



## THE CHANGING WORLD OF WORK

### Digitalization, automation and the future of work

#### Italy's contribution to the ILO centenary

#### Introduction

The current technological transformation, based on the interweaving of digitalization and automation of socio-economic relations, is creating profound changes in the world of work. As in all change processes, the world of work, and society as a whole, is confronted with challenges as well as great opportunities. The dual impact of this technological change brings to the forefront the importance of the role that public operators have, along with social and economic policy, in making sure that the opportunities outweigh the risks. And, above all, in making sure that any potential benefits that technological innovation may bring, in terms of growth, are distributed fairly, leave no-one behind and foster the development of socially and ecologically sustainable economic processes. Besides Public operators, also social dialogue, the participation of social partners and the support activities of International organizations such as the ILO have an essential role in ensuring that this transition leads to a significant and evenly distributed increase in social well-being.

The challenges facing the world of work concern the risk of technological unemployment; the quality and conditions of work, with the effects that automation can have on the control and reorganization of times and procedures for task execution; the risk of rising levels of economic inequality, with the more highly qualified workers seeing an increase in employment opportunities and income conditions at the expense of those employed in lower-skilled jobs; the rise of new jobs and new markets characterized by the absence of regulations that can guarantee adequate rights and protection as well as the proper appreciation of work. These risks come in addition to a series of pre-existing, crucial challenges that the Italian economy and world of work are confronted with, such as the ageing of the population, the need to reduce gender disparity in the labour market (in terms of greater female participation, of a reduction in the gender pay gap and of the fight against violence in and out of the workplace), territorial imbalances and the necessity to ensure the sustainable internationalization of economic relations.

At the same time, new technologies provide important opportunities of increasing quality employment, of improving ergonomics and the safety of production processes, of stimulating start-ups and fostering youth employment, of raising the environmental sustainability of those processes and of making sure that standards regarding the protection of workers' rights provided for by the ILO are guaranteed at global level. In this regard, the implementation of passive and active labour policies can magnify the impact of digitalization and Big Data, as can training, facilitating compensatory mechanisms to minimize the aforementioned risks. Basic and continuous training is essential to promote the necessary skills to make sure that full advantage is taken of the opportunities offered by new technologies and that such opportunities are made available to as many workers as possible. For this to happen it is fundamental that those involved in production processes agree on the necessary skills and the relative training required, which underpins the importance of the role of social partners and of national bilateral agreements, as well as of institutions such as ILO and the expertise of the ITCILO of Turin in supporting, on the basis of the best international

experiences, the governance of a concerted strategy for skills development. Furthermore, new technologies can enhance important social infrastructures, such as healthcare systems, by increasing their effectiveness and capillarity, producing significant social and economic benefits.

The Italian Government is committed to making sure that the benefits of the present technological transition are spread rapidly and fairly. In fact, interventions such as the Industria 4.0 plan, which aims to encourage the start-up of new innovative businesses and to foster the technological advancement of the Italian production system, are already heading in this direction. The ultimate objective of this intervention is to improve the capacity of Italian enterprises to generate new, decent jobs that will increase work opportunities for young people and women and contribute to reducing existing territorial disparities. Moreover, the policies put in place to strengthen the technological capacity of businesses, also aim to encourage the transition towards “green”, eco-compatible production that is, at the same time, characterized by the demand for high-level work and skills. From this point of view, the push towards competitive models based on innovation and product quality, rather than on cost reduction, is one way in which Italian businesses can improve their international positioning, with substantial benefits with regard to demand and employment.

This paradigm shift disrupts the concept of workplace and working hours, triggers the creation of new kinds of jobs and makes it necessary to continuously up-grade skills, which involves important public interventions aimed at improving education outcomes, professional training and the harmonization between knowledge accumulation and work. Experimental work-linked training-that will involve one and a half million students over a three-year period-and apprenticeship are measures that go in this direction. Furthermore, lifelong learning paths are being developed to ensure a dynamic up-grading of skills in the face of constantly changing work processes. Alongside this, training activities organised through bilateral organisations in collaboration with the social partners will boost the benefits of the training itself. Furthermore, policies geared towards enhancing the skills system and fostering matching between labour demand and supply must be accompanied by effective industrial policies that help to seize these new opportunities, above all in those areas of the Country where infrastructure is poor but where there is no lack of human capital on which to focus and in which to invest in order to boost technological innovation. These actions aim at enhancing production throughout the Country and at encouraging full and decent employment.

