

## **Lifelong learning and innovation**

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*Abstract:* Italian productive development is far to take place as a diffused and concrete practice and this is not only due to the low investments in this direction, but also caused by a cognitive deficit about *what is* innovation and *how has it to be done*.

Most generally is thought that innovation needs basically financial operativeness, while on the contrary analysis in progress detach for economy the crucial contributions of training. This last, in fact, is the most able to generate relevant changes concerning production and transfer of knowledge and innovation.

The present essay investigates the apport of training, in the modality of lifelong learning, and its strength to imply new orientations in productive contexts or changing them on a socio-economic level and on a sphere of structural shapes.

*Keywords:* innovation, lifelong learning, training, policy.

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## 1. The context

We live in a society defines, with a happy expression, coined by the sociologist Zygmunt Bauman, modernity liquid (2004) to distinguish its character of mutability in comparison to the connotation that the human society has shown up to the half of last century. In this contemporaneity of *passage* (Giddens 1994), countersigned by fears, uncertainties but also from tensions of risk and from volitive appeals (according to U. Beck's analyses) the civil society appears in its constitution *disembedded*, (as Giddens would say) and, therefore, less dependant from ties, automatism and principles that have sustained it up to now.

This doesn't mean that it has progressively lost solidit of its conformation, given that modernity in the late state it is said, the society presents a systemic structure. The nowadays society is strongly rooted in technology and hyper-connective in comparison to the preceding conformations, held up by a different logic – the networks, which not only function on interpretative but above all constitutive paradigm.

The network logical, together to the informationalism<sup>2</sup>, a category opposed to that of industrialism, countersign of modern society, influences the production in a radically different way.

The particularity of the information technology resides in shifting the source of production into the ability to generate knowledge and elaborate information. To such intention, Castells (2002, 31) sustains that, "differently from any other revolution, the nucleus of the present transformation regards the elaboration of technology, a gathering and communication of information. (...) The information technology is connected to this revolution in the same way as the new sources of energy were related to the industrial revolutions, (...) In fact, the generation and distribution of energy have been the key element of the industrial society."

The Spanish sociologist describes a context which is characterised by unforeseen changes, where the innovation represents a fonder category collocated at the crossroads of diversified apparatuses – such as science,

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<sup>2</sup> The informationalism paradigm presents these founding aspects:

- information, which is the first subject;
- *asset* technologies deeply integrated;
- network logic.

technology, information, knowledge and the training (as in lifelong learning) - connected among each other by cyclic relationships. Such ties, of mutual structuring produce relapses on the labour market and therefore on people, organizations, enterprises, given that they are able to activate *opportunities* for development (human, organizational, territorial, etc.), to implement the managerial and cultural tools.

Innovation will constitute the object of reflection for this article, a context which is extremely problematic, because it exceeds beyond standard categories and which leads to knots and further problems, such as:

- the clarification of what is intended by innovation (a result of scientific research and technologies or output of policies);
- the specification of the role of the policies in generally
- and of those related to the educational and training systems. That is to say how important is it to produce innovation in the educational and training systems which then lead to innovation in both public and private enterprises;
- the individualization of the relationships which get established among places and the generating learning processes and economic and social development.

Starting from the listed matters, which will constitute the key element of future reflections, we will seek useful elements to implement knowledge in a context (innovation-training) which qualifies as the core basis of strategies in the near future.

## **2. Innovation and Training: toward a new paradigm?**

"We will never be as before". To avoid the painful consequences of the crisis it is necessary to save on other activities, "but not on training, information and people above all."

Such statement relaunches - as anticipated above - and introduces the thesis that we intend to discuss regarding the fundamental role of training in the innovation process.

Therefore, what is the role of training in the process of change?

As a starting point we assume that training implements the competitive abilities of a country and its productive system and the dependence of the latter, from the stock of knowledge incorporated in the available human resources, apart from the economic investment.

On the basis of such assumptions we will look further into the concept innovation-training, particularly *if* and *how* economic and social change can be considered a correlated variable to the two considered objects.

We will therefore investigate the contribution of training to innovation, looking for signs of confirmation or otherwise, exploring territorial situations - national and local contexts - verifying *if* and *how* the combination of innovation and training can produce a potential change.

