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► Survey on the future demand for vocational training in the textile sector in Brazil



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Survey on the future demand for vocational training in the textile sector in Brazil

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SURVEY ON THE FUTURE DEMAND FOR VOCATIONAL TRAINING IN THE TEXTILE SECTOR IN BRAZIL



This research is being developed by two global projects of the International Labour Organization - ILO: South-South Cooperation Project for Decent Work with Cotton and Project on the Future of Work in the Textile and Clothing Sectors, implemented in collaboration with the government and organizations representing employers and workers in Brazil, Ethiopia and Jordan.

The objective is to provide technical support to partners in the sector to design and implement professional training strategies that enable them to develop the skills necessary for the success and growth of industries, while ensuring that workers have access to decent and productive jobs.

Recommendations or proposals for action developed by representatives of the government, employers and workers in Brazil will be shared on a South-South platform, facilitating the dissemination of good practices and the transfer of knowledge with other developing countries.

▶ 1. BACKGROUND

[The ILO Centennial Declaration on the Future of Work](#), adopted at the 108th session of the International Labour Conference (ILC) in June 2019, calls for an “human-centred approach to the future of work”. The Declaration recommends, among other measures, “promoting the acquisition of skills, competencies and qualifications for all workers throughout their working lives,” as a joint responsibility of governments, employers and workers. Such measures aim to address existing skill gaps and anticipate them, to improve the capacity of workers to seize the opportunities for decent work. The Declaration also recommends ensuring the education and vocational training systems respond to the needs of the labour market, bearing in mind the evolution of work.

In 2019, the ILO published [a study on the future of work in the textiles, clothing, leather and footwear sectors](#). The study examined the impact of technological advances, globalization, and climate and demographic changes on decent work. The study also elaborated different scenarios about the future of work in countries with different levels of development, technology and income.

Regardless of how these scenarios unfold or how the strategies are applied by different producing countries, it is clear that professional training is an essential component to

tackle the challenges and opportunities of the future of work. The new skills will be essential to ensure that employers and workers can adapt to new industries, with the advent of new technologies, new materials and the growing pressure and need to manufacture products in an environmentally sustainable manner.

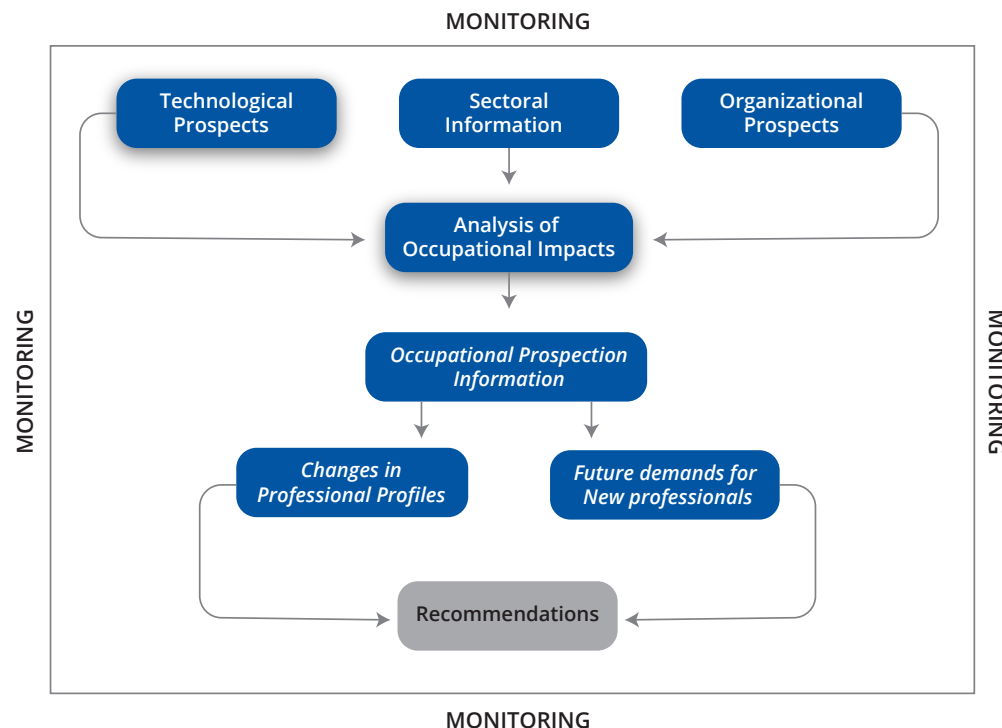
The theme of vocational training is addressed by the [ILO Employment Policy Convention, 1964 \(No. 122\)](#),¹ which highlights the importance of an active employment policy aimed at promoting full employment, which should be productive and freely chosen. According to Convention 122, the concept of freedom of choice of employment implies “*the fullest possible opportunity for each worker to qualify for, and to use his skills and endowments in, a job for which he is well suited*”. [The ILO Human Resources Development Convention, 1975 \(No. 142\)](#)² calls on Member States to “*adopt and develop comprehensive and co-ordinated policies and programmes of vocational guidance and vocational training, closely linked with employment, with the goal to encourage and enable all persons to “to develop and use their capabilities for work in their own best interests and in accordance with their own aspirations, account being taken of the needs of society*”.