To respond to and govern these changes public policy-making concerning work, training, safety and welfare must keep pace with the sudden transformations brought about by technological innovation. In fact, in the future social protection will become increasingly linked to social inclusion. To complicate matters even more, we are in a phase in which the past has not yet passed but the future is already here.

We are faced with a world of work where old and new professions coexist: we must embrace future opportunities, by updating the social protection framework, without leaving behind those workers who are currently having to contend with once unthinkable innovation that is rapidly transforming processes.

We must reduce inequalities and foster a positive relation between the human condition and technological innovation through the implementation of internationally coordinated policies to avoid social dumping. In this regard the ILO initiatives to encourage coordinated efforts among countries are of fundamental importance.

Policies aimed at optimizing the benefits of the current technological transition must be part of a systematic plan that takes into account demographic changes and migration flows, new safety conditions at work linked to new production processes, youth and female employment conditions as well as the needs of older workers. It will be necessary to strengthen the social protection networks for workers and companies, to ensure a strong welfare system for everyone, involving active and passive policies and the continuity of social security.

Special priority should be given to young people, whose level of unemployment in our Country, despite recent improvements, is still too high. Young workers are becoming increasingly mobile, both spatially and functionally, having to face non-standard kinds of work-such as digital platforms and other new business models-in a panorama where the difference between being employed or self-employed is blurring and where on the one hand opportunities arise to reconcile private and working life and on the other problems arise regarding the discontinuity of employment and social protection. A broader social protection network is required, with a floor of minimum protection for everyone, on which to introduce other individual or

collective accumulated rights that can be carried forward to respond to different needs at various points in one's career and life (training, sabbatical leave or sick leave). The laws that have recently been approved in Parliament concerning self-employed workers and smart working provide an initial response to this problem.

Its conversion means we must put in place actions to foster change while optimizing opportunities. In driving change in the world of work, it is necessary to use foresight, aiming to include everyone and to avoid leaving the labour market alone to allocate advantages and establish the winners. Policy-making is essential for the purpose of managing and driving change processes, to create a society where everyone benefits or is at least protected. Such actions need to be developed through continuous discussions between institutions and social partners, with shared objectives regarding inclusive and quality growth for our Country and a decent job for everyone.

This contribution is a synthesis of the discussions and the work carried out by the working table "The Changing World of Work" set up by the Ministry of Labour and Social Policy. With the centenary of the International Labour Organization (ILO) and the G7 of Labour Ministers approaching, the purpose of the table was to build a base of open and shared knowledge regarding the potential impact of digitalization and automation on the world of work, the economy and society. A knowledge base to be used as a resource when planning interventions to optimize the benefits and minimize the social costs of the current technological transition, to put people first in an effort to create a future which can guarantee "a decent job for everyone".

Starting from the contributions made by the numerous participants at the working table and on the [online Forum](#), this document provides a list of the main subjects that arose and for each one there is: a brief description of the subject; a list of the required exploratory activities; preliminary guidelines for potential policy interventions; the list of stakeholders involved. There are two transversal issues that must be integrated in all policies and measures: the fight against inequality and the building of a woman-friendly economic environment.

