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Research Work in the Industry 4.0 Era: The Italian Case

Michele Tiraboschi¹

Abstract Purpose. This paper wants to contribute to providing a legal framework for research work carried out in companies and the private sector.

Design/methodology/approach. After providing the theoretical framework, an analysis is supplied of all measures –including financial ones – related to the promotion of research work in companies and the private sector, more generally.

Findings. The idea of research in Italy is still closely associated with academia and this might hamper the establishment of company-based researchers and cooperation between the public and the private sector, especially without the setting up of a legal and institutional framework that puts private research work on an equal footing with public research.

Research limitations/implications. This research calls for the need to bring together academia and industry by putting in place a set of rules regulating research work at companies and in the private sector, more broadly, according to the European Charter for Researchers.

Originality/value. For the first time in Italy, non-academic research work is analyzed in a systematic framework covering legislation and rules laid down by collective bargaining.

Paper type. Theoretical and institutional research aimed to change and modernize the legal framework in Italy.

Keywords: *Research work, Industry 4.0, Labour Law, Italy.*

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1. Framing the Issue²

Though far later than in other countries, Italy's lawmakers have eventually addressed research carried out in companies, and in the private sector, more broadly. Yet this has been mostly done through narrow and piecemeal rules – somehow drawing on the well-established path leading to the *norma-incentivo* (see par. 3) – which have frequently paved the way for legislation on labour flexibility. An example of this has been the troubled process concerning the legal justification for fixed-term employment contracts and derogations to limitations on the duration of one's work performance set by legislation and collective bargaining (see par. 3.1.).

The same narrow-minded approach has also marked the growing interest towards more innovative forms of doctoral programmes which, as shown by international experience, are focused on closer collaboration with employers and on the new skills needed in the labour market.

In Italy's case, the goal of Italian lawmakers has been that of preserving the wealth of knowledge gained by PhD holders, often by means of generous incentives afforded to employers. This is usually done against the background

² This research is part of a larger international project concerning “innovative doctoral degrees” and their relative career prospects, funded by the European Commission (Grant Agreement n. 2014-1-UK01-KA203-001629) and coordinated by Middlesex University in collaboration with ADAPT, Maastricht School of Management, Trinity College of Dublin, EURODOC and University of Central Florida. A first part of this research has been published in a Special Section of the *International Journal of Technology and Globalisation* of the Belfer Center for Science and International Affairs, Harvard University, with the title “The Evolution of Doctoral Education Towards Industry and the Professions”, for which I served as a Guest Editor. A second part of this research concerning the promotion of research in the private sector was presented in Brussels on 19 January 2016 during a closed-door seminar on Inter-Sectorial Mobility and Industrial Talents promoted by the Directorate B – European Research Area of the European Commission which saw the participation of the most important European stakeholders on research, among which was ADAPT. This seminar provided the occasion to establish an international network coordinated by ADAPT in collaboration with the University of Gent and the Vienna University of Technology which led to a feasibility study concerning a strategy for researchers' inter-sectorial mobility within the European Space for Research, which is now under evaluation by the European Commission. Finally, the outcomes of the present research were also used as a starting point for two draft bills submitted to the Italian Parliament in the XVII legislature. One was Draft Bill no. 3654/2016 tabled by a number of members of the Parliament (among whom were Vignali and Palmieti), aimed at amending article 2095 of the Italian Civil Code to introduce the legal category of the researcher and at regulating research in the private sector. The other was Draft Bill no. 2229/2016 submitted by Senator Sacconi and D'ascola, among others, concerning to agile working in the fourth industrial revolution. To facilitate consultation and comparison, most documents and essays referred to in this paper can be accessed open access in *Osservatorio ADAPT Il lavoro di ricerca nel privato* (<http://moodle.adaptland.it>).

of their increasing difficulty to pursue the academic career for which they have been singled out and educated³, even more so because holding a PhD does not seem to appeal to industry⁴.

Adding to this is the lack of a consistent approach to examine research in the private sector in the light of what Karl Polanyi has termed the new “great transformation of work”, which in turn calls for the need to thoroughly review concepts like “business”, “work” and “employment contract”, also from a legal and regulatory standpoint.

Industry 4.0, 3D printing, robotics and Artificial Intelligence (AI), big data, biotechnology, nanotechnology and genetics are triggering a new industrial revolution in Italy, which is fuelled by research and continuous innovation of processes and products.

Standardised and routine tasks that characterised Taylorism and Fordism manufacturing and work organisation are now increasingly mechanised and less relevant⁵, as is large-scale and series production that marked industry in the twentieth century. Therefore, priority is given to skills that are necessary to operate short- and very short-cycle manufacturing in need of continuous re-planning and reviewing. The will to attend to this “great transformation” is the actual reason behind employers’ growing attention towards dual training and alternation between work and study⁶, that can serve purposes other than helping young people access employment⁷. The same can be said of the many,

³ Relevant literature refers to this as “over-education” (e.g. G.L. GAETA, G.L. LAVADERA, F. PASTORE, *Much Ado About Nothing? The Wage Effect of Holding a Ph.D. Degree but Not a Ph.D. Job Position*, IZA Discussion Paper, 2016, n. 10051), though the actual problem seems to be the mismatch between PhD holders’ traditional education and the needs of the labour market as far as research is concerned outside academia.

⁴ This problem is also seen elsewhere, though in Italy it seems to be a more serious one. Cf. H. DE GRANDE, K. DE BOYSER, K. VANDEVELDE, R. VAN ROSSEM, *From Academia to Industry: Are Doctorate Holders Ready? Journal of the Knowledge Economy*, 2014, vol. 5, n. 3, 538-561, and EXPERT GROUP ON THE RESEARCH PROFESSION, *Excellence, Equality and Entrepreneurialism. Building Sustainable Research Careers in the European Research Area*, European Commission, 2012, esp. p. 28, where it is argued that: «many researchers are trained in a traditional academic environment, which does not equip them for the needs of the modern knowledge economy where connections with society’s needs and the private sector are increasingly important».

⁵ Cf. A. Corlett, *Robot wars. Automation and the labour market*, Resolution Foundation, 2016.

⁶ Cf. E. MASSAGLI, *Alternanza formativa e apprendistato in Italia e in Europa*, Studium, 2016, who discusses the school-to-work alternation system not only as a tool to promote young people’s access to employment but also as a learning method facilitating people’s employability in the new labour market.

⁷ I discussed this aspect at length in M. TIRABOSCHI, *Productive Employment and the Evolution of Training Contracts in Italy*, *IJCLLR*, 2006, vol. 22, n. 4, 635-649, and in I. SENATORI, M. TIRABOSCHI, *La sfida della occupazione giovanile nel mercato globale tra produttività del lavoro e investimento in capitale umano*, in *Diritto delle Relazioni Industriali*, 2008, n. 3, 648-677.

albeit misfiring, attempts to promote advanced-level apprenticeships as a means to favour young people's involvement in company-based research projects and activities (see par. 3.2). This way, apprenticeship schemes are no longer viewed as employment contracts featuring on-the-job training⁸, but as arrangements helping individuals during their early stages of learning⁹. Specifically, they are taught to deal with real tasks, with this approach that is more suitable to provide them with the skills required by the labour market, among others the ability to identify, to examine, and to solve complex problems and realities¹⁰.

Somewhat linked to Industry 4.0¹¹ is the on-demand economy¹², which creates new markets and acts on producers, investors, workers and consumers' attitudes and needs, therefore affecting the spatial and temporal dimension of the production of goods and the provision of services and the legal regulation and framework of employment relationships¹³. This state of affairs has led

⁸ This is based on misleading assumptions relative to the opportunity provided by apprenticeship contracts to undergo training. For a more detailed analysis and relevant literature, see M. TIRABOSCHI, *Definizione e tipologie*, in M. TIRABOSCHI (a cura di), *Il Testo Unico dell'apprendistato e le nuove regole sui tirocini. Commentario al decreto legislativo 14 settembre 2011, n. 167, e all'articolo 11 del decreto legge 13 agosto 2011, n. 138, convertito con modifiche nella legge 14 settembre 2011, n. 148*, Giuffrè, 2011, spec. 183-185.

⁹ The topic of new educational and training models resulting from ongoing economic and social changes has been nicely dealt with in D. BARRICELLI (ed.), *Spazi di apprendimento emergenti. Il divenire formativo nei contesti di coworking, FabLab e università*, Isfol Research Paper, 2016, n. 29.

¹⁰ See L. ORSENIGO, *Politiche per la ricerca e l'innovazione*, in AA.VV. (eds.), *Investimenti, innovazione e città. Una nuova politica industriale per la crescita*, Egea, 2015, esp. p. 219. More generally, see also the WORLD ECONOMIC FORUM, *The Future of Jobs. Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution*, 2016. On this topic, mention should also be made of

EuroDualLE – European cooperative framework for Dual Learning – an Erasmus+ Project on advanced-level apprenticeships funded by the European Commission and carried out by the Centre for International and Comparative Studies of the University of Modena and Reggio Emilia (DEAL) in collaboration with ADAPT, the Italian-German Chamber of Commerce, the Otto-von-Guericke Universität Magdeburg, the University of Southampton, the Fondazione Politecnico di Milano, the UC Leuven, Cofora International Projects, the European Foundation for Education (EFE), the Universidad de Sevilla, the University of Padua, and Università degli Studi Roma Tre.

¹¹ The links between Industry 4.0 and the sharing economy have been pointed out by F. SEGHEZZI, *Una risposta di mercato ai rivolgimenti originati dalla sharing economy*, *Il Foglio*, 10 March 2016, 2. On this point, see the final document drafted by the X Commission of the Chamber of Deputies, *Indagine conoscitiva su «Industria 4.0»: quale modello applicare al tessuto industriale italiano. Strumenti per favorire la digitalizzazione delle filiere industriali nazionali*, Roma, 30 June 2016, esp. p. 32-33.

¹² Cf. W.P. DE GROEN, I. MASELLI, *The Impact of the Collaborative Economy on the Labour Market*, European Union, 2016.