The previous experimentations (v.Re..Kno.Ma Project) they demonstrate that conditions and structural ties, defined by the coherent interlacement of cultural resources, technological, human and relational when they came the cross training processes, in the sense that are activated through lifelong learning actions which work development (Nuissl et al. 2007).

In the same direction, proceed Priore & Sabel (1984) studies confirms the innovation demands predisposition of virtuous relationships able to structure partnership, among the different social parts, among multiple local actors (university, region, employer corporate bodies, etc.) and national. An objective achievable when there are adequately training of human resources (the human capital) (Priore and Sabel 1984).

With these considerations, we will analysed innovation and training the connections between them, the significant characteristics each training the pinpoint the contribution that such a combination can give to development.

#### *a. Innovation*

Now we will try to define the epistemological basis of the concept of innovation in order to avoid misunderstandings and to improve the understanding of the matter<sup>3</sup>.

The reference point is *Science and Technology Studies*<sup>4</sup>, (STS), which are concerned with *how* society and cultural values affect technological innovation and *how* this in turn affects society and culture.

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<sup>3</sup> If we move on to a phenomenological level we find a high orientation to innovation, justified by the high simplicity of ideas and patents.

The STS studies, are interested in a variety of problems, but their focus are relationships between scientific and technological innovations and society. STS studies, in fact, are grounded in socio-technological understanding, that is, systematic knowledge of the mutual relationship between technical objects, the natural environment and social practice (Ankiewicz , De Swardt e De Vries 2006) .

This stream of research approaches technology from various angles, conceptualizing it, particularly, as knowledge.

Technology as knowledge can be differentiated according to various types of knowledge, for example theories, etc. (Mitcham 1994, 268). A further theme studied by the STSs is the concept of innovation.

To clarify what is intended by the innovation it involves individualizing its contents which approximately consist of ideas (concepts, ideologies, political hypothesis), applications, tools, techniques and methods (cfr. Von Hippel 2005; Mitcham 1994).

What we have mentioned above is not sufficient to clarify other ambiguities such as the difference between invention and innovation, two concepts which have been for a long time fuzzy and well illustrated by Berglund (2004).

According to him the innovation represents vehicle which contains a plurality of meanings. This is ambiguous because often it is associated either with the use of product or the innovative processes, for which it becomes synonymous to change, novelty. In other cases innovation is associated with linguistic forms as a means adoption new knowledge or use of new technologies (Von Hippel 2005).

It must be mentioned, then, how the interchanging use of the terms innovation and invention – generated by their contiguity and by the scarce knowledge of the respective distinctive factors, it produces further confusion.

We specify that the innovation centres around the use of knowledge, while invention is a prerogative of the centres of research.

On this point, the error, widely diffused, is lies in reducing, through in simplification process, the innovation to the mere application of something

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<sup>4</sup> It deals with a research program with the aim of deepening the understanding of technology on society and vice versa.

news, whether these regard knowledge, procedures, technologies or other and a synonym to non existent before.

An explanatory contribution is traceable in the jobs of Cornett and Freytag (2002, 2010), where the two researchers think that: “innovation can be addressed in many ways . Societal and policy-based approaches have been applied as well as approaches dealing with organizational and knowledge creation have been introduced to the field. Particularly fields related to the new economy (...) attention has been on importance on networking and relations in a broader perspective”.

You owe a great clarity to Fagerberg (2006) contribution. The author proposes an approach to the two terms using an explanation able to include an approach which goes beyond the dualisms and the oppositions. The choice of such a lens of analysis is conclusive for the overcoming of the dichotomizations and the development of a perspective centred on the mutual implication of the two circles. In the researcher's thoughts, invention and innovation are not against one another, nor do they overlap, but they constitute two different levels of an ample and circular trial.

Just like the same Fagerberg (2006, 4) says: I’ “invention (is) at the first occurrence of an idea for a new product or process, while innovation is the first attempt to carry it out into practice”.

Based on what we have discussed about the circularity of the two circles and on the different levels in which innovation and invention are positioned it is worth mentioning that we can start from the production of new ideas and continuing with their socialization in specific contexts, in which training reveals itself crucial factor because for the transfer to take place (Federighi 2008).

Otherwise it can be started from transferring innovation to generate invention transformations, in this case the new one will result mainly commensurate to the problem or to the context.

Going back to the recognition of the distinctive lines of the invention and the innovation the annotations from Maciel and Albagli in the book *Informação e desenvolvimento: conhecimento, inovação e apropriação social*(2007) explain the differences well.