Inequality poses the main obstacle to the spread of inclusive and sustainable growth. The inequalities created by crystallizing privileges, encourage polarization and disparity among workers, companies and geographic areas. The rise in opportunities for the more highly qualified workers, triggered by the recent technological change, is one of the main factors responsible for the increase in inequality in the advanced economies. Worker inequality regards not only income but also rights (social, legal, participation and representation), education and training, services for work, gender inequality. The businesses with greater involvement in innovative processes have benefited from increases in productivity and revenue. Disparities in access to technology generate a risk of polarization also among enterprises and give rise to the need for sophisticated industrial policies that enable more and more businesses to cross the technological frontier through multi-faceted interventions. Inequalities between workers and between businesses are-in particular in our Country-enveloped by territorial disparities, deeply-rooted in the diverse availability of services, capital and capacitating infrastructure, and that are further emphasised in the different capacities to generate decent employment that includes minimum protection and rights. Only by fighting gender inequality inside and outside the workplace will it be possible to build a woman-friendly economic environment. Starting from the gender pay gap-and the consequences that this has on pensions and individual independence-to affirming the right to equal pay (and contributions) for the same job, to the recognition of unpaid care work -still today largely carried out by women-and its bearing on the economy; from the necessity to identify and remove the obstacles that women face when entering the labour market, to social investments that facilitate women's entry into work. All these issues must be integrated into the analyses and the actions that aim to give our Country a synergistic combination of tools and policies to implement an equitable strategy for skills enhancement that will enable us to keep up with the technological and demographic transformations, and to ensure well-being and decent work for everyone.

## **1. Protect, encourage and enhance employment**

### **1.1. Technological unemployment**

#### *Description*

Risk of jobs, tasks and duties becoming obsolete and risk of a decrease in the demand for work due to the automation and digitalization of production processes.

#### *Required exploratory activities:*

- Empirical analysis that provides a detailed picture of the organisation of employment (by sector, geographical area, gender, age-group, qualifications, profession, duties, skills) and the rapport between this and the technological characteristics of businesses and sectors
- Analysis of the evolution of jobs and task content to enable the detailed mapping of the current organisation and the future developments, in as much detail as possible
- Analysis of the role of human capital (with particular reference to digital skills) and its impact on the performance of workers and businesses
- Identify the strong and weak points of the compensatory mechanisms through which the demand for new jobs should compensate for the loss of those jobs that have become obsolete due to technological advancements

#### *Guidelines:*

- Organize a coordinated set of active labour and social protection policies that take into account the diverse consequences that technological change can have on different production sectors and on different geographic areas
- Foster transitioning of sectors, professions and responsibilities to minimize the risk of technological unemployment and to reduce the related social cost
- Strengthen the services for public and private work by exploiting information flows and available data elaboration technologies in order to increase the efficiency and timeliness of the support offered

#### *Stakeholders:*

The Italian Ministry of Labour and Social Policies-MLPS, the Italian Ministry of Economic Development-MISE, the Italian Ministry of Education, University and Research-MIUR, the Regions, the Italian National Institute of Statistics-Istat, The Italian National Institute for Public Policy Innovation-Inapp, the Italian Institute for Social Security-Inps, the Italian National Agency for Active Labour Policies-Anpal, Social partners, Professional associations, ILO.

### **1.2. Enhance and up-grade the skills of workers and enterprises**

#### *Description*

Technological transition requires the development of new skills and the up-grading of existing ones to facilitate effective matching between labour demand and supply. Skill enhancement in the labour market and the adaptation of skills to technological progress, at the various professional levels, is essential if we are to take full advantage of the economic and production potential of new technologies. Furthermore, a

favourable organisational structure is required if workers or entrepreneurs are to use their skills to their full potential. The building, the development and the up-dating of skills of workers and businesses also requires investment in public and private research, in research training and in the creation of meeting infrastructures to facilitate the technological transfer between companies and the research world.

*Required exploratory activities:*

- Quantitative and qualitative analyses of demand from the production system for professional requirements, skills and responsibilities, and of the structure and the characteristics of the available training offer
- Analysis of the characteristics of entrepreneurs and of the link between these characteristics and the use of process and organizational innovations that facilitate the use of skills
- Cross check information on jobs, tasks and skills with the data from the analyses of education and training offers