1 Brazil ratified Convention 122 on March 24, 1969.

2 Brazil ratified Convention 142 on November 24, 1981.

► 2. THE PROSPECTIVE STUDY IN BRAZIL

In 2019, the National Service for Industrial Training (SENAI) developed a [prospective study for the Brazilian textile sector](#), through the application of its Prospective Model (The SENAI Prospective Model).



The Model aims to generate information that can support the various agents involved (eg, professional training institutions, employers' associations, labour unions of the sector and government bodies) in supporting the sector.

The Model initially presents *future contexts*, which are generated by the information obtained in its various stages: technological and organizational prospects, occupational impacts and identification of new professionals.

The Model generated the following information about the future of the Brazilian textile sector:

- Technological and organizational changes for the next 5, 10 and 15 years.
- Changes in activities and competence elements (*knowledge, skills and abilities*) of occupations.³
- Identification of future demand for new professionals by companies in the sector in question.

³ This research uses the terminology of the SENAI Model, according to which competency is defined as a set of *knowledge, skills and abilities*.

► CONTEXTS

CONTEXT 1 – TECHNOLOGICAL AND ORGANIZATIONAL CHANGES

The technological prospects carried out within the scope of the SENAI Prospective Model pointed, for the next 10 years, to an increase in the diffusion (acquisition and use) of technologies associated with industry 4.0, as well as those associated with the fields of nanotechnology and biotechnology. Some examples can be cited: *Industrial Internet of Things (IIoT) for production control, Big Data system for production planning and collaborative robots in production processes, production digitization, identification of products and operating conditions*, among others.

If the insights from experts consulted are confirmed, the sector will increase its capital intensity, theoretically increasing its productivity and competitiveness power. However, experts pointed out some factors that may hinder/prevent the acquisition and use (diffusion) of such technologies by companies in the sector, such as: *Lack of perception by decision makers of the advantages of the new technology in relation to the current one, high degree of complexity of new technologies, lack of qualified labour and lack of suppliers or technical assistance in the country.*

Furthermore, the digitization of production will bring new challenges to employers and employees, such as the creation of *protocols for information access, privacy guarantee and digital security.*

In the organizational context, the experts consulted indicated that the sector is moving towards the implementation of management tools and organizational actions that seek a balance between the offer of products with low costs and greater added value. According to the results of the organizational prospects, part of the Brazilian production chain will implement, in the next 5 and 10 years, a set of actions to reduce the costs of final products, such as *the implementation of market positioning strategies based on leadership by costs, and production based on the concept of lean production.*

Another part of the chain has sought to increase the differentiation of its products, through the *implementation of market positioning strategies based on market niches, marketing strategies based on offering solutions (products + services), and production strategies based on mass customization.* In addition to these two movements, *the implementation of strategies to attract, identify, develop and retain talents based on the existence of projects and actions that allow the commitment and empowerment of workers, and the implementation of a decentralized organizational structure, democratization of information.*

CONTEXT 2 – ELEMENTS OF FUTURE COMPETENCIES

The occupational impacts stage of the SENAI Prospective Model identified some **knowledge** needed today and in the future for occupations that will be most impacted by technological and organizational changes: *Textile Technician, Textile Maintainer and Textile Processing Operators*. The areas of knowledge identified were:

- **Chemistry** - General Chemistry; Environmental Chemistry; Analytical Chemistry; Waste Management; Treatment of Tailings and Effluents; Organic Chemistry.
- **Mathematics** - Applied Mathematics; Probability and Statistics; Calculation and Analysis; Mathematical Logic; Geometry.
- **Physics** - Mechanics, Electricity and Magnetism; Fluid Physics
- **Portuguese language** - Text reading and interpretation, technical writing.