¹³ Cf. The Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - a *European*

many to move on from the traditional debate on stable and atypical work and to reflect on the gradual marginalisation of working arrangements featuring salaried employment, which prompted the rise of crowd-based capitalism that is mostly managed through digital platforms. Notwithstanding challenges stemming from assessing and evaluating each contributor's output¹⁴, these forms of crowd-sourced capitalism are well researched and developed¹⁵. Many express some reservations about these futuristic views regarding the changing world of work. Specifically, doubts are voiced as regards those supporting forms of circular economics – through which new forms of employee representation¹⁶ can also be established – who argue that “physical factories will become less and less relevant, but cities with a large percentage of interconnected, highly-educated workers will become the new factories”¹⁷. In a similar vein, difficulties arise at the time of providing legal definitions for new working arrangements because of some resistance to moving on from legal subordination¹⁸. This is so despite widespread automated and on-demand manufacturing that makes salaried and permanent employment¹⁹ no longer

agenda for the collaborative economy, 2 June 2016 COM(2016)356 final, that has been examined by E. DAGNINO, *Sharing economy e lavoro: cosa dice l'Europa?*, in *Nòva*, blog ADAPT *La grande trasformazione del lavoro*, 4 June 2016.

¹⁴ An overall analysis of this issue is provided in E. DAGNINO, *Uber law: prospettive giuslavoristiche sulla sharing/on-demand economy*, in *Diritto delle Relazioni Industriali*, 2016, n. 1, 137-163. In relation to the proposals put forward by Italian lawmakers to regulate the sharing economy, see E. DAGNINO, *Proposta di legge sulla sharing economy: il grande assente è il “lavoratore”*, *Nòva*, blog ADAPT *La grande trasformazione del lavoro*, 4 April 2016.

¹⁵ See, among others, A. SUNDARARAJAN, *The Sharing Economy. The End of Employment and the Rise of Crowd-Based Capitalism*, MIT Press, 2016, esp. cap. 7 e 8.

¹⁶ For a perspective that goes beyond that of employment studies but is a key issue in future industrial relations, cf. G. SATERIALE, *Come il welfare crea lavoro. Guida per contrattare nel territorio*, LiberEtà, 2016, who also deals with geography and cities as new areas for trade unions. See also R. SANNA, G. SATERIALE, *Contrattazione territoriale per creare occupazione, innovazione e sviluppo locale*, in AA.VV. (eds.), *op. cit.*, p. 263-268.

¹⁷ This is the point of view of E. MORETTI, *La nuova geografia del lavoro*, Mondadori, 2012, p. 215. A similar approach is provided by K. SCHWAB, *op. cit.*, p. 74 and ff.

¹⁸ An example of this is provided by Italy's Jobs Act that gives employers full powers (in terms of recruitments, dismissals, changes to tasks, employee monitoring and sanctions), yet making reference to full-time open-ended salaried employment as “the most common type of employment relationship” (article 1 of Legislative Decree no. 81/2015). A criticism to this approach, which fails to consider the changes to work prompted by technology, demography and the environment is offered in F. SEGHEZZI, M. TIRABOSCHI, *Al Jobs Act italiano mancano l'anima e la visione di un lavoro e una società che cambia*, in F. SEGHEZZI, F. NESPOLI, M. TIRABOSCHI (eds.), *Il Jobs Act dal progetto alla attuazione. Modernizzazione o ritorno a un passato che non c'è più?*, ADAPT University Press, 2015, p. 11 and ff.

¹⁹ This point is highlighted by K. SCHWAB, *op. cit.*, p. 47-49 and 71. See also A. SUNDARARAJAN, *op. cit.*, esp. p. 159-176.

relevant. The same holds for those professionals with key roles in the past, e.g. middle managers and executives²⁰, that served as a link between decision-makers in the company and the other workers.

Though many authoritative sources speculate that technological changes challenging the current classification of working arrangements, also from a legal standpoint, will take place within five years,²¹ it is difficult to predict what the future of work holds and the possible organisational models that will apply. On reflection, in considering the foregoing, the arguments made by Marco Biagi more than 15 years ago are even more compelling. According to Biagi “labour terminology itself – e.g. posts – is outdated. Now and in the future, workers will not only be parties to the employment relationship but collaborators operating within a ‘working cycle’. Be it a project, a mission, an assignment, a production phase or its duration, one’s career path is increasingly made up of stages where one moves between salaried and self-employment and that at times can be interspersed by training and re-training courses”²². While appealing to employers willing to carry out research in the private sector (see par. 3.1), Biagi Law did not produce the expected results in relation to project work²³, even though this form of employment is compatible with the features of research. This is so because research “is an extremely dynamic activity that cannot depend only and always on the same people, but needs different skills to carry out specific projects”²⁴.

No one can deny the evolution of businesses – not only research institutions – that undergo major changes to their nature and structure. They are moving from being top-down economic organisations managed through “command

²⁰ On the obsolescence of managerial roles within the Industry 4.0 model, cf. AA.VV., *Man and Machine in Industry 4.0. How Will Technology Transform the Industrial Workforce Through 2025?*, *beg.perspectives*, 28 September 2015.

²¹ Cf. WORLD ECONOMIC FORUM, *op. cit.*, 2016, and the ILO *Technology at Work* portal (technologyatwork.ilo.org).

²² See, M. BIAGI, *Competitività e risorse umane: modernizzare la regolazione dei rapporti di lavoro*, in L. MONTUSCHI, M. TIRABOSCHI, T. TREU (eds.), *Marco Biagi. Un giurista progettuale. Scritti scelti*, Giuffrè, 2003, 151.

²³ An assessment of project work and of how its implementation has somehow moved away from the original intention provided in relevant legislation is provided in A. PERULLI, *Il lavoro autonomo tradito e il perdurante equivoco del “lavoro a progetto”*, in *Diritto delle Relazioni Industriali*, 2013, n. 1, 1-33, and A. PERULLI, *Il lavoro a progetto tra problema e sistema*, in *LD*, 2004, n. 1, 87-116. An interesting empirical analysis is provided by S. BERTOLINI, *Flessibilmente giovani. Percorsi lavorativi e transizione alla vita adulta nel nuovo mercato del lavoro*, Il Mulino, 2012, esp. p. 48-88.

²⁴ See GARATTINI, *Ricerca, le assunzioni restano un miraggio*, in *Sanità24 – Il Sole 24 Ore*, 3 June 2015.

and control” models²⁵ and focused on the production and exchange of goods and services²⁶ to being full-fledged cooperation platforms giving rise to networks establishing partnerships and innovation districts which are difficult to classify from a legal point of view²⁷. With production involving hybrid professionals, whose work is a halfway house between researching and managing changes in organizational and production processes, work itself is performed as a sort of circular process involving training and research aimed at “learning to learn”²⁸ according to a sequence of productive tasks based on studying, learning, innovation, planning and developing²⁹.

Research is key to the transformation of the way business is performed because it is concerned with what has been termed “intermediate labour markets”³⁰ in international literature. In other words, research has to do with international hubs in those productive processes built on the open and circular interconnection of intelligent systems.³¹ These systems are such not because of the massive use of highly-developed technologies, but because of the involvement of people and modern researchers that create and implement them, fuelling ongoing development which in turn adds significant value.

The above is evident in those areas that are home to so-called “brain hubs” – to use the fortunate and catchy terminology employed by Enrico Moretti in his book on the geography of jobs³². Brain hubs can be seen as an evolution of industrial districts. For this reason, they have also been dubbed “knowledge

²⁵ See Article 2086 of the Italian Civil Code (“management and hierarchy in the enterprise”): “the employer is the head of the enterprise and his collaborators hierarchically depend on him”.

²⁶ See article 2082 of the Italian Civil Code (“the Entrepreneur”): “an entrepreneur is anyone who performs an organised economic activity professionally for the purposes of producing or exchanging goods or services”.

²⁷ See R.J. GILSON, C.F. SABEL, R.E. SCOTT, *Contracting for Innovation: Vertical Disintegration and Interfirm Collaboration*, in *Columbia Law Review*, 2009, vol. 109, n. 3, 431-502.

²⁸ See J.D. NOVAK, D.B. GOWIN, *Learning How to Learn*, Cambridge University Press, 1984. See also S. HEMLIN, C.M. ALLWOOD, B.R. MARTIN (eds.), *op. cit.*

²⁹ Pedagogical literature refers to it as “learnfare” in relation to lifelong learning. On this perspective, see U. MARGIOTTA, *Dal welfare al learnfare: verso un nuovo contratto sociale*, in G. ALESSANDRINI (ed.), *La formazione al centro dello sviluppo umano. Crescita, lavoro, innovazione*, Giuffrè, 2012, esp. p. 48.

³⁰ On this point, see C. LANCIANO-MORANDAT, H. NOHARA, *The Labour Market for the Young Scientists*, in E. LORENZ, B-A. LUNDVALL (eds.), *How Europe’s Economies Learn. Coordinating Competing Models*, Oxford University Press, 2006, p. 156-189.

³¹ See the study *Indagine conoscitiva su «Industria 4.0»: quale modello applicare al tessuto industriale italiano. Strumenti per favorire la digitalizzazione delle filiere industriali nazionali* already referred to, esp. p. 31, where an analysis is provided of the transition from a linear economy to a circular economy in which products and processes are monitored and developed through their entire lifecycle.

³² Cf. E. MORETTI, *op. cit.*, p. 85 and ff.

districts”, or “local innovation platforms” by Bellandi³³. The latter definition can be explained by the fact that innovation is a local process triggered by “a relation and interaction system favoured by proximity”³⁴ – also in terms of culture and language – and by critical thinking.

This is the “agglomeration” of ideas, projects, resources and qualified staff which is being increasingly discussed³⁵ by economists and that – beyond a certain threshold – helps to boost innovation, productivity and growth³⁶ in new markets in times of globalisation. The sharing economy itself can be viewed as an exemplar of proximity relations and agglomeration³⁷.

Besides the demise of the idea of national sovereignty underlying the notion of “Nation-State”³⁸, the geography of work and that of the economy are also undergoing major changes. Rather than the rigid political and administrative boundaries that have been delineated by traditional cartography, this new geography revolves around polycentric dimensions where cities³⁹ serve as

³³ Cf. M. BELLANDI, *Piattaforme territoriali per l'innovazione, fra città e distretti industriali*, in AA.VV. (eds.), *op. cit.*, 161-166, and A. GERVASONI, *Infrastrutture, capitali, intelligenze, le città come hub di sviluppo*, p. 345-348.