Inside this study, they tell when the different bases of knowledge or informations are recombined with the processes of learning, innovation (Maciel, Albagli, 2007) assumes different connotations. In other words, innovation demonstrates goes beyond transferring the results of the

research, even also the most advanced, towards the enterprise or towards the organizations or towards other users: assuming the characteristics of *hard innovation*.

We can back up what has been said with the annotations of S. Gherardi (2010) and of Guthrie & Dawe, (2004, 10) these sustain that the innovation isn't the same as "to do again something or something of already existing with innovative formality"<sup>5</sup>.

S. Gherardi<sup>6</sup> (2010, 15-16) analyses the innovation through the micro-sociological approach. She conceptualizes the innovation in terms of a continual increase and continuous process; and it introduces the distinction of innovation as transfer, translation and transformation<sup>7</sup> (Gherardi 2010, 21).

Summarising everything that has been said up to this point, innovation is not only the transfer of the results of the research, perhaps even the most advanced, towards the enterprise or towards the organizations or towards the recipients. In the same way as it is insufficient to produce an innovation for it to be considered something new as an innovation. It is necessary that the changes of process or product are adopted by an organization, from a service or from a community and, only when they are embodied (in the organisation or structure), they provide a different meaning, a generator of a new value.

To sum up, "it is only when doing something new or differently is put into practice in the community or commercialised it becomes *innovation* (Kearney 2004).

#### *b. Training*<sup>8</sup>

An invention or an innovation (ex. a good patent remain only a good idea or an interesting product if devoid of head and legs allowing its transfer: innovation needs human resources able to apply it, engineering it,

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<sup>5</sup> We find ourselves in front of *soft innovation*

<sup>6</sup> Sociology is in accordance with the researchers quoted that knowledge is the object and the resource of innovation, production and the circulation of knowledge is a factor in the ability of enterprises to innovate.

<sup>7</sup> In this work we will mainly focus on innovation as a process centred on the transfer of knowledge.

<sup>8</sup> We use training as synonym of lifelong learning.

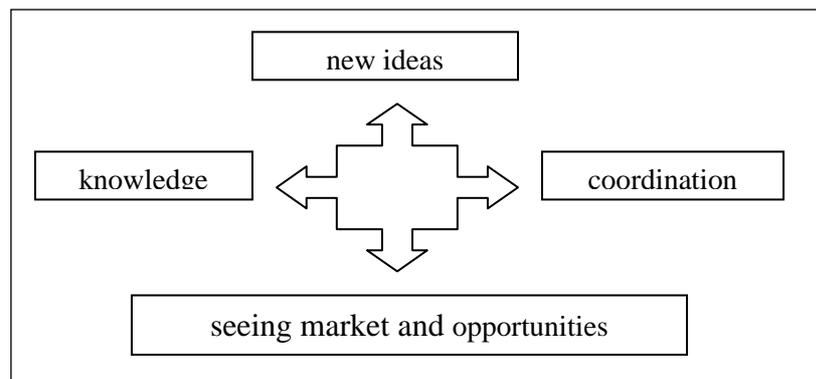
over that of a competent management for the coordination and the brokering with other firms.

This leads to an approach to innovation able to understand actors inside and fundamental factors for the development of new products or unknown ideas, that is of the preexisting know how, beginning from human resources, to the partnerships among organizations, to the most advanced research and technology.

Among many mentioned factors we focus on the widened education and training of human resources (h.r.) representing an essential prerequisite for the change's policies (structural), as many international experiences document. The reference is to a widened education and training because innovating has many dimensions with an excellent training and educational system able to promote scientific and technical culture, to open to *brains'* international circulation, at least inside high area (university and post-university education), able to determinate a strong absorption of new knowledge and technologies. An educational and training structure with scientific infrastructures able to develop a basic research of high quality and resources to investments to long term goals and all for open research.

To discuss these arguments one would ask for space and an approach that cross the objectives of this paper and therefore we limit ourselves to their enunciation and the underlining of their role within the investment in training.

Figure 1. *Player's skills* (cfr. Cornett e Freytag, 2002, 218)



For what has been said above we will carry out a synthetic reflection on the state in which the Italian trainee structures find themselves that share some problems with the Countries of the EU., and they differentiate from others (Dosi *et al.* 2005).