Added to this knowledge are those related to the area of **ICTs and Electronics** (Programming Languages, Electronic and Electrical Circuits, Hardware, Electronic Installation and Software Applications).

In addition to knowledge, the SENAI Prospective Model identified some new **skills**, as well as others that should be intensified in the coming years for occupations that will be more impacted by technological and organizational changes: *Textile Technician, Textile Maintenance and Textile Process Operators*. The skills identified were:

- **Programming** - Writing and modifying computer, machine and equipment programmes for different purposes. Recognition of programming paradigms.
- **Technology projects** - Generate or adapt equipment and technologies to meet the needs of users.
- **Systems analysis** - Analyse how a system should work and how changes in conditions, operations, and the environment can impact results.

- **Negotiation** - Promote the debate of ideas and/or positions with the objective of reaching a point of balance between different interests.
- **Solving complex problems** - Structuring complex problems and analysing related information in order to develop and evaluate options aiming to implement solutions.
- **Operation analysis** - Analyse requirements and procedures for the design or improvement of production, parameters and objectives of operations, inspection standards, materials and forms of use, facilities, equipment, tools, working conditions and methods.
- **Systems analysis** - Analyse how a system should work and how changes in conditions, operations, and the environment can impact results.
- **Environmental perception** - Be aware of the importance and relationship of environmental issues with production processes and new business models

CONTEXT 3 – DEMAND FOR NEW PROFESSIONALS

Technological and organizational changes will strongly impact the demand for new professionals in the next 15 years. The specialists consulted by the SENAI Prospective Model identified a set of new professionals, which should be demanded by Brazilian textile companies in line with the technological and organizational evolution (diffusion) of the sector in the country. Possible new professionals and a brief description of their activities in the companies are presented below.

Name of the new profession	Brief description of performance
Sustainability specialist for textile processes	This professional will seek sustainable solutions for waste products from the textile chain.
Specialist in nonwovens and technical textiles	This professional will develop nonwoven and technical textile products, as well as their respective manufacturing processes.
Textile technician specialized in mechatronics	This professional will plan, execute and maintain the integration of electronic, mechanical, automatic control and computing technologies in textile processes.
Textile technician specialist in textile surface design	This professional will develop structures and designs for textile substrates (yarn, flat fabric, knitted fabric and prints) and 3D printing.

Name of the new profession	Brief description of performance
Specialist in biotechnology processes applied to textile fibres	This professional will develop biopolymers applied to the textile sector
Specialist in biotechnology processes applied to textile processing	This professional will develop processes for textile processing of biopolymer fibres
Specialist in textile process certification	This professional will guide and monitor the certification processes of textile processes and products
Digital textile stamper	This professional will operate the digital stamping machines

CONTEXT 4 – OTHER TRENDS

To respond to the crisis caused by COVID-19, it is necessary to consider the structural, technological, productive and organizational changes that have taken place recently. The recovery and resilience of Brazil's social, economic and environmental development requires a coherent set of employment policies and, within this framework, a system of apprenticeship and professional training.

Strengthening the capacities of all actors to interpret and design innovative strategies in the face of structural, technological, productive and organizational changes that add to the critical impact of COVID-19 is essential to influence employment and professional training policies. This implies *in deepening new methods of management the professional training systems and professional qualification frameworks for the analysis of competencies that improve knowledge, skills and capacities of workers and human resources personnel or directors of companies in the labour market.*

The management of a modern lifelong learning system requires a systemic approach and an inclusive methodology that *integrates the dynamic axes of decent work in the perspective of adapting to organizational, technological and productive changes in the system for an inclusive labour market, including the global value chains.* This cannot be achieved if not through updating key actors, such as union organizations, involved in the management of education and lifelong learning systems. Such actors should liaise with other agents of labour institutions to foster social dialogue according to the perspective of the future of work; and, encourage the inclusion in the negotiation and collective agreements of clauses on productive development with adequate working conditions and with the management of permanent learning processes.