³⁴ See G. GAROFOLI, *Le interrelazioni tra ricerca e industria nei sistemi innovativi locali: i fattori critici di successo*, proceedings from the Conferència Econòmica de la Mediterrània Nord-Occidental, *La Cooperació Territorial a la Mediterrània Occidental*, Barcelona, 6-7 June 2011, p. 2. With reference to the regional case, see F. AIELLO, *L'occupazione di ricercatori, una sfida per le imprese calabresi*, in *OpenCalabria*, 26 August 2015.

³⁵ See the detailed report by the WORLD BANK, *World Development Report 2009. Reshaping Economic Geography*, 2009, esp. p. 126 and ff. For a detailed examination of research on the relationship between agglomeration and innovation and how this might affect growth and productivity, see G. CARLINO, W.R. KERR, *Agglomeration and Innovation*, Harvard Business School Working Paper, 2014, n. 15-007; S.S. ROSENTHAL, W.C. STRANGE, *The Determinants of Agglomeration*, in *Journal of Urban Economics*, 2001, vol. 50, n. 2, 191-229; B.T. MCCANN, T.B. FOLTA, *Location Matters: Where We Have Been and Where We Might Go in Agglomeration Research*, in *Journal of Management*, 2008, vol. 34, n. 3, 532-565.

³⁶ Cf. OECD *Business and Finance Outlook 2016*, 2016, p. 78 ff. On the close links between research, innovation and productivity see the report AA.VV., *L'innovazione come chiave per rendere l'Italia più competitiva*, Aspen Institute Italia, 2012. On the relationship between Industry 4.0, globalisation and local dynamics in relation to the German case, see ACATECH (ed.), *Industry 4.0, Urban Development and German International Development Cooperation*, Acatech Position Paper, 2015.

³⁷ On this point, see the enlightening research by N.M. DAVIDSON, J.J. INFRANCA, *The Sharing Economy as an Urban Phenomenon*, in *Yale Law & Policy Review*, 2016, vol. 34, n. 2, 215-279.

³⁸ Cf., among others, N. IRTI, *Norma e luoghi. Problemi di geo-diritto*, Laterza, 2006. For a labour law perspective, see T. TREU, *L'internazionalizzazione dei mercati: problemi di diritto del lavoro e metodo comparato*, in P. CENDON (ed.), *Studi in onore di Rodolfo Sacco. La comparazione giuridica alle soglie del 3° millennio*, Giuffrè, 1994, vol. I, 1117 and ff.

³⁹ This issue is so widespread that many talk of interconnected cities as “New nations”. Cf. P. KHANNA, *Connectography. Mapping the Future of the Global Civilization*, Random House, 2016. In relation to Italy's geography of work and economy, see R.M. LOCKE, *Remaking the Italian*

aggregating elements of a network in which “distance is no longer referred to in terms of metrical parameters but considering the intensity of people’s relations”⁴⁰.

Therefore, while industrial relations in the past featured the construction of streets, bridges, railways, harbours and airports, the 4th Industrial Revolution is marked by the fact that research and planning activities, be they private or public ones, are key elements of the intangible infrastructure known as “knowledge infrastructure”, which concerns broadband connection and new generation technologies and should set the basis for a modern economy⁴¹.

If research work is considered against this backdrop, the present analysis should go beyond contractual and non-contractual⁴² arrangements promoting collaboration between the private and the public sector, either in general⁴³ or regarding the legal acknowledgement of researchers operating in the private sector and hired through industrial doctorates or by means of partnerships with employers⁴⁴. For this reason, this paper wants to contribute to setting a legal framework for research work carried out in companies and the private sector, particularly because the idea of research in Italy is still closely associated with academia and this might hamper the establishment of company-based researchers and cooperation between the public and the private sector,

Economy, Cornell University Press, 1997, where a classification is provided of how Italian capitalism develops locally.

⁴⁰ See E. CASTI, *Rappresentare la spazialità della mondializzazione*, in *Nuova Secondaria*, 2015, n. 7, p. 39. See also the *World Development Report 2009. Reshaping Economic Geography* already referred to, esp. 48, where the notion of “relational intensity” is defined in terms of “density” to explain the concentration of economic assets and resources.

⁴¹ Some insights into this are offered by C. MANCINI, *Il settore delle infrastrutture negli Stati Uniti: creazione di lavoro, competenze, formazione*, in *Nova*, blog ADAPT *La grande trasformazione del lavoro*, 30 May 2016. On the relationship between research and development activities and intangible infrastructure in the new economy, see T. SOUGIANNIS, *R&D and Intangibles*, Wiley Encyclopedia of Management, 2015.

⁴² On this point, see the detailed analysis by E.M. IMPOCO, *Il contratto di ricerca tra Ente pubblico e impresa*, Università degli Studi di Roma Tor Vergata, Dottorato in Autonomia individuale e autonomia collettiva, XXIV ciclo, a.a. 2011/2012.

⁴³ This topic is currently investigated by the Foundation set up by the Conference of Italian University Rectors (CRUI) that has established a specific observatory to promote dialogue and cooperation between universities and businesses. See FONDAZIONE CRUI, *Report Osservatorio Università-Imprese 2015*, 2015. See also G. ABRAMO, C.A. D’ANGELO, F. DI COSTA, *University-industry research collaboration: a model to assess university capability*, in *Higher Education*, 2011, vol. 62, n. 2, 163-181, and, more recently, the proposal contained in AA.VV., *Verso un ecosistema virtuoso “industria-università-ricerca”*, Aspen Institute Italia, 2015.

⁴⁴ I have devoted a specific study to this professional figure and the difficulty to be hired by companies due to legal and cultural limitations. See M. TIRABOSCHI, *Dottorati industriali, apprendistato per la ricerca, formazione in ambiente di lavoro. Il caso italiano nel contesto internazionale e comparato*, cit.

especially without the setting up of a legal and institutional framework that puts private research on an equal footing with public research (see par. 5). After all, assessing the efficacy of the generous public funds granted to Italian employers (see par. 3) to foster innovation becomes difficult if no eligibility criteria⁴⁵ are in place and if the national industrial relations system (see p. 4) fails to provide the tools to acknowledge the status of private-sector research in an open and transparent market, as hoped for in the European Charter of Researcher and in Code of Conduct for the Recruitment of Researchers (see par. 2), which are still poorly implemented in Italy.

2. Research carried out in the Private Sector: Relevance, Growth and Development Prospects. The Italian Case examined from an International and Comparative Perspective

R&D can be defined⁴⁶ as “the set of creative works performed systematically to increase one’s knowledge and to employ this knowledge for new applications”⁴⁷. In general terms, R&D consists of three main areas “a) basic research, that is experimental or theoretical research carried out to acquire knowledge on observable facts and phenomena but not intended to be used for a specific purpose; b) applied research, namely original work performed to gain knowledge to be used for practical or specific purposes; c) experimental development, that is systematic work based on existing knowledge acquired through research and practical experience that is performed to complement, develop or improve materials, products, production processes, systems and services”⁴⁸.

⁴⁵ This point is highlighted in MINISTERO DELLO SVILUPPO ECONOMICO, *Migliorare le politiche di Ricerca e Innovazione per le Regioni. Contenuti e processi di policy*, 2009, p. 107, where it is specified that eligibility criteria regarding funding “have the purposes of allocating incentives according to a results-based approach”.

⁴⁶ At the international level, the starting point to measure and define research and development activities was June 1963 when experts convened in Frascati in a meeting promoted by the OECD. Cf. OECD, *Proposed Standard Practice for Surveys of Research and Development: The Measurement of Scientific and Technical Activities*, 1963. See also OECD, *Frascati Manual 2015. Guidelines for Collecting and Reporting Data on Research and Experimental Development*, 2015. Finally, see the interim report related to Article 8 of the Council Decision (94/78/CE, Euratom) establishing a multiannual programme for the development of Community statistics on research, development and innovation (presented by the Commission). COM (96) 42 final, 14 February 1996.

⁴⁷ OECD, *Frascati Manual. Proposed Standard Practice for Surveys on Research and Experimental Development*, 2002, p. 30.

⁴⁸ *Ibidem*. In literature, see F. MERLONI, *Ricerca scientifica (organizzazione a attività)*, in *Enc. dir.*, 1989, XL.

If this definition is taken, R&D is identified taking account of its “purpose” – though varied in nature⁴⁹ – namely the search for new solutions to complex problems, and not by considering whether the institution that engages in or funds research is a private or a public sector one. This aspect alone suffices to call into question the misleading assumption underlying the public monopoly of research and to give private-sector research the same status as that conducted in the public sector, particularly because the fulfilment of objectives pursued by research should be more relevant than the location where research takes place or the formal qualifications of those carrying out research activities. Besides this, the definition referred to above reasserts the central role of Research and Development in relation to doing business and generating profit through the use of new technologies and systems of circular economies that promote sharing and that call into question the traditional boundaries between investors, producers and consumers (see par. 1).

At the start of the new millennium, thus earlier than elsewhere⁵⁰, the European Commission had already regarded research as “one of the most promising areas for future work”⁵¹, whether carried out in the public or the private sector. Suffice to say that R&D activities generate between 20% and 25% of economic growth⁵² with this sector that will provide the highest number of job opportunities, either directly or indirectly, if one also includes related services⁵³. This aspect is supported by the fact those areas where companies allocate significant investments in research usually report the lowest unemployment levels, the highest degree of productivity and resilience in times of job and

⁴⁹ A detailed evaluation of the boundaries between research and relating activities is offered in OECD, *Frascati Manual. Proposed Standard Practice for Surveys on Research and Experimental Development*, cit., esp. 34-45. In literature, see F. MERLONI, *Ricerca scientifica*, in EGT, 1991, XXVII, e G. SIRILLI (ed.), *La produzione e la diffusione della conoscenza. Ricerca, innovazione e risorse umane*, Fondazione CRUI, 2010, p. 191-193.

⁵⁰ See the study by the Department of Innovation, Industry, Science and Research of the Australia Government, *Research Skills for an Innovative Future. A Research Workforce Strategy to Cover the Decade to 2020 and Beyond*, Commonwealth of Australia, 2011, according to which “Success in the 21st century belongs to those societies that value qualities such as creativity, innovation and problem-solving. Societies that invest in the intellectual capacity of their people. At the heart of that capacity lies our research workforce, because it is they who underpin so much of our nation’s innovation effort by pioneering the ideas, applications, products and services of tomorrow”.