The Italian position is not with respect to the classifications on the best universities of the world. Indeed, according to the distribution for each country of the first two hundred universities and of the first one hundred technical and scientific universities, Italy is far from presences from the greatest European countries (United Kingdom, Germany, France) and also from Holland, Switzerland, Sweden, but even from extra-European countries, such as Australia, Japan, China and Hong Kong.

The difficulty of Italy to maintain extensively a high quality level of the educational system, in comparison to the international standards (Grilli and Mariotti 2006) .recoils on innovation.

It is at this level of training system, the crucial gap that strikes the innovation is confirmed by Luck e Ferrell (1979 cit. in Cornett e Freytag, 2002, 218) “to generate a new ideas, (is necessary) a task of players but also to transform that in un practices is fundamental having the necessary knowledge” (figure 1) developed inside scholastic and university structures.

This deficit explains the numerous limits that Italy introduces in the lower levels of innovation both when it comes to the simple discoveries of new products and patents as well as when it postpones processes of change

In other terms, it is the same training to innovate through interdisciplinary hybridizations and the differentiation of its structures, finality and assignments. The one mentioned above is also a difficult change for another reason: training is, in Italy, too centred on the dimension of the ideal and little orientated around the practice, the experimentalism or the implementation of the application devices, all of which are useful in giving answers to the principal challenges set by the globalization (of the markets).

In Italy there is not largely present a dynamic vision of education and training, that asks for the preparation of interactive and cooperative environments, of learning. The exploitation of such factors creates best conditions for the competitiveness and for the socioeconomic development.

The interaction, is particularly, the fundamental device of the innovation, in how much the socialization of the experiences produces new

knowledge, active exchange of competences and of knowledge among individuals, between enterprises and the other local actors.

In fact innovation is stimulated by a recombination of the different bases of knowledge, in a mutual learning process" (Maciel, Albagli, 2007).

The economy and the sociology of the innovation as the economic geography, also using different approaches, underline the role of the interactive trials.

Such fields observe the role practiced by the geographical proximity in the knowledge's diffusion, particularly when there are tacit knowledges and innovations.

The reference is not so much to the spatial proximity as to the cultural, institutional and interpersonal interactions that the training processes facilitate.

The considerations above have illustrated the role of the training devices in the processes of innovation. A link, the one between training and innovation, crucial if its relapses are considered on the employability, invested by loss of effectiveness when little is invested in training.

This is the situation in which we find how the Italian labour market, characterized by a high persistence of unemployment, that has transited from 7,4<sup>9</sup>, of the first semester of 2009, to the 8,2%, of the end of year, and anticipated in 2010, to 9,9%. An even worse course can be seen within the juvenile unemployment that, in 2007, which presented -15,9% and, in the same year, a still more worrisome -14,8% of young people who have dropped out of secondary education against the 10% fixed by the U.E. for 2010.

The timid signals of the start of an inversion of tendency recorded in 2009, after three years of a decrease of juvenile (between the ages of 15 and 24) unemployment in the 27 countries of the UE, to 18,3% (cfr. Eurostat 2009) are not extendable to Italy that instead marks a 24,9% percentage.

If, from the formative and occupational scenery, we move to the diffusion of innovation, that we have assumed as other meaningful variable to support of our thesis, the difficulty in which Italy is will not change. To represent the state of innovation we will use the surveys carried out within

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<sup>9</sup> The statistic institute of the European Committee has measured the performances in the field of innovation in the 27 Member States and of the principal partner countries.

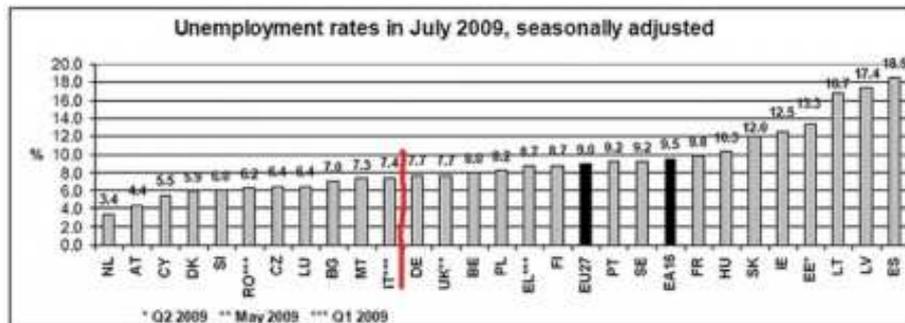
the denominated search "European Innovation Scoreboard" starting from the 2006 report.

