent decades (inequalities that dampen growth) and the huge shift from wages to profit and rent-earning, as well as between working wages; the shift from the middle-class (workers and office staff) towards managers and top professionals, and, something that for me is extremely dangerous, the drop-off in union membership rates (this is indeed a problem);
- I do not agree that we are condemned to a future as isolated individuals who, on our own, have to educate ourselves, invent a job, create our own pension pots... The individualization of labour relations must be avoided at all costs; if it prevails, all that’s left is a relationship of weakness;
- Lifelong learning is of vital importance to us all. And yet lifelong learning can only exist if a sound and basic education is already in place: an education capable of teaching people how to learn, and how to keep on updating our skills. A solid university education is of vital importance (something that cannot be achieved by simplifying the three-year degree course); it is also vital to increase the number of graduates capable of competing with graduates from other developed nations;
- I do not agree with the theory that a welfare system – one that can no longer be defined as universal – can be entrusted to second pillar bargaining, which reduces healthcare, welfare and caring for the person in general to a mere factor of employment law, in the process denying citizens’ rights to all individuals who, owing to age, health, disability or family circumstance, are

either not on the jobs market or have a discontinuous and precarious relationship with the labour market, as is increasingly the case for the younger generations;

- Lastly, in order to avoid job losses it is key to maintain and develop manufacturing, including high-end manufacturing (Italy is a top manufacturer of robots), pursue national schemes for maintaining and correctly managing local areas, introduce innovation to healthcare, modernize on-the-ground services, and fully leverage our top-tier agriculture and artisanal output. Representatives of workers and enterprises must be involved in policy decisions, updating national contracts while at the same time confirming their role and defining forms of worker participation.

Annex 2. - Note from Senator Giovanni Barozzino (*Mixed-SI-SEL*)

I appreciate the Chairman's efforts to include in the final report some of the issues I raised.

The reference to the importance of public policy both on the supply side (education in particular) and on the essential demand side has been strengthened.

For three-year degrees, the term "reform" was preferred to "simplification", a term that may imply that these degrees will be further stripped of their educational content.

Although highlighting the critical issue of the increase in employment recorded by ISTAT, the report fails to sufficiently strongly underline the fact that these statistics do not calculate standard jobs but rather employees, that is to say, even people who worked a single hour during the week the survey was carried out. We must acknowledge that any employment policy that has rendered worker protection more precarious is a policy that has failed (the Jobs Act, the Poletti decree law on fixed term contracts); they may have helped companies take people on, but all they

have done is reduce the cost to companies (while wasting around €18 billion in the process), without for that creating stable jobs.

Work managed by digital platform algorithms – a phenomenon that requires greater protection if we are not to return post-haste to 19th century-style piecework – has become a pressing issue.

Scholarships have been added as a tool to foster education, although the idea of trust-based loans remains on the table.

There is explicit mention of monitoring all educational activities; we believe, however, that it should explicitly be stated that, in particular, tax credits to companies for training need not just be “monitored” but rather certified through veritable public controls, in which the ANPAL organization should take the lead.

I repeat my opposition to work/school alternation, which is currently more or less akin to the provision of free labour to companies without, in the majority of cases, there being any link between the internship and what the students are actually studying.

When it comes to representation, it is positive that the report explicitly notes Constitutional Court ruling no. 231/2013, which declares that limiting representation merely to unions empowered to sign contracts is unconstitutional. Yet there is no mention of a need for a law on representation that incorporates the 2013 inter-federal agreement.

A positive reference remains to corporate welfare, which, in my opinion, risks returning Italy to a corporatist system of social protection; equally ambiguous is the reference to a reduction in non-welfare contributions, which runs the risk of paving the way for a further privatization of healthcare.

Industry 4.0 must go hand in hand with Work 4.0; this is something that Italy’s unions have been asking for unanimously. Not just issues like technological innovation but education and skills must lie at the crux of the debate; we should also be looking at working hours, how they are managed, a different form of redistribution

and new options for reducing working hours in order to effectively tackle the risks of technology-driven unemployment.

Lastly, the ecological limitations of these technologies are not “off topic” given that they use rare metals and “rare-earth” elements, which places a clear limit on this type of development – a limit that will impact employment-related issues and the social model that the fourth Industrial Revolution ushers into the world in the near future.

For all of these reasons, notwithstanding my appreciation for the rapporteur’s efforts, I shall not be taking part in the vote on this document.