⁵¹ Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions of 18 January 2000: Towards a European research area, COM(2000) 6 final, p. 4.

⁵² *Ibidem*.

⁵³ The same approach is adopted by E. MORETTI, *op. cit.*, 215, which points out that the social return resulting from research and development is about 38%. According to Moretti, each research job generates five more positions in traditional industries.

economic crisis⁵⁴. Hence the idea of devising more research-oriented policies⁵⁵ and establishing a genuine “European research space” to facilitate researchers’ geographical and inter-sectorial mobility⁵⁶ and to streamline red tape, especially as regards the portability of social security rights⁵⁷. Another step in this direction has been the formal adoption of the European Charter for Research and the Code of Conduct for the Recruitment of Researchers, which apply to researchers operating in the private and the public sector – without regard to the employment relationship in place between the parties or the legal nature of the employer⁵⁸ – and which openly intend to navigate juridical and sectorial issues hampering “greater integration between public-sector research and industry”⁵⁹.

Regrettably, little has changed since the adoption of these two documents, which are even more relevant today, in consideration of the financial and economic crisis that besets employers and produces a significant reduction in public expenditure. Public and private-sector research across Europe faces a stalemate situation, to the point that “without concerted action to rectify this, the current trend could lead to a loss of growth and competitiveness in an increasingly global economy. The leeway to be made up of the other technological powers in the world will still grow further. And Europe might

⁵⁴ Cf. D. CIRIACI, P. MONCADA-PATERNÒ-CASTELLO, P. VOIGT, *Innovation and Job Creation: A sustainable relation?*, IPTS Working Paper on Corporate R&D and Innovation, 2013, n. 1. See also WORLD BANK, *op. cit.*

⁵⁵ See article 179 of the Treaty on the Functioning of the European Union, according to which “The Union shall have the objective of strengthening its scientific and technological bases by achieving a European research area in which researchers, scientific knowledge and technology circulate freely, and encouraging it to become more competitive, including in its industry, while promoting all the research activities deemed necessary”. Articles 180 through 190 set forth the activities that have to be carried out to achieve this objective, defining the ways the pluriennial programme should develop.

⁵⁶ EUROPEAN COMMISSION, *Mobility of Researchers between Academia and Industry. 12 Practical Recommendations*, European Communities, 2006.

⁵⁷ Pension rights have been seen as the ‘most problematic’ dimension of social security for European researchers, followed by health insurance, unemployment benefits, and family benefits. See EUROPEAN COMMISSION, *Realising a single labour market for researchers. Report of the ERA Expert Group*, European Communities, 2008, p. 37. On the current difficulties concerning the harmonisation of national pension systems and the proposal by the ERA Expert Group to establish a supplementary pension system for researchers operating at the European level, see M. SACCAGGI, *Mobilità dei ricercatori: il nodo della sicurezza sociale*, in *Boll. Spec. ADAPT*, 2016, n. 4.

⁵⁸ Cf. The Recommendation of the Commission of 11 March 2005 concerning the European Charter for Researchers and a Code of Conduct for the Recruitment of Researchers.

⁵⁹ See G. SIRILLI (ed.), *op. cit.*, p. 33.

not successfully achieve the transition to a knowledge-based economy⁶⁰. The situation in Italy is even more worrisome. The lack of substantial investment in R&D is endemic and can be explained by companies' production specialisation⁶¹ and by the fact that some of them fail to keep pace with the development process, mostly because the role of the university in Southern Italy has been downgraded⁶².

One might note that public investments in R&D are shrinking and their allocation often takes place through unclear⁶³ and cumbersome procedures due to poor coordination between institutions operating at the central and peripheral level. This holds true if one considers that it is the Ministry of Economic Development itself that points out the difficulty to access public funds to conduct research, also because of political meddling and excessive red tape⁶⁴.

As evidenced by the relevant literature, the existing gap between Italy and other developed countries cannot be only ascribed to limited investment⁶⁵ and governance issues, but also to skills that become rapidly obsolete⁶⁶ or are not provided at all⁶⁷. This is also due to the absence of career paths and retraining

⁶⁰ COM(2000)6 def., cit., 4. See also the comparative study produced by Deloitte for the European Commission, *Researchers' Report 2014. Final Report*, European Commission, 2014, 16 and ff. and 117 and ff.

⁶¹ See G. FORESTI, *Specializzazione produttiva e struttura dimensionale delle imprese: come spiegare la limitata attività di ricerca dell'industria italiana*, CSC Working Paper, 2002, n. 32. See also, ASSOCIAZIONE TREEELLE, FONDAZIONE ROCCA, *Scuola, università e ricerca. L'Italia nel confronto internazionale*, 2013.

⁶² The reduction of funding allocated to Southern Italy universities and the negative implications resulting from human capital investment have been analysed in (ed.), *Università in declino. Un'indagine sugli atenei da Nord a Sud*, Donzelli, 2016.

⁶³ Cf. *Analisi e Raccomandazioni sui Contributi Pubblici alle Imprese*, rapporto al Presidente del Consiglio e Ministro dell'economia e delle finanze e al Ministro dello sviluppo, delle infrastrutture e dei trasporti redatto su incarico del Consiglio dei Ministri del 30 April 2012 (c.d. *Rapporto Giavazzi*).

⁶⁴ In this sense, see the report by the MINISTERO DELLO SVILUPPO ECONOMICO, *op. cit.*, esp. 4-6. On the fact that tasks are assigned to different institutions randomly, see A. BONACCORSI, *Politiche regionali per la Ricerca & Innovazione in Italia*, in *I&S*, 2011, n. 91, 16-20, who refers to this phenomenon as the "fractal syndrome".

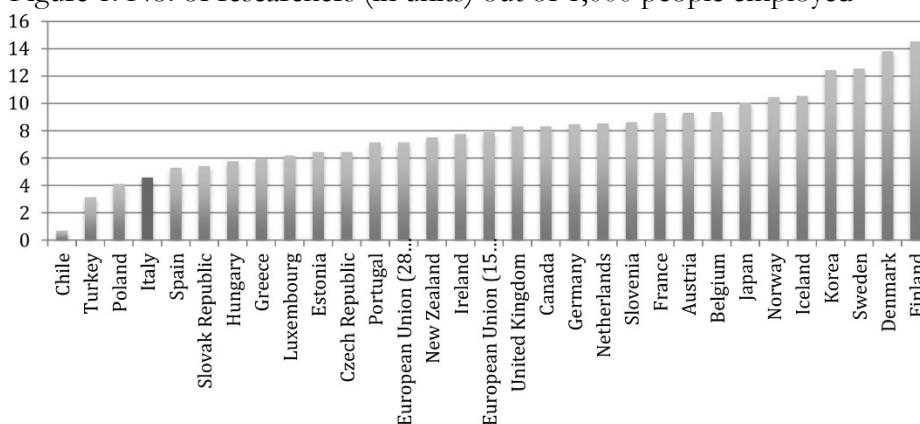
⁶⁵ Cf. the comparison carried out on Eurostat data by D. MANCINO, *Quanto spende l'Italia in ricerca?*, in *Wired*, 15 January 2016.

⁶⁶ See G. BRACCHI, *Rigenerare l'industria creando nuove imprese tecnologiche*, in AA.VV. (ed.), *op. cit.*, p. 330, where an investigation is provided of the ageing of research and development staff in Italy and the reasons hampering turnover, which also causes brain-drain.

⁶⁷ Cf. L. ORSENIGO, *op. cit.*, p. 217 and p. 218 where he states that "a lack of skills can be seen in staff as well as an unwillingness to use research as a tool to classify and deal with problems in many sectors of the economy and society. This phenomenon can be seen not only in

programmes for researchers that can only be devised in an open and transparent labour market (see par. 5) that moves beyond the increasingly weak monopoly of public universities. Tellingly, among the OECD countries, only Chile, Poland and Turkey are far worse than Italy (see Figure 1) as regards the contraction of domestic expenditure on research, the limited amount of public funding⁶⁸ devoted to research and the low number of researchers hired by companies⁶⁹ and the private sector, more broadly (see figure 2)⁷⁰. In figures, this amounts to 4 researchers out of 1,000 people employed, against the OECD average of 10.

Figure 1. No. of researchers (in units) out of 1,000 people employed



Source: Database OECD, 2013

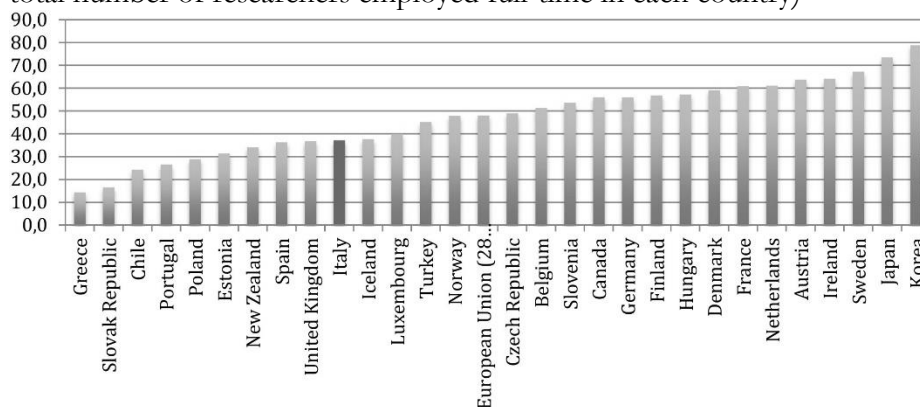
technologically-advanced companies, but also in small and medium-sized enterprises, financial institutions and public administrations”.

⁶⁸ MINISTERO DELLO SVILUPPO ECONOMICO, *op. cit.*, esp. 9.

⁶⁹ See the articles collected by E. PRODI, *Uno, nessuno, centomila: i numeri dei ricercatori in Italia e all'estero*, in *Nova*, blog ADAPT *La grande trasformazione del lavoro*, 12 April 2016.

⁷⁰ A comparative analysis is provided by DELOITTE, *op. cit.*, p. 16 and ff., which also provides a gender-based analysis (30 and ff.).