*Guidelines:*

- Enhance and adjust the private and public training offer to up-date it with the most in-demand skills
- Develop tools to spread the digital know-how of those entering the labour market for the first time and of those involved in processes of reorganization or reallocation
- Encourage bipartite social dialogue on training and take better advantage of the inter-professional funds to guarantee timeliness and suitability of skills adjustment paths
- Encourage social dialogue to facilitate the creation of organizational environments that optimize the advantages of training and of skills development
- Improve industrial doctorates and technology clusters as well as the technology transfer between the research world and the business community
- Implement programmes and support measures for the upgrade and development of entrepreneurial skills for entrepreneurial and professional organisations, in relation to the Fourth Industrial Revolution
- Redesign training policies to bring programmes more in line with individual characteristics and needs in order to enhance formalized skills and working experience, soft skills, intangibles and transversal skills
- Introduce the right to training that is transferable from one job to another and between employment situations (see the French experience regarding personal training accounts)
- For job transitions, certify the skills attained by workers, also in order to identify future training needs
- Enhance support tools for the school-work transition facilitating: work experience schemes, career services and dual apprenticeship
- Encourage the use of existing labour agreements (apprenticeships and 150 hours) and industrial relations (second level bargaining) to support the virtuous circle from school to skills enhancement to the development of innovations in companies
- Encourage investment in training through tax relief, by lifting the tax from training resources and hours and by defining forms of super amortization of investments in human capital, similar to those used for machines and technologies

*Stakeholders:*

MLPS, MISE, MIUR, Regions, Istat, Inapp, the Italian National Institute for Accidents at Work-Inail, Anpal, Unioncamere, Social partners, Professional associations, Inter-professional and Bilateral Funds, ILO, OECD-Directorate for employment, labour and social affairs, OECD -Directorate for education and skills.

### 1.3. Quality of Employment and work conditions

#### *Description*

Digitalization and automation impact on the quality and conditions of work, modifying the structure and the composition of the workforce (increasing the demand for highly specialized jobs), production processes (efficiency and reorganization) and task execution methods (timing, frequency, location, ergonomics, monitoring, health and safety).

#### *Required exploratory activities:*

- Analysis of the quality and conditions of work, to be carried out with qualitative and quantitative techniques
- Investigate the specific relation between process and product innovation and organizational innovation and work conditions
- Monitor the structure and the bearing of the various agreements in use, per sector, size and type of business

#### *Guidelines:*

- Draw upon new technologies (Big Data) to monitor the compatibility of innovations designed to increase industrial efficiency and work conditions
- Verify the appropriateness of existing laws in the light of the changes in progress and identify potential adjustment paths
- Foster co-design innovation activities, where appropriate through social dialogue, that facilitate the competitiveness of the company and the quality and conditions of work
- Support the spread of organizational participation in industrial bargaining with activities that support the social partners, with particular attention to the spread in the SMEs
- Encourage innovative health and safety interventions, also regarding the possible increase in psychosocial risks of social exclusion
- Right to disconnection and regulation of performance control and evaluation practices based on the use of digital technologies

#### *Stakeholders:*

MLPS, MISE, MIUR, Inail, Istat, Inapp, Anpal, Social partners, Professional associations, ILO

### 1.4. Youth employment and the school-work transition

#### *Description*

Given the expected growth in demand for new skills and for flexible, dynamic professionals, new technologies are the current driving force behind youth employment. Moreover, Big Data make it possible to significantly improve matching between the demand and supply of new skills and to enhance the infrastructures and systems for career guidance, placement and school-work transition. Taking good advantage of the opportunities related to the spread of new technologies could significantly reduce the incidence of NEET.

#### *Required exploratory activities:*

- Mapping of the spread of digital know-how among young people and in schools

- Practical analysis of the relation between the probability of a young person finding a job and his/her skills set (particular focus on those who have just finished a course of study)
- Practical analysis of the performance of young workers, identifying them by type of responsibility and the technological intensity of the work
- Monitoring and evaluation of current programmes that aim to foster youth employment and the placement of those who have finished their studies
- Monitoring and evaluation of current work-linked training schemes
- Monitoring and evaluation of the Technical High Schools (ITS)

*Guidelines:*

- Intensify programmes for the spread of digital know-how right from the first years of school
- Enhance and, where necessary, up-date work-linked training schemes with particular regard to fostering the active involvement of businesses and to create synergies between schools and businesses working in middle to high technology sectors
- Enhance and, where necessary, modernize the tools that aim to foster youth employment (i.e. Youth Guarantee, tax incentives to encourage youth employment in particular in the disadvantaged regions)
- Enhance and, where necessary, modernize the ITS
- Enhance and, where necessary, revise dual apprenticeship
- Enhance resources and tools to guarantee transversal training for vocational apprenticeships and certify the digital skills for all apprentices
- Enhance and certify training done by company or school tutors
- Enhance placement services in schools and universities
- Certify informally or formally acquired transferable skills

*Stakeholders:*

MLPS, MISE, MIUR, Regions, Istat, Inapp, Inail, Anpal, Unioncamere, Social partners, Professional associations, Inter-professional funds, Bilateral organisations and funds, ILO, OECD-Directorate for employment, labour and social affairs, OECD-Directorate for education and skills.