Annex 3. Note from Senators Nunzia Catalfo, Sara Paglini and Sergio Puglia (*M5S*)

The Movimento 5 Stelle group on the 11th Senate Committee, having examined the final document of the fact-finding investigation on “The Impact of the Fourth Industrial Revolution on the Jobs Market”, with regard to the second part of the document in question (“CHALLENGES”), wishes to make the following comments:

In section 3 (*Institutions for an Active Life*), we generally agree with the content. The emphasis placed on the need to offer workers appropriate tools in order to allow them to keep up with the rapid changes underway on the jobs market, including the possibility of completely deducting expenses for independent workers’ self-training, is of particular importance. On the contrary, the role allocated to interprofessional funds in the new inclusive work market raised a number of doubts, especially given that this role was deemed to be “primary”. To us, this emphasis appears to be excessive and quite possibly unjustified.

Moving on to section 4 (*Less Law, More Contract*), a great deal of attention should be focused on this to ensure that the gradual expansion of realms regulated through bargaining does not become a form of backdoor deregulation. Wages are particularly important: it is indeed necessary to guarantee equitable remuneration for

workers in order to provide for a dignified life and work, in conditions of liberty, equity, safety and dignity. To this end, even if one may speculate that the dividing line between independent workers and employees will gradually become blurred, this distinction clearly continues to broadly characterize the jobs market. The reference to “guaranteeing minimum wage standards” would appear to be too ambiguous and generic, given that already today, given the lack of *ad hoc* contractual definitions, entire categories of worker and productive sectors are crying out for a definition of a “minimum hourly wage”. It seems in any event to be necessary to point out that the legal definition of any “minimum wage standard” should be identified through a broad-ranging consultation process among stakeholders. Moreover, effective representation of contracting parties is required as a precondition for a truly profitable expansion of regulation in a contractual approach to job contracts. The reference to the need to undertake reform of representative bodies in the workplace – one that goes beyond today’s system – as outlined under Article 19 of the Workers’ Charter, is a positive thing.

Moving on to section 9 (*New Personal Welfare at a Time of Ongoing Transition*), we do not concur with the rather enthusiastic outlook of an exclusively private supplementary pension system in which, in a *de facto* sense, the public pillar appears to be merely the rump of an old, slow and irremediable social system. It is, on the contrary, necessary that the welfare system’s load-bearing pillar be the public sector. The public sphere should have its value increased through modernization, reform and strengthening, to ensure that it can cater to today’s needs and requirements; then it can be accompanied – but not overshadowed – by a supplementary public/private second pillar. We do not share the outlook of a pillar that is an exclusive private monopoly to provide complementary support not just for pensions but for healthcare too.

It seems clear to us that on this new market it is necessary to ensure that workers benefit from protection capable of adapting both to them as individuals and to the market as its needs change. Although it is true that worker categories as

defined today will gradually die out, automation and computerization will gradually strip away the difference between tasks and jobs; it will no longer make any sense to anchor welfare to whether a not an individual belongs to a given productive or working category. It will become necessary to develop a new paradigm on which to build and structure the social protection system, shifting it from a worker-centric to a citizen-centric approach, one that relies more on a Universal welfare system than the coordination and integration of various types of sector-based and corporate welfare schemes. As we have stated a number of times, it is necessary to draft a new charter of guarantees not just for work but for the very concept of what it means to be a citizen. We must redraft the foundations of rights in life by asking a key question: given today's social and global upheavals, what do social rights mean today? What does it mean to give a guarantee of a socially-decorous standard of living, freedom of choice and self-determination for individuals in society? Ideally, in future this will coincide with implementation of a universal citizens' income, a single payment that covers twin functions: on one hand, guaranteeing a minimum level of living standards, while on the other encouraging personal and social growth for individuals through information, training and development of their particular aptitudes, as a precursor to citizens truly and to their full potential taking up their place in the world of work.

We wish to offer our gratitude for contributions made at Committee hearings held at the President's Office, attended by representatives sent by the Minister for Education, Universities

and Research, Valeria Fedeli, the Minister of Employment and Social Policy, Giuliano Poletti, as well as delegates from Federmeccanica, FIOM, FIM, UILM, CGIL, CISL, UIL, UGL, CIDA, AIDP, Confsal, CUB, Confindustria, Rete Imprese Italia, Coldiretti, Confagricoltura, CIA, ACI, ABI, ANIA, OCSE, Istituto italiano di tecnologia, ILO, CEI, SIMLII, Confprofessioni, Assolavoro, CUP, ISTAT, INAIL, INAPP, CNR, ADAPT, Digital Transformation Institute, IWA Italy, Fondirigenti, Fondartigianato, For.Te., Fondimpresa, For.Agri., Fon.Ar.Com., Fondir, Formatemp, Fondo Banche Assicurazioni, Politecnico di Milano, Università Bocconi di Milano, LUISS and the Scuola Superiore Sant'Anna di Pisa.

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