Figure 2 – No. of Researchers in the private sector (% calculated out of the total number of researchers employed full-time in each country)



Source: Database OECD, 2013

Consequently, as rightly stated by the Ministry of Economic Development “companies do little research, and fewer of them allocate money to it”⁷¹, because Italy’s labour market mostly comprises small and medium-sized enterprises and because the regulatory system presents shortcomings that significantly hamper innovation approaches⁷². Italy’s expenditure on research in companies, universities and other institutions in the public and private sector is as much as €21 billion, that is 1.31% of GDP⁷³, a far cry from the OECD’s average of 2.5% and the 3% set by government representatives during the 2002 Barcelona Development Agenda⁷⁴, during which it was also established that 2/3 of research expenditure had to be funded by the private sector⁷⁵. Innovation performance, which is measured considering the relationship between research input (expenditure), intellectual property (patents) and the

⁷¹ MINISTERO DELLO SVILUPPO ECONOMICO, *op. cit.*, p. 9.

⁷² See p. 10 and 11 in relation to the assumption, for which no empirical support has been provided, that national production systems characterised by small and medium-sized enterprises develop innovation all the same, though in a less organised and clear way. An empirical analysis of research carried out in companies in Italy is offered in G. PETRONI, C. VERBANO, *L’evoluzione della ricerca industriale in Italia. Caratteri peculiari e prospettive*, Franco Angeli, 2000.

⁷³ ISTAT, *Ricerca e sviluppo in Italia. Anno 2013*, 2015.

⁷⁴ Cfr. R. PRODI, *Ricerca, innovazione e competitività: la sfida globale dell’Europa*, a relation presented on the occasion of the inauguration of the 2002-2003 academic year at the University of Genoa. See also EUROPEAN COMMISSION, *An analysis of the development of R&D expenditure at regional level in the light of the 3% target*, European Communities, 2009.

⁷⁵ Cf. D. MANCINO, *op. cit.*, who provides data showing that the gap between Italy and other countries in terms of research is due to the scarcity of private funds allocated to research.

introduction of new products (output) is also below the OECD average, confirming the “absence of established relations between industry and academia”⁷⁶.

This state of affairs explains the attempt to move beyond the time-honoured, ponderous system made up of a deluge of provisions enforced over time and to replace it with a national agency tasked with allocating funds in a more flexible way through calls for applications that cover a number of years and promote cooperation between the public and the private sector⁷⁷. The situation described above also accounts for the Government’s increasing use of provisions (e.g. *norma-incentivo*) aimed not only to promote research activities that might benefit the public and entice investors⁷⁸, but also to serve as a guide for private operators, prompting the need to engage in innovation and research – which is particularly pressing in Italy – and favouring the establishment of “market-oriented research” over traditional “academic research”⁷⁹.

3. Government Support to Research carried out in Companies and the Private Sector: Economic Incentives

Unlike universities⁸⁰ and other publicly-funded research centres⁸¹, Italian law does not set forth specific rules on private-sector research, nor does it provide a proper legal definition for this form of employment. Research carried out in

⁷⁶ In this sense, cf. MINISTERO DELLO SVILUPPO ECONOMICO, *op. cit.*, p. 10.

⁷⁷ This is the proposal of the Gruppo 2003, an association promoting academic research. Cf. S. GARATTINI, G. BUZZETTI, *A un’agenzia italiana la nuova governance*, in *Sanità24 – Il Sole 24 Ore*, 1-7 March 2016.

⁷⁸ A detailed analysis of legal norms promoting employment contracts for research purposes that benefit both clients and the public, more broadly, pursuant to article 9 of Constitution, is offered in cf. E.M. IMPOCO, *op. cit.*, p. 99-107. It is also fitting to refer to V. DI CATALDO, *Il contratto di ricerca – Commento alla l. 17 febbraio 1982, n. 46, Interventi per i settori dell’economia di rilevanza nazionale*, in *NLCC*, 1983, 330 ss., cui *adde* M. BASILE, *Ricerca scientifica (contratto)*, in *Enc. dir.*, 1989, XL, § 8 (i contratti di promozione della ricerca), who provides an analysis of all those contracts concluded for research purposes from the perspective of Italy’s Civil Code.

⁷⁹ G. BRACCHI, *op. cit.*, qui 330.

⁸⁰ Cf. C. MIRIELLO (ed.), *Manuale di legislazione universitaria*, Maggioli, 2013. See also R. MOSCATI, M. REGINI, M. ROSTAN (eds.), *Torri d’avorio in frantumi? Dove vanno le università europee*, Il Mulino, 2010, and P. MONTANARO, R. TORRINI, *Il sistema della ricerca pubblica in Italia*, Banca D’Italia, Questioni di Economia e Finanza (Occasional Paper), 2014, n. 219.

⁸¹ See E. DI CARPEGNA BRIVIO, *Lo status giuridico del personale ricercatore nella ricerca scientifica extrauniversitaria: tendenze di evoluzione di sistema*, in *Amministrazione in Cammino*, 2013, 1-31, and F. TROILO, *Il lavoro negli Enti Pubblici di Ricerca: un primo sguardo d’insieme*, Working Paper ADAPT, 2016, n. 5. Cf. G. GULLÀ, R. PALAIA, *I ricercatori, il sistema ricerca italiano e la crisi del Paese*, in *Analysis*, 2014, n. 1. For some proposals concerning the establishment of an open and transparent “labour market” for researchers, see the Manifesto drafted by ANPRI on 6 March 2014, *Ruolo e valorizzazione dei Ricercatori e Tecnologi degli Enti pubblici di ricerca*.

companies is therefore assessed on a case by case basis and classified according to working schemes typical of salaried workers or those in self-employment. This uncertainty exacerbates the inadequacy of standard legal classifications and contributes to the rise of atypical work and precarious employment through internships, scholarships, research grants and temporary contracts whose legal basis and legitimacy is often doubtful⁸².

One might note that there exist a number of financial and economic measures which, either directly or indirectly, promote company-based research, as well as forms of collaboration between businesses and universities (e.g. “research contracts” that are still poorly used in Italy)⁸³. On closer inspection, many initiatives are in place favouring private-public cooperation either at the national or regional level. Examples include joint research projects, competence centres, industrial, productive, and technological districts, clusters, joint laboratories, science parks, incentives to create innovative start-ups, innovation poles and so forth⁸⁴. Reference should also be made to financial support schemes to promote private investments in public universities⁸⁵, and

⁸² The issue of instability of employment in research has been examined also by the EXPERT GROUP ON THE RESEARCH PROFESSION, *op. cit.*, 10. In literature, see cf. L. ACKERS, L. OLIVER, *From Flexicurity to Flexsequality? The Impact of the Fixed-Term Contract Provisions on Employment in Science Research*, in *International Studies of Management & Organization*, 2007, vol. 37, n. 1, 53-79, and L. OLIVER, T. HOOLEY, *Researchers, fixed-term contracts and universities: understanding law in context*, CRAC, 2010.

⁸³ This issue is such a serious one that scholars of civil law resort to categories used to classify atypical employment. See V. ZENO-ZENCOVICH, *I contratti di ricerca ed il loro «tipo sociale» in una analisi di alcuni dei modelli più diffusi*, in *GI*, IV, 1988, 3-16, and A. CANDIAN, *Ricerca (contratto di)*, in *DDPCin*, 1998, XVII. See also E.M. IMPOCO, *op. cit.*, and the literature therein.

⁸⁴ Cf. MINISTERO DELLO SVILUPPO ECONOMICO, *op. cit.* Some proposals concerning public and private funding are provided in G. BRACCHI, *op. cit.*, 329-336, while an examination of the legal definition of research in the private sector is provided in E.M. IMPOCO, *op. cit.*, and the literature therein.

⁸⁵ Here reference is made to tax incentives and to the opportunity for employers to deduct from their taxable income any fund allocated for research purposes if provided as a contribution or a donation. Save for VAT, no direct and indirect tax shall be paid on money allocated on a gratuitous basis to universities, university foundations and public and private research centers (for private centres MIUR’s monitoring is necessary). In addition, a 90% reduction apply to the notarial fees to be paid to fill out the necessary documentation. See the plan to fund research passed by the Italian Council of Ministers on 6 February 2014 laying down urgent measures to support innovation and research activities in companies (PON Ricerca e Innovazione, in www.faredottorato.it). The plan was subsequently implemented under the Renzi government on 1 May 2016, see: Cf. C. MANCINI, *Programma Nazionale per la Ricerca 2015-2020: Guida alla lettura*, in *Boll. ADAPT*, 2016, n. 17.

measures that ideally⁸⁶ should favour the recruitment of PhD holders and graduates in technical subjects who are engaged in R&D activities⁸⁷, also through employment agencies⁸⁸,

Finally, a passing reference should be made to Law no. 190 of 23 December 2014 (2015 Stability Law), that introduced a tax credit⁸⁹ for employers that invest in R&D activities in the 2015-to-2019 period⁹⁰. This provision is of

⁸⁶ Before being replaced by par. 35, Article 1 of Law no. 190/2014, the economic incentives envisaged in Article 3 of Legislative Decree no. 145/2013 were not implemented for lack of financial resources.

⁸⁷ Cf. Decree-Law no. 83/2012 as converted by Law no. 134/2012, which was followed by the Ministerial Decree no. 13 October 2013. “*Disposizioni applicative necessarie a dare attuazione al contributo sotto forma di credito di imposta alle imprese, per l’assunzione a tempo indeterminato di personale impiegato in attività di Ricerca e Sviluppo*”, published in Gazzetta Ufficiale no. 16 of 21 January 2013. Before its repeal, having effect from 1 January 2015, this provision granted a tax credit to those employers investing on research and development. This tax credit also applied to costs resulting from the recruitment of a PhD or workers having a master’s degree in scientific or technical subjects if they are hired to conduct research activities. The contribution also took the form of a 35% tax credit up to a maximum of €200,000 yearly, concerning the costs borne to hire permanent staff with the foregoing requirements. Similar measures have been put forward in the *FlxO S&U – Alta Formazione e Ricerca* project promoted by Italia Lavoro, according to which a €6,000 contribution is allocated for each worker hired on a full-time apprenticeship contract for research purpose (which is reduced to €4,000 for part-time employment contracts) and an €8,000 contribution for each PhD holder aged between 30 and 35 years old who is recruited on a full-time salaried employment contract, either on a full-time or a part-time basis for at least 12 months (cf. Italia Lavoro, *Guida incentivi all’assunzione e alla creazione d’impresa*, 2016). Another project that is worth a mention is PhD Talents (2015-2018) that has been carried out by the CRUI Foundation for MIUR and in collaboration with Confindustria. The project, that has been conducted on an experimental basis, covered 80% of labour costs for the 2015-2018 period, specifically: 80% in the first year, 60% in the second year and 50% in the third year, with researchers who had to be paid at least €30,000 per year. An evaluation of the difficulties related to the implementation of the project can be found in A. Claudi, A. D’Ascenzio, *PhD ITalents: un progetto lastricato di buone intenzioni*, Associazione dottorandi e dottori di ricerca italiani, 2016 (in www.faredottorato.it).