► RECOMMENDATIONS

TO PROFESSIONAL TRAINING INSTITUTIONS

1. Add aspects related to fashion trends to curricula, with special attention to circular and sustainable economy, as well as contextual cultural aspects that support a holistic reflection on the sector, in order to ensure the necessary flexibility and willingness for occupational mobility to sector workers.
2. Adapting the offer of courses according to the demand of the industry so that there is a convergence between workers and employers, promoting equity and equal opportunities for all people, with special attention to women.
3. Expand the capillarity to reach the largest number of workers that are vulnerable to technological changes, offering them possibilities both to adapt to the new capacities sought by the market, and to facilitate professional requalification for possible adaptations in the sector.
4. Expand the offer of courses to train formal and informal workers in new skills and competences, in order to reinsert workers in the production chain.
5. Expand the tripartite and technical social dialogue, with a view to address the skills needed for the development of training curricula, such as the main trends in the sector and fashion, the social context of the world and other relevant aspects.
6. Seek technical and higher education training capable to integrate learning with the use of new technologies in order to increase productivity.
7. Seek partnerships with companies and unions (labour and employer) to implement new programmes and professional training courses in order to train current active workers and also train new staff to assist remotely with these new demands.
8. Empower their respective faculty in the new demands, so that they are fomenters of this new knowledge and skills to future professionals.
9. Create and offer professional updating and (re) qualification programmes at the frontier of knowledge.

10. Develop marketing actions aiming to reach the largest possible number of young people of entry age in the labour market, with special care for the poorest populations and vulnerable groups, aiming to prepare them for the new skills needed, as well as retraining adults, eventually dismissed from jobs that no longer exist, for functional or even sectoral mobility.
11. Develop curriculum designs for training courses and business training programs totally focused on deficiencies, demands and on improving the competitiveness of micro, small and medium businesses according to in-depth research carried out with these business segments. Listening to the “pain and expectation” of the entrepreneurs/ leadership on the “shop floor” is essential to develop the best solution for the detected demands/needs.
12. Develop and offer high school courses, with the curricular load of current engineering courses, with a bias in computerization, data flow and digital communication network and concepts of electronics and biomolecular applications to anticipate the placement in the market of younger, innovative professionals that are aligned with the new data flow management techniques.
13. Develop course plans that address the fundamentals and technical capabilities that will enable the trainee to have a systemic view of how these new technologies interact with each other and within the production process.
14. Develop programmes dedicated to the needs of the sector, supported by active learning methodologies.
15. In this way, the vocational education institution will continue to meet the changes imposed by the labour market, ensuring the formation of qualified labour and its adaptation to the demands arising from the need for changes, generating employability.
16. Foster the development and dissemination of a greater number of virtual professional training courses to increase the access to vocational courses for the most diverse workers.
17. To train specialists in industrial computerization systems that go beyond automation to ensure industrial process and data flows in the situation of permanent optimum, self-monitored and self-regulated.
18. Form partnerships with companies and/or associations in the textile sector and/or labour unions to enable a greater and better offer of qualification courses and professional training.

19. Format new courses and readjust the existing ones to provide the student with the necessary skills for the scenario to be prospected.
20. Merge the disciplines of textile and apparel technology and production, as students do not have an overview of the production chain and, due to that, they do not have the motivation to follow technical careers in the textile and apparel areas, which are seen as part of an outdated and futureless industry. Students should be offered a curriculum design that integrates technology subjects with industry-specific teaching. In a single course, propose elements of *IIoT*, robotization, among others, applied to textile and apparel processes.
21. Implement actions to modernize facilities, with the minimum infrastructure to meet new demands.
22. Constantly map with companies and associations of the sector which skills are needed to be developed for the continuous update and modernization of employees in the sector, aiming to guide the creation of courses.
23. Promote the continuous update of the offerings of professional training courses, paying attention to the new realities arising from the changes promoted by the social dynamics, for example, the social requirements imposed by COVID-19.
24. Promote the participation of faculty and students in technology fairs, to follow the technological evolution of the sector.
25. Conduct surveys with workers and companies to obtain feedback and to make continuous improvements in the content and availability of online courses.
26. Continue training professionals, even if remotely.
27. Use intuitive, didactic and employee-accessible platforms to enable learning and mastery of skills.

TO THE MINISTRIES AND SECRETARIATS OF THE FEDERAL GOVERNMENT:

1. Adapt the curriculum design of public and private schools, strengthening knowledge about citizenship, sustainable development, new technologies and the Portuguese language, valuing the quality of basic training.
2. Expand the spectrum of scenario analysis and strengthen relationships with academia; expand multilateral international cooperation and invest in parameterised studies of different scenarios.