The "European Innovation Scoreboard" (2006) report to compile an informative picture of the innovative European countries, has indicated a set of indicators: education, technologies and communication investment research & development and number of brevets.

The data synthesis shows Italy below the European average.

But the situation does not even change with the multivariate analysis and the cluster analysis. These have produced a typology of groups of Countries, have individualised very diversified countries in relation to innovative dynamism and to factors generating change.

Figure 2. Unemployment rates 2009



The final typology, built on the base of the importance of structural variables: innovation, the construction of knowledge, entrepreneurship, the applications and the intellectual ownership. The clusters have highlighted the performance of the different Countries in respect to their ability or possibility to activate resources (economic, social and training), choices and orientations regarding their own project of development. The statistics reconfirm Italy's position below the European average, notwithstanding that it registered, in the period 1998-2005, an improvement for some variables: university students.

The above factors, that signal Italy's difficulty in taking on innovation as a primary objective, exposing its risk of decline, the others are added. The number of people that have completed secondary school (10,29% in

comparison to an average 21,22% UE) the scarcity of funds devoted to research and development (0,53% of the PIL against an average 1 UE ,28%) and the scarce number of patent of high technology (in Italy 6,2 per million inhabitants against an average UE of 27,8).

Particularly the application of brevets and the patented inventions is the weak point of the Italian case. Italy is lacking of meaningful investments in important sectors to the social-economic development. as the quality of training systems.

The analysis of the European Innovation Scoreboard (2006) shows Italy immobilized in a stagnant situation, condition confirmed again by Innobarometer 2009 data, that update the scenery (tab. 1).

Il contesto italiano è, dunque, uno dei *meno innovatori*, per la presenza di tassi di crescita, in tale ambito, inferiori alla media dei 27 paesi europei, unitamente a Spagna, Grecia e Portogallo, ed altresì, con l'aggravante di essere in assoluto la nazione che ha fatto meno progressi nell'ultimo anno di rilevazione (il 2008).

Italy is losing ground to other E.U. countries, despite the growth of new products – moving to 13,5% against the 6,5% achieved by the other 15 member states, notwithstanding the increase in the number of firms involved in innovation, 44,4%; of small to medium sized firms against 44 % of E.U. average.

Make real the virtuous correlation, among educational systems - developed – and innovation, countries such as Sweden, Finland, etc..

It doesn't not deal with the appeal to the tout court training rather to a lifelong learning. What Lundvall (2007b) maintains on the basis on his recent research is that the device able to support enhancement strategies of structural innovation of the social and economic systems - and their replacement toward products and services with high technological and cognitive content, as well as to support the change of traditional services to be directed toward quality - and the updating of the involved HR competences.

To conclude, innovation is a process that involves numerous levels, from the micro (the subject, the knowledge and the capabilities) to the macro (the structural interventions for reform in the systems of education

and training); it is the output of a mix of different actions (permanent training, continuous, etc.)<sup>10</sup> but strongly interrelated.

The lesson for Italy to develop the employability is that it should must depart from the re-engineering of the educational paths- in some cases on demand<sup>11</sup>- solving many diffused lacks<sup>12</sup> and re-organizing the lifelong learning.

Table 1. Innovation growth leaders<sup>13</sup>

Cluster	Growth rate	Leader	Moderate	Trailing
<i>Innovation leader</i>	1,6%	Switzerland	Germany Finland	Denmark, Sweden, United Kingdom
<i>Innovation followers</i>	2,0%	Ireland Austria	Belgium	France, Luxembourg, Holland
<i>Moderate innovators</i>	3,6%	Cyprus Portugal	Czech Republic, Estonia, Greece, Iceland, Slovenia	Italy, Norway, Spain
<i>Trailing countries</i>	4,1%	Bulgaria Romania	Latvia, Hungary, Malta, Poland, Slovakia, Turkey	Croatia, Lithuania

In consideration of the connection among formation-innovation-employment, to which we have made reference, and in presence of the

<sup>10</sup> This rediscovery of the social role of training brings to a rebirth. This fact means Italy has to redesign both life long learning and university systems. The increase of life long learning is justified by its natural ability to organize processes of acquisition of new competences. These are factors that support economic growth, the development of productivity and employability, of support to the governance of the change (of work).