⁸⁸ This aspect has been defined by Italy’s Tax Authority through Resolution no. 55/E of 19 July 2016. It facilitates cooperation between employment agencies and small and medium-sized enterprises that cannot invest in highly-qualified staff to perform research or to train and retrain them.

⁸⁹ This can be added to the benefits provided by Article 24 of the Decree-Law no. 83/2012 that has been referred to in the previous note. Cf. Article 9 of Ministerial Decree of 27 May 2015, *Attuazione del credito d’imposta per attività di ricerca e sviluppo*, published in *Gazzetta Ufficiale* no. 174 of, 29 July 2015.

⁹⁰ Specifically, Article 3 of Decree-Law no. 145 /2013, as replaced by par. 35, Article 1 of Law no. 190/2014. Pursuant to Ministerial Decree 27 May 2015, the tax credit is granted in consideration of the extra costs borne compared to the average amount of investments made in the tax years 2012, 2013 and 2014 where two different tax rates apply, namely: 25% for costs resulting from laboratory tools and instruments in consideration of the amount of time, the period, and the type of research staff have been used for having a cost per unit of less than

interest in that it applies to all companies – irrespective of their legal entity, industry sector, accounting regime, turnaround – and contains a list of activities falling under the definition of R&D⁹¹, among others:

- a) experimental or theoretical work, the main purpose of which is to develop basic knowledge of observable phenomena and facts;
- b) planned research or critical surveys aimed at gaining new knowledge, to be used to create new products, processes and services, to improve existing ones or to produce components of complex systems which are necessary to industrial research;
- c) the acquisition, combination and structuring of existing knowledge and abilities of scientific, technological and business nature to produce plans, projects or drafts for new, amended, or improved products or services;
- d) The manufacturing or trial of products, processes and services, provided that they are used or transformed for industrial applications or for business purposes.

Regular changes to products, production lines, manufacturing processes, existing services do not count as R&D activities, even when these amendments generate an improvement. One provision that might play a significant role in relation to the present analysis is the lengthy circular issued by the National Tax Office to clarify the scope of application of Article 3 of Law-Decree no. 145 of 23 December 2013, as replaced by par. 35, Article 1 of Law no. 190/2014. The circular provides a wider and up-to-date definition of research work, including that “performed in fields other than scientific and technological ones (for instance, the sociological and historical sector), provided that research is carried out to gain new knowledge, to increase existing one and to create new applications”, therefore “regardless of the entity’s legal nature, industry sector, accounting system and size”⁹².

In considering the aim of this paper, namely the setting up of a full-fledged legislative and institutional framework for private-sector research (see par. 1),

€2,000 (VAT excluded) and for technical skills and industrial property rights for any industrial, bio-technological invention or a new plant variety; b) 50% of the cost of highly-qualified staff (having a PhD degree, enrolled in a Doctoral programme at both an Italian and a foreign university, or holding a Masters’ degree in technical or scientific subjects) and the ensuing costs for concluding research contracts with universities, research centres or equivalent institutions, or other companies including innovative start-ups as specified in Article 25 of Decree-Law no. 179/2012.

⁹¹ Cf. Art. 2 of Ministerial Decree of 27 May 2015.

⁹² See AE Circular no. 5/E of 16 March 2016, *Articolo 3 del decreto-legge 23 dicembre 2013, n. 145, convertito con modificazioni dalla legge 21 febbraio 2014, n. 9, come modificato dal comma 35 dell’articolo 1 della legge 23 dicembre 2014, n. 190 (Legge di Stabilità 2015) – Credito di imposta per attività di ricerca e sviluppo*, qui rispettivamente, par. 2.1 e 1.

the proliferation of economic measures supporting this form of employment should come as no surprise. Though an under-researched topic in national labour law literature⁹³, the incentive-based regulatory approach is a well-established and recommended practice, as far as economic analysis and the evaluation of public support are concerned, particularly as compared to the legislative process, on the assumption that the former “promotes economic efficiency by allowing for decentralised flexibility in conduct research”⁹⁴. Research on productivity, that is increasingly seen as “the ultimate engine of growth in the global economy”⁹⁵ also supports this view and highlights the relevance of public incentives that support R&D activities⁹⁶. Significantly, private companies and institutions engaged in R&D have access to a wider set of public incentives. By way of example, mention can be made of financial aid to companies (incentives based on the activities performed or outcomes, non-refundable loans, loans with low-interest rates, tax credits and reductions, premiums, and so forth), which are envisaged by both Italian and EU law regulating public support for R&D⁹⁷, and tax incentives (reduction of tax rates, tax deductions of R&D-related expenses, tax credits related to innovation, and so forth)⁹⁸. These measures are considerably different from one another in terms of size and scope and also in consideration of company size and industry sector: basic research, applied research, industrial research, experimental development, aid to create and modernise research infrastructure, etc.⁹⁹

⁹³ One cannot fail to refer to E. GHERA, *Le sanzioni civili nella tutela del lavoro subordinato*, in *DLRI*, 1979, 305-381. Mention should also be made of my monography *Incentivi alla occupazione, aiuti di Stato, diritto comunitario della concorrenza*, Giappichelli, 2002, esp. par. 1 e 2. and the literature therein in relation to definitional aspects.

⁹⁴ See R.B. STEWART, *Regulation and the Crisis of Legalisation in the United States*, in T. DAINITTH (ed.), *Law as an Instrument of Economic Policy: Comparative and Critical Approaches*, De Gruyter, 1988, 104. Cf. R. GÖNENÇ, M. MAHER, G. NICOLETTI, *The Implementation and the Effects of Regulatory Reform. Past Experience and Current Issues*, OECD Economics Department Working Paper, 2000, n. 251, esp. p. 12-14, where emphasis is given to the importance and positive consequences of “incentive-based regulatory approaches” in the regulation of the current labour market.

⁹⁵ OECD, *The Future of Productivity*, 2015, p. 3.

⁹⁶ p. 10 and pp. 53-58. See also E. MORETTI, *op. cit.*, p. 219.

⁹⁷ Cf. the Communication of the European Commission, Regulation on state aid for research, development and innovation (2014/C 198/01).

⁹⁸ Cr. The taxonomy in MINISTERO DELLO SVILUPPO ECONOMICO, *op. cit.*, p. 53 and ff. At the international level, cf. *OECD Business and Finance Outlook 2016*, cit., chap. 3, *Fiscal incentives for R&D and innovation in a diverse world*, and also the report for the European Commission carried out by the CPB NETHERLANDS BUREAU FOR ECONOMIC POLICY ANALYSIS, *A Study on R&D Tax Incentives. Final Report*, Taxation Paper, 2014, n. 52.

⁹⁹ On the maximum amount of each incentive and whether benefits can be accrued, see the definitions laid down in the Communication of the Commission, Regulation for State aid for Research, Development and Innovation, referred to in par. 2.1 of AE Circular no. 5/E/2016 previously mentioned.

Much has been written about the effectiveness of these incentives, which in Italy are frequently allocated sporadically and are penalised by the overlapping between coordination centres at both national and regional level¹⁰⁰. The widespread impression, which is confirmed by authoritative case studies and empirical research¹⁰¹, is that these incentives are similar to mere transfers of money that do not influence business decision-making and are tainted by political meddling, especially at the time of allocating resources¹⁰². This is even more so if one considers Italy's wobbly legislative and institutional context that is subject to regular changes to legislation on incentives. It is enough to say that some recent and important provisions have been passed and then gone unimplemented for lack of financial coverage¹⁰³, giving rise to interminable bureaucracy¹⁰⁴ which has "discouraged business activities"¹⁰⁵ and the willingness of those concerned to apply for funding.

¹⁰⁰ Cf. *Rapporto Giavazzi*, cit., p. 3, where it is argued that "Empirical evidence, both in Italy and elsewhere, points to additional effects in relation to R&D funding, which however concern small and medium-sized enterprises and start-ups. No additional effects have been associated with other forms of funding, for instance, those allocated to companies operating in developing areas". In a similar vein, and with special reference to the effects of Law no. 46/1982 and further amendments that make provisions for employers' most widespread forms of incentives for research and development, see E. BARBIERI, R. IORIO, G. LUBRANO LAVADERA, *Incentivi alla ricerca e sviluppo in Italia: una indagine sugli effetti della Legge 46/82*, c. MET Working Paper, 2010, n. 3, 1, according to whom empirical analysis and the results obtained "show that the provision scrutinised might not be successful and above all an overlapping seems to exist between incentives pursuing the same purposes". Cf. S. ADAMO, G. PELLEGRINI, *La valutazione degli effetti degli incentivi alla ricerca applicata sull'efficienza dell'impresa*, in SOCIETÀ ITALIANA DI STATISTICA, *Atti del Convegno intermedio "Processi e metodi statistici di valutazione"*. Roma, 4-6 giugno 2001, CISU, 2001; M. MERITO, S. GIANNANGELI, A. BONACCORSI, *L'impatto degli incentivi pubblici per la R&S sulla attività delle PMI*, in G. DE BLASIO, F. LOTTI (eds.), *La valutazione degli aiuti alle imprese*, Il Mulino, 2008; M. MERITO, S. GIANNANGELI, A. BONACCORSI, *Gli incentivi per la ricerca e lo sviluppo industriale stimolano la produttività della ricerca e la crescita delle imprese? Evidenze sul caso italiano*, in *L'Industria*, 2007, n. 2. Finally, cf. the literature review in C. BURATTI, C. COLOMBO, *Le politiche di sostegno agli investimenti. Una rassegna della letteratura*, Università degli Studi di Padova, 2014, esp. 18-22, dealing with incentives to research and development.