3. Support and finance professional updating and RD&I programmes for the sector.
4. Act, in an integrated manner and providing the necessary financial resources, in short, medium and long-term actions involving the training process (education), technical and human capacity-building and improvement in the business environment.
5. Create specific financing mechanisms for the incorporation of new technologies in the industry, since purchasing new technologies has a high cost, both in physical investments and in training and adaptation. It will be necessary to propose financing lines that are competitive in relation to other markets that compete with the Brazilian sector.
6. Develop actions to improve basic education to reinforce STEM subjects (science, technology, engineering and mathematics).
7. Develop financial and structural incentive programmes so that new technologies are accessible to companies.
8. Develop and/or disseminate existing initiatives and public policies to foster the technological and organizational development of companies in the sector, such as B+P and the Chamber of Industry 4.0.
9. Develop public policies to encourage hiring migrant workers to make up for any shortage of workers with the necessary skills, facilitating and strengthening skill certification processes.
10. Oversee current working conditions throughout the chain, in order to eliminate precariousness, informality, and working conditions that are inadequate to the current legislation.
11. Generate financing conditions for skill training programs.
12. Implement, as soon as possible, an efficient digital communication network, 5G or higher, in all regions of the country, to ensure free, clean, safe, and permanent traffic for the huge volume of data coming from 4.0 and communications technologies, cloud processing and archiving, breaking the paradigm of the last mile and ensuring free competition.
13. Offer more credit to small and medium-sized companies to protect jobs.
14. Promote public policies to encourage the implementation of new technologies, subject to the establishment of decent work conditions.

15. Publish standards that promote more modern ways of working and learning to facilitate the adaptation to new technologies and promote hiring new professionals.
16. Reduce costs and bureaucracy that eventually fall on production, import, marketing and use of machinery, equipment and services to modernize the sector.
17. Liaise with professional training institutions and sector associations to identify the demand for professional training courses and encourage the creation of these courses, as well as foster social dialogue and reduce bureaucratic obstacles to more modern forms of work and learning.
18. Continue to deepen the tripartite social dialogue and partnerships with academia, in order to reflect on the most effective active and passive employment policies, in order to facilitate the functional and sectoral mobility of workers, as well as the social protection necessary for professional readjustment, that should occur without damage to social cohesion, with special attention to workers who have difficulties in their professional requalification.

19. Simplify and regionalize the support and promotion processes to train workers and entrepreneurs, taking into account local realities and expertise.

TO SECTORAL ASSOCIATIONS

1. Expand the debate among its members, with a view to establish a collaborative environment favouring tripartite social dialogue, with allows an open and frank technical debate with other social partners.
2. Support its members in intrasectoral dialogue, aiming to facilitate the recognition of new skills to be developed in the textile industry, and to readjust production and increase productivity within a highly volatile context.
3. To work with other tripartite social partners in order to support reflection on how to adequately ensure functional and sectoral mobility, based on a volatile matrix, through professional training and requalification.

4. Build a common agenda and indicate the most likely trends that will affect the textile and apparel sector. This information should guide decision-making and construction of solutions by educational institutions and government ministries and agencies.
5. Build, through mechanisms already used by the associations, a panel formed by the industries to guide stakeholders.
6. Contemplate the interests of its representatives with the formulation and proposal of policies to be analysed, evaluated and implemented by the government.
7. Create informational dissemination actions on the new professional profiles of the future.
8. Create and carry out events (or create easily accessible communication channels) to publicize job and knowledge openings, and skills and capabilities (aptitudes) of workers required by companies in the sector.
9. Develop actions that allow the integration of the various links in the chain for the development of joint technology.
10. Develop permanent innovation programmes through a partnership between the productive sector and educational and research institutes.
11. Continuously disseminate information among member companies about training courses and professional training available to increase interest and access to information.
12. Continuously disseminate information among member companies about public policies to promote technological and organizational development available to encourage new companies to seek and achieve development.
13. Preparation of seminars and qualification programmes for new professions in the sector.
14. Foster the creation of business relationship networks to exchange good practices, solve problems/difficulties, identify needs and connect with actors who can address the issues raised by entrepreneurs and workers, according to local reality.
15. Identify, together with member companies, the *knowledge, skills and capabilities (aptitude)* necessary to their workers and managers that allow companies to be able to face technological and organizational changes and direct the demand for training and updating courses. Identify with member companies (only members?) machines, equipment, services, processes, among others, that are necessary for the

technological and organizational development of companies to gather information, assist the process and encourage new companies to seek development.