<sup>11</sup> Pay more attention to weak groups, to equality of the sexes and to social inclusion is not only a political choice but is also guaranteed to offer widespread knowledge.

<sup>12</sup> The PISA 2009 data confirm lacks in basic knowledge, such as the reading, maths and sciences.

<sup>13</sup> Innometrics 2008, 10.

scarce propensity to invest in formation, the U.E. has held important to deepen the phenomenology of such missed link.

Taking back the annotations of Lundvall (2007a, 2007b, 1992) around the importance of the investment in lifelong learning as salient factor of the innovation, the section that relatively introduces us the investigation to the 'conditioning factors the regional development' in theme of quality of the human capital and permanent learning of the adults, commissioned within the National Strategic Picture for the planning of the Structural Funds, it is, to little dir, not enthusiastically: only three Italian regions show good performances (Lazio, Trentino, Alto Adige and Abruzzo). while all the remainders are well distant from the European average.

On the base of the European experiences we can conclude that in order to align itself to the standards of (economic) development, Italy needs to plan investments in lifelong learning and to put this inside a promotional welfare. It is necessary to avoid reactive strategies to the change (the politics of management of the emergency)

Finally, innovation is not like to grab opportunity of changing products or trials but it requires the support of new knowledge and information to be applied trough suitable training system.

### **3. Conclusions**

In this paper we have highlighted the link between innovation and training affirming that innovation has to interface with processes of lifelong learning (Lundvall 2007b). Training is, therefore, the principal device on which to lean in order to give importance to the structural (social and economic) innovation. It supports the shifting of companies towards products and services of high technological (cognitive) content and supports the modification of traditional services (to redirect towards quality) and it communicates the updating of human resources skills therein involved.

Therefore, innovation, far from being comparable to a simple opportunity to change (a product or a process), is the result of a range of factors, such as learning, knowing how to apply new knowledge/information and the effort towards the destructive creation of old knowledge/ information.

Our analysis has shown that training is truly one of the greatest weaknesses in Italy, which is also highlighted by the benchmark with the closest competitors (eg. Germany, France, etc.) which shows the scarce investment in this sector in our country, compared to:

1. a European average of 60% of firms that in 2005 had benefited from training. Italy remained at 32%;
2. 33% of European firms that declared to have provided their employees with training. Italian enterprises remained at 29%;
3. a duration of training activities equal to 27 hours in Europe. In Italy are only 25 hours;
4. there a hourly cost for participants of 1492 PPS for hour of training at the European level, but only of 58 PPS in Italy.

Therefore, since development involves the ability to innovate, and this is supported by training, Italy will have to redesign its investments in training and, above all, in lifelong learning. To bring itself into line with the European standard, any intervention on this front must be programmed within a promotional welfare. This leads to the necessity to abandon the previous strategies reactive to change, the so-called politics of emergency management, and the assumption of a proactive approach. An choice approved by socially responsible economies as confirmed by studies and research (see Lundvall, Andersen, Von Hippel).

From all of the above the reform of the training systems must be favoured, that requires Regions endowed with powers (both normative and managerial) and stimulating policies that drive towards innovation of training. Only in the presence of such a device will the constant updating of the training to the demand of permanent re-entry in the training of all ages and the adjustment of the knowledge relative to all life contexts (both professional and personal). Such a process will allow the acceleration and anticipation of the times of attainment, from both young people and those looking for a job, of a culture of production and an ability of construction and development of social networks.

It deals with a realization that, also by putting itself, mainly to local and regional level, it is influenced by the strength of the choices made on a national level. This has to activate the reform of the training systems and the policies of flexicurity.

Therefore the regional politics should push enterprises and civil society to assume direct responsibility for the education and training of all the

social actors (young people, adults, unemployed, etc.) towards both work and a social life. This is practicable only with the expansion of the training systems that, in such a way, answer to the assignment to strengthen the offer of competencies for the labour market of new skills for new jobs - reducing social exclusion.

The connection training-innovation confirms the differentiating factor, the advanced productive and institutional contexts, the factor which one must converge the social politics to protect the most precious element of a country, its future.

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