¹⁰¹ See the *Rapporto Giavazzi*, cit., p. 9 and ff. See also R. BRONZINI, E. IACHINI, *Are incentives for R&D effective? Evidence from a regression discontinuity approach*, Banca D'Italia, Temi di Discussione (Working Paper), 2011, n. 791.

¹⁰² Cf. the *Rapporto Giavazzi*, cit., esp. 10, that argues that "the opportunity to receive public funding might reduce the willingness of employers to engage in business management, to create new products and to access new markets as they will focus on how to obtain incentives and on entering the political circles in which these funds are allocated".

¹⁰³ As in the case already referred to in footnote 93, concerning Article 3 of Decree-Law n. 145/2013.

¹⁰⁴ One example of this is the difficulties to implement the tax credit to hire PhD holders introduced by so-called Monti-Passera Law (Article 24 of Decree-Law no. 83/2012 as

It has been pointed out that when market failures arise allowing for exceptions to EC law on State aid¹⁰⁶, public funding for R&D “gives rise to innovation but also generates more income”. Yet in this case “patents can be used, especially the system to assign them, to prompt companies to engage in a ‘socially adequate’ amount of R&D” so that “public incentives will be saved”¹⁰⁷.

Another aspect that has been underlined is that Italy’s peculiar production structure – i.e. large numbers of small and medium-sized companies – causes “academic research to become overly influential” in the sense that “it entices public administrations to allocate funds for projects having great academic value but little relevance for companies”¹⁰⁸. Without considering political meddling, this happens notwithstanding empirical evidence showing that R&D funds are assigned to small and medium-sized businesses but not to large-sized ones¹⁰⁹.

At any rate, at the time of considering the two forms of public aid allocated to support innovation – namely capital and intangible infrastructure – Italy seems to prioritise machinery and equipment and, to a little extent, intangible assets (e.g. human capital), thus moving in the opposite direction of other developed countries.

The analysis of available data and considerable research on this topic show that tax incentives promoting research in the private sector “have represented an important tool for innovation and have been largely used in many OECD countries”. On the contrary, “public funds to private-sector research in Italy is mostly concerned with direct investment”, non-refundable loans and subsidised funding, thus without providing for a tax relief system for research carried out in companies. This point is also raised by Confindustria (Italy’s General Confederation of Italian Industry), which argues that, save for a few

converted by Law no. 134/2012) containing measures to promote sustainable development and growth. This provisions became operational only in September 2014, concerned recruitments made starting from 26 June 2012 and therefore was not seen as an incentive by employers. On this point, see C. FOTINA, *La beffa del bonus ricercatori: impantanato da due anni al ministero dello Sviluppo*, in *Il Sole 24 Ore*, 28 May 2014, who referred to the hurdles faced by those who applied for funding as a bureaucratic odyssey.

¹⁰⁵ *Rapporto Giavazzi*, cit., esp. p. 10.

¹⁰⁶ At the Community level, this issue is regulated by the Communication of the Commission, Regulation on state aid for research, development and innovation that has been already referred to here. The communication frequently refers to talks “failures of the market”.

¹⁰⁷ *Rapporto Giavazzi*, cit., p. 8. Cf. C. DAHLBORG, D. LEWENSOHN, R. DANELL, C.J. SUNDBERG, *To invent and let others innovate: a framework of academic patent transfer modes*, in *The Journal of Technology Transfer*, 2016, 1-26, available at the link <http://link.springer.com/journal/10961>.

¹⁰⁸ MINISTERO DELLO SVILUPPO ECONOMICO, *op. cit.*, p. 54.

¹⁰⁹ Cf. the *Rapporto Giavazzi*, cit., pp. 13-14.

cases, “Italian industry shows [...] a low willingness to invest in scientific research applied to products and processes, although the country’s high propensity for innovation”.

This is a further confirmation of the Italian paradox that has been referred to earlier, namely high-innovation ability clashing with low R&D expenditure and little funding for the recruitment of researchers. This is also due to the fact that “Italian companies mostly operate in fields where innovation is based on the incremental development of products and manufacturing processes (learning by doing, learning by using and learning by interacting). Accordingly, basic technology used to operate machinery or that certified by patents and licences is purchased from external suppliers, so no need arises to engage in regular scientific research to come up with new equipment”¹¹⁰ and to hire research staff as described above (see par. 2). One should also consider that problems in terms of statistic quality might exist that lead to underestimating the value of research, especially in small and medium-sized companies where research activities are performed now and then¹¹¹. Mention should also be made of the distinction that is made in Italy between official R&D expenditure and expenditure on innovation, which in fiscal terms is not regarded as a form of investment in research but as an item of current expense¹¹². This happens when research staff are hired and assigned the same employment grade as white-collar employees or professionals, for no law or collective agreement regulates this aspect (see par. 4). The fact remains that failing to acknowledge research in institutional terms will also endanger its promotion on the company level. As with academic research, the legal status of researchers operating in the private sector is the most qualifying aspect to recognise this new form of employment. This aspect is confirmed by the fact that a limited number of the 10,000 people that receive a PhD every year would be satisfied with working in a company, also because they think that research can only be carried out in academic

¹¹⁰ *Ibidem*. In similar vein, see G. GAROFOLI, R. & S. nei distretti industriali e nei sistemi di piccola impresa, in A. QUADRIO CURZIO, M. FORTIS, G. GALLI (eds.), *La competitività dell’Italia. I. Scienza, ricerca, innovazione*, Il Sole 24 Ore, 2002.

¹¹¹ G. FORESTI, *op. cit.*, p. 18. In terms of *Main Science and Technology Indicators*, the *Total Researchers in the Business Enterprises* indicator is defined as follows by the OECD: “up to reference year 2007, the source of TBP data was the balance of payment statistics compiled by the Ufficio Italiano dei Cambi, based on the ITRS system (settlement data collection system). On 1st January 2008, UIC ceased to exist and its functions have been taken over by the Bank of Italy. *The data are derived from a new data collection system, mainly based on direct reporting from enterprises*” (OECD, *Main Science and Technology Indicators*, 2016, n. 1, 22, emphasis added).

This clarification confirms that research is underrated, because it is employers who provide this information on a discretionary basis, and no criteria have been agreed upon by companies as to how to define researchers.

¹¹² *Ibidem*.

settings¹¹³. Employers are also wary of hiring PhD holders, for they think that they are not trained to engage in research in companies. This is one of the reasons attempts have been made in Italy to repeat the experience of Danish industrial doctorates¹¹⁴, not so much in terms of establishing quotas in companies to increase the employability of PhD holders¹¹⁵, as to experiment with forms of knowledge transfer, research and innovation based on on-the-job training¹¹⁶.

The significance of an open and transparent labour market for researchers and their acknowledgement in legal and institutional terms enabling them to access employment, advance their career and join re-integration programmes and inter-sectoral mobility, has also been confirmed by some pilot projects carried out by Confindustria. These trial projects have assessed to the extent to which adopting the same production structure as that in France or Germany in terms of business size and specialisation would reduce the gap with other countries in relation to R&D output¹¹⁷. Against all odds, these trials have disproved the assumption that little acknowledgment and use of private-sector research in Italy are due to a higher share of small-sized companies¹¹⁸: “Establishing in Italy companies having the

same size as those based in Germany would rise R&D to 1.18%, against the current 0.98%, thus the gap with Germany will be reduced by a small margin. The same conclusion can be drawn if France is considered”¹¹⁹. It is significant

¹¹³ I have examined this issue in M. TIRABOSCHI, *Dottorati industriali, apprendistato per la ricerca, formazione in ambiente di lavoro. Il caso italiano nel contesto internazionale e comparato*, cit., p. 2.

¹¹⁴ On Denmark’s Model of industrial Doctorates, cf. A. KOLMOS, L.B. KOFOED, X.Y. DU, *PhD students’ work conditions and study environment in university- and industry-based PhD programmes*, in *European Journal of Engineering Education*, 2008, vol. 33, n. 5-6, 539-550.

¹¹⁵ This is what happened following the approach of ANVUR at the time of interpreting Article 11 of Ministerial Decree no. 45 of 8 February 2013 concerning the criteria to authorise institutions and programmes to issue a Doctoral qualification and to set up Doctoral programmes for those institutions that are already authorised.

¹¹⁶ Cf. T. THUNE, *Doctoral students on the university-industry interface: a review of literature*, in *Higher Education*, 2009, vol. 58, n. 5, 637-651, and L. HERRERA, M. NIETO, *Recruitment of PhD Researches by Firms*, paper presented at the 35th *Druid Celebration Conference 2013*, Barcelona, 17-19 June 2013 (in www.faredottorato.it).

¹¹⁷ *Ibidem*.

¹¹⁸ In this sense, see G. FORESTI, *op. cit.*, p. 10, according to whom “a company’s small dimensions do not necessarily entail fewer resources allocated to research at an aggregate level. If fragmentation is the result of a higher division of work among companies (rather than within one company), small size simply reflects different ways of organising the productive unit”.

¹¹⁹ Again, see CENTRO STUDI CONFINDUSTRIA, *op. cit.*, 64. A simulation shows that product specialisation generates significant effects. In other words, “by assuming the same make-up of German manufacturing, Italy’s R&D intensity would increase between 0.91% and 1.32%, reducing by ¼ the gap with Germany. Using French manufacturing, Italy’s R&D intensity would be equal to 1.38%, halving the gap with France”.

that the divide between Italy and other developed countries as regards research is mostly found in large-sized companies and in those operating in technology-rich industries¹²⁰. This aspect might be ascribed to structural shortcomings that hamper the development of research and innovation activities that cannot be promoted only by means of incentive-based policies. If research is entrusted with the exclusive control of public institutions, one should not be surprised that research in the private sector fails to take off and that many agreements favouring public-private cooperation coming down from on high are not implemented because private-sector research is not placed on an equal footing with the public one.

Against this backdrop, the recourse to incentives seems to be a valid option just the same, particularly to compensate the absence of an institutional and legal framework favouring private-sector research and to set the basis for innovation development. Its widespread use, which is based on the economic theory that subsidies to company are effective only when markets are not able to fulfil socially desirable objectives (so-called market failures)¹²¹, reflects the old-fashioned argument, that has also been disproved by economics literature¹²², that innovation follows a linear path whereby research expenditure gives rise to inventions and their adoption by companies. Consequently, it is no coincidence that “the industry-research relation is an area that features many market failures but also many failures on the part of decision-makers”, as also illustrated by relevant literature¹²³.