16. Inform and mobilize companies in the sector to effectively participate in professional training programs.
17. Engage with the public sector to reduce obstacles to the modernization of companies in the sector in the face of technological and organizational changes to encourage new companies to seek and achieve development.
18. Engage with the public sector, professional training institutions and companies to encourage the training of qualified workers as needed by the industry.
19. Engage with the public sector, professional training institutions and companies to encourage the adoption of modern and flexible standards and forms of work and professional training for workers.

TO THE WORKERS UNIONS

1. Support the training of professionals in order to prepare them for the future.
2. Appropriate management and production instruments and the effects on employment, creation of model clauses for the entire sector and the entire country, to avoid informality, unemployment, gender discrimination.
3. Bring the sectoral demands closer to the needs of its constituents, with a view to help to build an ideal worker profile within a volatile scenario. Likewise, the union must participate in negotiations around professional training and the requalification of those who will not find jobs available for their activity, in order to provide them with possibilities of functional or sectoral mobility.
4. Reach out to its constituents and the most vulnerable populations, especially young people from needy communities, in order to establish a constant dialogue about the real needs of these groups, as well as the possibilities of facilitating professional training and requalification, insertion in the market and functional and sectoral mobility.
5. Articulate and foster agreements with employers to allow for more flexible and decent working environments and working hours, ensuring the same delivery of results.

6. Articulate and promote agreements to provide professional training to union members with companies, sector associations and professional training institutions to facilitate access to workers.
7. Acting together with sector associations to expand the skills and productivity of workers, which will result in an increase in labour remuneration.
8. To work with other tripartite social partners in order to support reflection on how to adequately ensure functional and sectoral mobility, based on a volatile matrix, through professional training and requalification.
9. Seek to implement new systems of interaction with society, seek partnerships with vocational education institutions and companies to train and update the workforce.
10. Create and carry out events (or create an easily accessible communication channel) to publicize job openings and the skills required by companies for workers in the sector.
11. Create support mechanisms for workers in relocation/out of the labour market, with support courses in these new areas.
12. Develop actions to reach out to the most vulnerable workers, both to unemployment and to work in the informal economy, in order to offer training solutions that prepare them to readapt to change.
13. Develop actions to mobilize workers to participate in improvement and professional (re)qualification programs.
14. Develop actions to raise awareness and mobilize workers for a new scenario of technological and organizational development.
15. Develop actions to engage young workers in the sector on issues related to work and the importance of unions.
16. Dialogue with companies and jointly propose to the government protection against unfair and informal competition.
17. Continuously disseminate information among union members about training courses and professional training available to encourage worker qualification and expand access to courses.

18. Develop a salary policy and regulate working conditions in the production chain. Help with the formalization of female workers. Strengthen associative forms of work to ensure better working and living conditions for the base.
19. Identify adequate and safe environmental working conditions and working hours for the performance of employees' duties, considering technological and organizational changes to contribute to worker safety.
20. Identify necessary skills to be developed by union members to remain constantly "employable".
21. Investing resources in mapping new skills for its constituents, as well as participating in processes that facilitate functional mobility, whether in training, collective or even individual business.
22. Carry out actions to discuss the valorization of work and the qualification of workers for the challenges.
23. Mobilize and make workers aware of changes and actively participate in the negotiation of transformations.

24. Engage with the public sector, professional training institutions and companies to encourage the adoption of modern and flexible standards and forms of work and professional training for workers.
25. Represent the interests of workers in this new labour world that integrates technologies, considering all the variables that affect the labour market itself, strengthening social dialogue, including collective bargaining and tripartite cooperation.

TO TEXTILE COMPANIES

1. Adopt the best practices and production processes based on national and international experience, seeking to insert innovative aspects into the production process.
2. Adopt strategies and programmes for retraining and hiring new skills.
3. Present their real needs to the market and offer effective job openings to re-qualified workers, with special attention to young people.

4. Act together with sector associations and unions in order to indicate, identify and suggest skills needed by workers in the sector.
5. Seek support from teaching and research entities and effectively participate in the programmes offered.
6. Strengthen social dialogue, including collective bargaining and tripartite cooperation, in order to stimulate reflection on professional training and requalification, based on the recognition of a volatile matrix that facilitates functional and sectoral mobility; encourage productive intersectorality in order to facilitate the exchange of information on observed trends.
7. Share their real productive needs with other social partners, in order to establish an adequate scenario for the training field.
8. Create jobs in occupations and sectors with low probability of automation and more related to the creative economy, such as *Pattern Makers and Fashion, Shoes and Clothes Designers* and others related to fashion events, such as producers and workers.
9. Develop actions to reduce informality throughout the production chain, responsibility for quality of life and working conditions throughout the chain
10. Develop awards or programmes with financial incentives for workers who present positive results with the application of skills to stimulate the search for professional qualification.
11. Strengthen relationships with professional training institutions and sector associations to encourage the creation of professional training courses for employees.
12. Facilitate the diagnosis of new skills required for functional flexibility to occur, as well as help other tripartite social partners in the reflection on forms of training readjustment to avoid collective layoffs that affect society as a whole.
13. Make use of existing initiatives and public policies that encourage the technological and organizational development of companies in the sector, such as B+P and the Chamber of Industry 4.0, to assist the modernization process.