## **1.5. Integrating supply and demand-side and industrial policies**

*Description*

To realise the full economic and employment potential of digitalization and automation it is necessary to effectively integrate labour supply policies (skills alignment and enhancement, enhancement of tools to foster matching between labour supply and demand), labour demand policies (reductions and tax and social security incentives), aggregate demand/public spending policies (public investments geared towards sectors and products with high technological intensity) and industrial policies (to encourage companies to do research and make innovative investments, to create infrastructures to stimulate the spread of new technologies). In this context it is crucial that digitalization and automation technologies are embraced by SMEs and micro enterprises and that these technologies encourage greater integration with the bigger companies.

*Required exploratory activities:*

- Analysis of the complementarity of investment in human capital, physical capital and innovation.
- Analysis of the rate of innovation of the various industrial sectors and of the impact of demand and

investment on innovation

- Analysis of the factors that facilitate or inhibit the spread of new technologies in SMEs and micro enterprises
- Evaluation and monitoring of the effectiveness of industrial policies in stimulating the innovation, economic and employment dynamic of businesses and sectors, particularly with regard to the additional effect of the Industria 4.0 plan

*Guidelines:*

- Combine interventions on the supply side aimed at guaranteeing the availability of useful skills for product and process innovation, with demand-side and industrial policies aimed at increasing employment, levels of investment, the start-up of new companies and the spread of innovation
- Strengthen the investment incentive plan (i.e. super amortization) and in particular measures aimed at stimulating technological upgrade (i.e. Industria 4.0)
- Direct public demand towards the most innovative sectors and products in order to stimulate the economic dynamic and encourage companies to invest in innovation

*Stakeholders:*

MLPS, MISE, MIUR, Regions, Istat, Inapp, Social partners, ILO, OECD-Directorate for Science, Technology and Innovation.

## **1.6. Platform Economy**

*Description*

Online delivery platforms – platforms that organise the delivery of goods and services to your home, such as Foodora or Deliveroo for food, Uber for transport, TaskRabbit for home services or Amazon Mechanical Turk and Crowdfunder for intellectual services—connect customers directly with service providers. These platforms make it possible to widen the offer and increase the efficiency of a plurality of services. At the same time, these platforms present challenges regarding: the legal definition of the relationship between providers and platforms; how to guarantee quality standards of the services provided as well as of the working conditions of the providers; social protection and the representation rights of workers; the degree of competition in the markets where the platforms operate and tax compliance.

*Required exploratory activities:*

- Mapping of existing platforms, their structural and economic characteristics and their impact on employment
- Quantitative and qualitative analysis of work conditions inside the platforms (based on the work already carried out by ILO)
- Analysis of the current legal set up of the platforms and of existing regulations that could discipline their activities
- Comparative analysis of the commercial platforms (i.e. Uber, Foodora, etc.) and of those where providers co-manage or co-own the infrastructure

*Guidelines:*

- Evaluate the viability of existing regulations, also extending- adapting- those that apply to other work agreements, or create ad hoc regulations to guarantee clear rules that regulate the activities provided via the platforms as well as to guarantee minimum standards in terms of quality, work conditions, social



protection, representation rights and remuneration

- Create tools to diffuse digital platforms for cooperation and co-management with the purpose of enhancing and increasing the efficiency of public services managed by cooperatives and social enterprises
- Facilitate and acknowledge social dialogue aimed at establishing rules and suitable contractual protection

*Stakeholders:*

MLPS, MISE, MIUR, Istat, Inapp, Inail, Inps, Social partners, ILO.