14. Provide capacity-building and professional training courses for employees to increase their qualifications and meet the labour needs of the company and the market.
15. Strengthen partnerships to accelerate new professional demands.
16. Implement plans for the modernization of machines, equipment, services, processes, among others, to seek the technological and organizational development of the company and work, as well as for the opening of new job positions.
17. Encourage hiring mid-level technical professionals trained in accordance with the above concepts, ensure to deploy resources to promote the technological revolution in their companies, implement data and process flows in permanent and self-regulated optimization (business homeostasis).
18. Indicate the need to develop specific skills to guide the creation of courses.
19. Insert the modernization of companies into the strategy and business plans, intensifying exchanges with markets where these stages are more advanced, with a firm willingness to incorporate progress, instead of using this knowledge to justify why it is not done.
20. Invest heavily in professional training, and that expenses with professionalisation are accounted for as an investment and not an expense.
21. Negotiate with workers unions the qualification and training of their employees and the enhancement of labour relations.
22. Plan, develop and implement new production processes without neglecting people. Any change should be considered as the least traumatic transition for workers and society in general.
23. Prepare products and processes with large computerized and bio-electronic content to receive innovations from the areas of biotechnology.

24. Provide an adequate working environment and working hours for workers to constantly improve the performance of their activities.
25. Provide modern and accessible forms of learning, through, for example, delivering virtual training, to develop and maintain the skills needed by the worker, even if there are restrictions, such as mobility.
26. Readjust the hiring processes of companies so that workers with the new necessary skills are considered and hired.
27. Engage with professional training institutions and sector associations to encourage the creation of professional training courses for their workers according to the new skills needed.

TO RESEARCH INSTITUTIONS

1. Adopt a more open and proactive approach to academic-industry integration. The historical distance between these entities constitutes an important barrier in the focused development of research and innovation efforts.
2. Broaden and deepen research in a holistic way, so that it encompasses information not only on technical aspects brought about by technological advances, but also contextual and tendencies on professional volatility in the labour market, which may result in the encouragement of functional and sectoral mobility.
3. Expand the spectrum of studies and topics related to scenario projections for the sector, ensuring the study of the intersectoriality necessary for new skills to be understood and, thus, academia can operate as a “bridge” between the productive sector and theoretical-academic reflection.