## **2. Welfare, co-operation and social investment**

### **2.1. Strengthen the welfare state and the social infrastructure**

*Description*

The potential impact of technological change on employment, due to the demand for new skills, just like the development of the afore-mentioned platform economy, underpins the necessity to establish social rights that accumulate over time, that are transferable from one employment situation to another and from one life-phase to another. The importance of skills brings to the forefront phenomena such as education poverty and the necessity to fight the intergenerational transmission of poverty, together with the phenomenon of the working poor. All this indicates the need to modernize social protection systems, with a view to investing in social infrastructure and capacitating social protection in terms of skills enhancement, from education to accessible quality nurseries, from social housing to training. An ageing population and the consequent rise in chronic disease mean an ever increasing demand for health and social services. At the same time, technologies such as smarthome technology and Big Data, together with product customization, based on individual needs, mean a better quality of life for many people (especially those with disabilities or who are not self-sufficient), and an increase in the quality and quantity of social services as well as a rise in related employment. The so-called digital social innovation and the adoption of a social investment strategy, can be put into operation through public-private partnerships, forms of project financing, social cooperatives, also mobilising long-term investors, institutional investors that possess patient capital and who are interested in the stability of the social system. In our Country, in addition to institutional investors and pension funds, the professional pension funds can also play an active role. Long-term care schemes, as well as the electronic infrastructures that enable the organization of care and support services, can be created and financed in this way. Additional protection based on national and decentralised collective bargaining is rapidly spreading in the same way. This complementary contractual welfare is additional and does not take the place of universal social protection, and can contribute to responding to needs (for care, for life-work balance) that have not been met up to now and also increase employment in services.

The latter can trigger greater employment, especially for women. It is however necessary to face the obstacles that inhibit the participation of women in our Country, also on account of difficult conciliation procedures and the over-representation of women in care work.

Technological advancements and the growth of the welfare state, with investments in services, could result in a strategy that facilitates compensatory mechanisms (increase in welfare jobs, white jobs, that compensate for those that have become obsolete because of new technologies in industry and services) and at the same time increases the quality and quantity of public goods, with investment in the future, primarily in the capacities of the new generations.

*Required exploratory activities:*

- Analyse the needs for social protection as a consequence of technological change
- Analyse the potential of digitalization and automation in strengthening the welfare state
- Analyse the impact on employment of the growth and technological advancement of social services
- Analyse obstacles and bottlenecks to female labour participation
- Analyse the spread of integrative contractual welfare, with regard to the population involved and the needs it covers

*Guidelines:*

- Foster social investment geared towards capacity and skill building in the face of technological change
- Invest in social protection schemes that give rise to transferable rights
- Foster interventions that encourage the use of new technologies to strengthen the welfare state and increase the efficiency of services
- Introduce open technological infrastructures that enable operators to use new technologies and share best practices with a view to improving the quality of services
- Encourage the spread of integrative welfare, that helps to build a floor of universal social rights

*Stakeholders:*

MLPS, MIUR, Regions, Inail, Inapp, Inps, Social partners, Social enterprise associations and third sector, Associations of cooperatives, Long-term investors, pension funds, Professional pension funds, ILO.

## **2.2. The role of cooperatives and social enterprises**

*Description*

Cooperatives and social enterprises can contribute significantly to the process of technological modernization and quality-quantity enhancement of the welfare state. The flexibility guaranteed by new technologies and the possibility of personalising the goods and services on offer means improved matching in the demand and supply of social services. Synergies between public operators and cooperative and social enterprises can be significantly enhanced by the use of technologies such as Big Data that can provide a better offer as well as a greater capacity of the public operator to monitor the activities carried out by its partners. In the case of cooperatives, the use of digital technology can increase the effectiveness of governance and facilitate the transfer of knowledge and skills within the association.