4. Expand the research portfolio based on the recognition of a volatile matrix and a holistic view of the labour market, which includes new activities in the same sector or in different sectors, as well as on methods of fostering the adaptability of workers to functional and sectoral mobility.
5. Deepen research on new activities and functions of the labour market of the textile sector, from a volatile matrix, and that includes a holistic approach, with studies of technological, fashion, and consumption trends, in order to support a training model and requalification based on the principles of improving productivity and the pursuit of full employment.
6. Seek partnerships with textile companies to plan and develop transitional training in order to mitigate the negative impacts on workers regarding the termination of certain functions.
7. Create an environment permeable to the access of sector associations and companies, in order to build RD&I programmes of common interest, facilitating access and better use of resources made available by the Government to finance these programs.
8. Develop actions that allow demystifying the complexity of the innovation theme, since many companies believe it is a path outside their reality.
9. Develop and execute RD&I focused on sectoral demands, aiming in the short, medium and long term to show the fastest and most efficient way for production chains to have greater results in their business, without forgetting about people, it is not possible to think of a competitive industry without valuing the worker.
10. Strengthen the relationship with Vocational Education Institutions, so that it is possible to use and deepen, more and more, the new knowledge identified, in applied research, with a focus on innovation, contemplating new functionalities to textiles.
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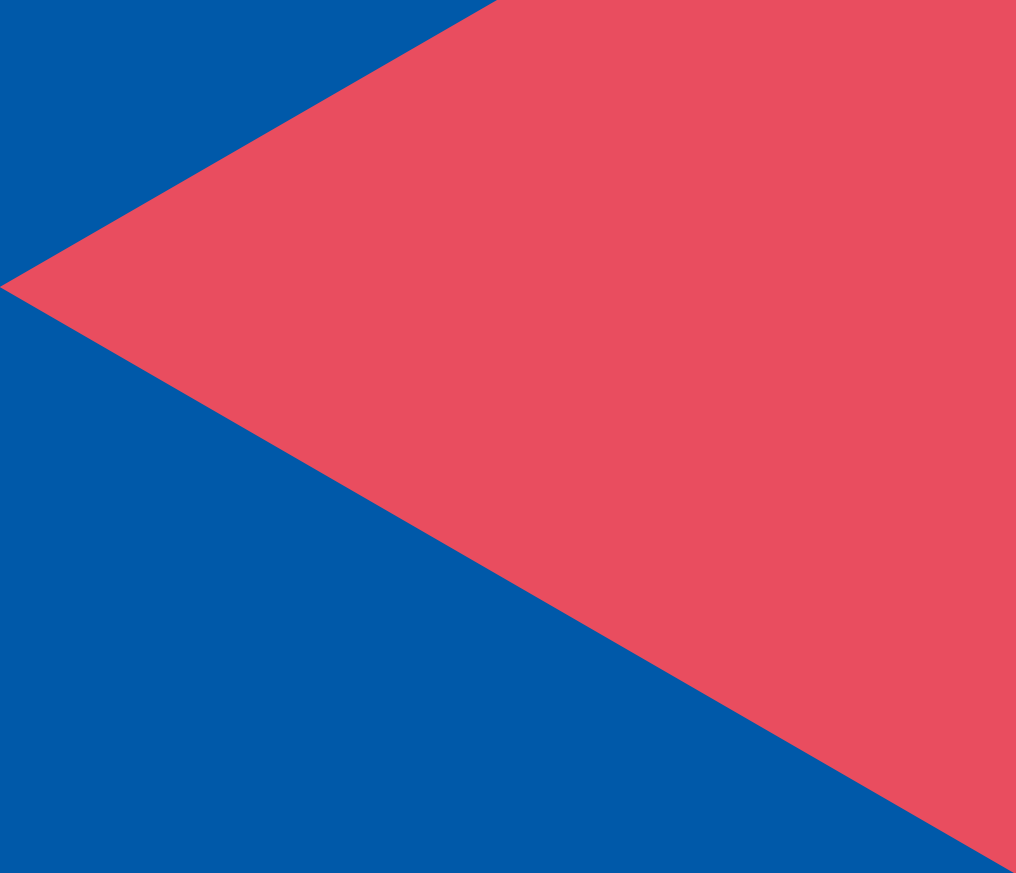
12. Encourage research, development and dissemination of technological solutions and/or processes for the adaptation of companies and workers to more modern, flexible working methods adapted to changes after COVID-19.
13. Form partnerships with sector associations, companies and professional training institutions to promote the exchange of information and to support workers and companies in the search for innovative and useful solutions for the productive sector with the advent of technological and organizational changes.
14. Invest in research for materials or biomaterials that are invisible in raw materials and products and that are carriers of information so that they can replace the obsolete barcode and the inconvenient RFID.
15. Map possible bottlenecks and opportunities for research, development and innovation and seeking solutions, in particular related to raw materials, functionalities, productivity and sustainability in textile and apparel production with sector associations and companies.
16. Offer internships to technicians in training, throughout the cycle, in related areas (cloud processing, neural networks processing, functional biomolecules, bioelectronics, etc.), in order to deepen the knowledge that will guarantee a leap in innovation within companies.
17. Carry out studies on the impacts of technological and organizational modernization of companies in the sector to encourage the adoption of the measure by others, or assist in the process.
18. Carry out RD&I related to the textile sector that allows for increased productivity and competitiveness.

► GENERAL RECOMMENDATIONS

WHAT THEMES COULD BE RELEVANT FOR FUTURE STUDIES?

1. Studies on the implementation of Industry 4.0, Internet of Things, Big data system, mainly in medium and small companies, seeking to popularize these themes.
2. Studies on Circular Economy and Sustainable Production; *Design Thinking*; *Lean Six Sigma*; and Knowledge Management.
3. What are the post-pandemic restructuring trends in global value chains? Will there be significant changes in the global production structure, including issues of technology, organization and regionalisation / nationalisation of production? And how could this affect the skills of workers to adapt to new production processes, new suppliers, new technologies, etc.?





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