*Required exploratory activities:*

- Analyse the potential of new technologies to strengthen the impact of social and cooperative enterprises
- Analyse the impact of new technologies for the cooperation between public and private social enterprises in providing public goods and services
- Monitor and evaluate the use of existing measures to encourage social-oriented start-ups

*Guidelines:*

- Foster actions that encourage the use of new technologies in social and cooperative enterprises
- Facilitate social enterprise networks and cooperation between public and private social enterprises
- Create tools to spread best practices regarding the use of new technologies in the social sphere
- Strengthen existing measures aimed at supporting the development of social-oriented innovative start-ups

*Stakeholders:*

MLPS, MISE, Regions, Inapp, Social partners, Associations of Cooperatives, Representatives from social enterprises, ILO.

### **3. Technological change, globalization, demographic dynamics and migration**

#### **3.1. Globalization and technological change**

*Description*

The advent of digitalization and automation comes with an ever increasingly intense integration of the Global Value Chains (GVC). The spread of these technologies provides an opportunity to increase the internationalization of companies with benefits in terms of economic growth, employment and technological advancement. By reducing the incidence of routine tasks in manufacturing, technologies such as 3D Printing and Advance Manufacturing could induce reshoring processes (reintegration of production phases that were previously delocalized) which are potentially beneficial in terms of the quantity and quality of employment. Finally, the greater cooperation and refining of control techniques of the GVC could facilitate the introduction of better international standards of work conditions, especially in the countries where there is higher employment intensity. The adoption of Industria 4.0 technologies in the manufacturing sector could mean a reduction in the carbon footprint through an increase in efficiency and a reduction of waste in the production cycle and the reintegration of production components.

*Required exploratory activities:*

- Analyse the potential of the new technologies regarding the reintegration of production phases and the improvement of management and control techniques of the GVC
- Analyse the structure and composition of the labour demand per geographic area, sector and size of enterprise
- Study the relation between technological innovations and the impact of employment (both in quantitative terms and in terms of sectorial distribution and between professional categories) on international trade

*Guidelines:*

- Foster interventions to accelerate the use of technologies for greater integration along the GVC
- Facilitate the introduction of international standards for the protection of work along the GVC also in the light of the opportunities made available by the technologies of digitalization (the possibility to trace the various phases of the processes in detail)

*Stakeholders:* MLPS, MISE, Istat, Inapp, Social partners, ILO, OCSE-Directorate for Science, Technology and Innovation.

#### **3.2. Aging of the population and migration flows**

*Description*

New technologies offer an opportunity to respond to challenges associated with population aging. There are two important current demographic trends: the aging of the population which is the result of a rise in life expectancy and a decline in fertility rates; the migration flows coming from emerging and developing

countries into Europe, which are bound to continue. As far as concerns the financial sustainability of welfare systems, the two demographic trends work in opposite directions: aging reduces the contribution base and increases the expenditure on services, while migration flows contribute to mitigating the aging process and to supporting contribution revenue. Digitalization and automation can widen the spaces for active aging as well as extend the opportunities for the modernization of care services with potential beneficial effects on the quantity and quality of employment (white jobs). In this context, population aging can be balanced by migration flows that increase labour supply and support the contribution revenue. For this purpose actions are needed, on the one hand, to establish the skills required by migrants and on the other to certify those skills and, where necessary, provide specific training.

*Required exploratory activities:*

- Study the potential of digitalization and automation in encouraging active aging
- Monitor the relation between demographic variables, macroeconomic dynamics and technological innovation
- Monitor and evaluate the effectiveness of reform policies of the social security systems in relation to the introduction of active-aging measures
- Establish integrable skills requirements through the migrant worker labour offer
- Build tools for the certification of migrant worker skills

*Guidelines:*

- Foster processes of innovation and modernization of production processes that facilitate active aging
- Encourage contactual forms that permit enterprises and workers to make the most of skills and introduce innovations also with the purpose of involving elderly workers in reorganization processes
- Create active and passive labour policies that alleviate social costs in the case of elderly workers who are not able to update their skills set; facilitate such updates and any relocation processes for active workers
- Encourage life-long learning programmes linked to the use of new technologies and the adoption of flexible organization models that foster active aging
- Foster active inclusion of migrants on the basis of their certified skills and training, considering also the opportunities offered by the sectors of the silver economy.

*Stakeholders:* MLPS, MISE, MIUR, Ministry of the Interior, Regions, Istat, Inapp, Inail, Inps, Anpal, Social partners, ILO.