This state of affairs also accounts for the major shortcomings, in terms of culture and planning, and for the difficulty to guide universities towards the so-called “third-mission”¹²⁴, as though knowledge was still the preserve of the

¹²⁰ pp. 64-65.

¹²¹ See the *il Rapporto Giavazzi*, cit., p. 9 and the literature therein.

¹²² See G. DOSI, *The Nature of Innovative Process*, in AA.VV. (eds.), *Technical Change and Economic Theory*, Pinter, 1988. More recently, see M. MAZZUCATO, G. DOSI (eds.), *Knowledge Accumulation and Industry Evolution. The Case of Pharma-Biotech*, Cambridge University Press, 2006, G. DOSI, R. NELSON, *La natura della tecnologia e i processi di innovazione tecnologica*, in *Parolechiave*, 2014, n. 51. A review of relevant literature is also provided in G. DOSI, R.R. NELSON, *The Evolution of Technologies: An Assessment of the State-of-the-Art*, in *Eurasian Business Review*, 2013, vol. 3, n. 1, 3-46. On this issue, see the widely-debated work of M. MAZZUCATO, *The Entrepreneurial State. Debunking Public vs. Private Sector Myths*, Anthem Press, 2013.

¹²³ G. GAROFOLI, *Le interrelazioni tra ricerca e industria nei sistemi innovativi locali: i fattori critici di successo*, cit., p. 10 and ff.

¹²⁴ Cf. S. BOFFO, R. MOSCATI, *La Terza Missione dell'università. Origini, problemi e indicatori*, in *Scuola Democratica*, 2015, n. 2, 251-272 e 256. It is pointed out that “the great emphasis on the economic role of universities and the fact that the third mission is seen as a way to generate profit end up downplaying, if not overshadowing, other aspects of this mission, among other the services provided free of charge to the community, which are equally in line with the purpose of universities both in Continental Europe and Anglo-Saxon countries”. See also P.

public sector¹²⁵. Regular collaboration between local institutions and companies, particularly in the ongoing transformation of work, is an effective and modern way for university to comply with its educational mission (by means of internships, apprenticeships, school-to-work alternation programmes), for research has no value if it is self-referential and ignores the economy and society¹²⁶. Increasingly, innovation is the result of complex mechanisms that cannot be codified in advance – even less so in legal and contractual terms¹²⁷ – and involves interaction between different actors (universities, companies and institutions)¹²⁸. In order to thrive and translate into learning processes, knowledge and skills, this interaction should take place on an equal basis to create value.

Indeed, the evolutionary models concerning cooperation between industry and research, at least starting from the 1980s and following the decline of production processes typical of the 1900s (See par. 1) “have increasingly stressed the interactive and cumulative nature of innovation supported by forms of gradual learning leading to the rise of integrated and incremental

SANTOS, *Moving the Universities to the «Third Mission» in Europe. New Impulses and Challenges in Doctoral Education*, in *Foro de Educación*, 2016, vol. 14, n. 21, p. 107-132.

¹²⁵ On this perspective, in relation to small and medium-sized enterprises, cf. R. TIEZZI, *Le Pmi vogliono crescere? Chiedano aiuto al mondo della ricerca*, in *Linkiesta*, 26 April 2016, and the reply by C. MANCINI, E. PRODI, M. TIRABOSCHI, *L'innovazione passa dalla ricerca, anche per le PMI*, in *Boll. ADAPT*, 2016, n. 16, where it was argued that “this idea that still places small and medium-sized enterprises in a Fordist scenario, fails to take into account what a company is today, irrespective of size, and what is university education in Italy. This separation between he who researchers and innovates and he who works and performs standardised tasks does not correspond to reality and fails to consider entities such as knowledge networks and districts and the realm of innovative start-ups, freelance workers, and innovators that, also through an open-access approach which the Italian university education seems to ignore, develop change through relations between worlds that are apart only apparently”. On this point, see E. MORETTI, *op. cit.*, 215-216, that highlights that the flow of knowledge spillovers is not unidirectional from universities to companies but “their core parts move from and to private companies”.

¹²⁶ Apparently, this is the same stance as Fondazione CRUI, *op. cit.*, 41, which states that “unlike teaching activities (the first mission, based on interaction with students) and research (the second mission, which rests on the interaction with other researchers and academic communities) the distinctive trait of the third mission is the direct interaction with society”. The 2008 Green Paper *Fostering and Measuring ‘Third Mission’ in Higher Education Institutions* adopts a more straightforward approach, as it argues that “Third Mission’ [...] is not a separate mission at all, but rather a way of doing, or a mind-set for accomplishing, the first two”.

¹²⁷ The topic is nicely dealt with through a review of legal and contractual arrangements promoting innovation in R.J. GILSON, C.F. SABEL, R.E. SCOTT, *op. cit.*

¹²⁸ Cf. C. MANCINI, E. PRODI, M. TIRABOSCHI, *op. cit.*

innovations”¹²⁹. It is impossible to fulfil this goal without an institutional and legal framework underpinning private-sector research that might promote dialogue with universities, especially as the latter are still wary of societal and economic changes currently in place.

Therefore, economic incentives should not be allocated just to fund a given company or a single project but, thanks to the support of specific legislation and institutions, they should be used to establish long-term and flexible processes. This is because incentivising “learning processes specific to each company appears to be more effective than making allocation depending on selecting dynamics among companies”¹³⁰.

3.1. Regulatory Incentives

Originally devised to promote the recruitment of researchers, regulatory incentives¹³¹ have been gradually set aside, even though they were perfectly suitable for this form of employment – where work is based on the fulfilment of projects and objectives – and met the need of the labour market in the Fourth Industrial Revolution (par. 1), that is characterised by high levels of flexibility in hiring and dismissal. One example of this, which bears, even more, relevance in consideration of many legal constraints to temporary work¹³², is Article 14 of Law of 24 June 1997 (so-called ‘Treu Law’). This provision promoted technological and academic research in industry by incentives favouring the recruitment of graduates and PhD holders on the part of companies (particularly small and medium-sized craft businesses), consortia or consortium companies. Researchers could be hired directly by the company on a permanent basis or by temporary posting from a public research centre to carry out specific training and research projects in collaboration with companies¹³³. Mention could also be made of the provisions laid down in par. 16-quinquies, Article 9 of Law-Decree no. 76 of 28 June 2013, as amended by

¹²⁹ See G. GAROFOLI, *Le interrelazioni tra ricerca e industria nei sistemi innovativi locali: i fattori critici di successo*, cit., p. 2.

¹³⁰ G. DOSI, R. NELSON, *La natura della tecnologia e i processi di innovazione tecnologica*, cit., p. 24.

¹³¹ On the distinction between economic incentives and regulatory incentives, see M. TIRABOSCHI, *Incentivi alla occupazione, aiuti di Stato, diritto comunitario della concorrenza*, cit., and the literature therein. More recently, see A. DAGNINO, *Agevolazioni fiscali e potestà normativa*, Cedam, 2008.

¹³² This was particularly the case in a time in which PhD holders were trained to “carry out academic research” pursuant to par. 8, Article 8 of Law no. 28/1980. A. TAMPIERI, *L’occupazione nel settore della ricerca*, in L. GALANTINO (ed.), *Il lavoro temporaneo e i nuovi strumenti di promozione della occupazione. Commento alla legge 24 giugno 1997, n. 196*, Giuffrè, 1997, 354, footnote 1.

¹³³ A detailed analysis of this provision is provided in A. TAMPIERI, *op. cit.*, 353-364.

Law no. 99 of 9 August 2013, aimed at promoting the conclusion of fixed-term employment contracts or collaboration contracts to engage in research projects on technological innovation¹³⁴. Also, reference should be made to Article 28 of Law-Decree no. 179 of 18 October 2012 on Additional Urgent Measures to favour Italy's Growth, as amended by Law no. 221 of 17 December 2012¹³⁵. This provision was passed with the aim of fostering the employability of qualified staff in light of the dissemination of new forms of entrepreneurship and technologies (so-called innovative start-ups) the purpose of which was to develop, produce and commercialise innovative, technology-rich products and services. This could also be done by concluding fixed-term employment contracts without the need to indicate a justifying reason, which is usually mandatory for these contractual arrangements, lasting between 6 and 36 months within the first 48 months from the establishment of the company. These have been major amendments to national legislation that attested to lawmakers' renewed interest towards research carried out in the private sector. Nevertheless, these initiatives are not sufficient if they are not accompanied by an awareness of the significant changes that have taken place in the way of doing business and the factors triggering innovation. In addition, these laws have failed to give company-based researchers¹³⁶ a clear identity and professional status in relation to training, career, employment grade (see par. 4) remuneration, relevant legislation and international and inter-sectoral mobility. In a similar vein, following the enforcement of measures to deregulate the labour market that culminated in the Jobs Act, the provisions referred to above, promoting research in the private sector have been gradually set aside¹³⁷,

¹³⁴ However, lawmakers have established that these provisions only applied to public agencies, universities and high schools which are governed by special regulations, without providing any form of cooperation with the production system and the private sector. This marks a significant difference from the terms of Law no. 196/1997 and many have regarded this move as a step backwards. Cf. G. BUBOLA, *L'utilizzo dei fondi premiali per la stipula di contratti a tempo determinato e collaborazioni coordinate e continuative per attività di ricerca*, in M. TIRABOSCHI (ed.), *Il lavoro riformato. Commento alla l. 9 agosto 2013, n. 99 (Legge Giovannini); alla l. 9 agosto 2013, n. 98 (decreto del fare); alla l. 9 agosto 2013, n. 94 (decreto svuota carceri); alla l. 6 agosto 2013, n. 97 (legge comunitaria) e al d.l. 31 agosto 2013, n. 101 (razionalizzazione P.A.)*, Giuffrè, 2013, 385-388.

¹³⁵ Cf. A. BALSAMO, *Start up e Pbd: l'impresa della ricerca*, in *Boll. ADAPT*, 2014, n. 5. An examination of the implementation measures concerning this provision is provided in ORDINE DEI DOTTORI COMMERCIALISTI E DEGLI ESPERTI CONTABILI DI BOLOGNA, COMMISSIONE DI STUDIO IMPOSTE DIRETTE, *Il punto sulle opportunità previste per le Start Up innovative (ex D.L. 179/2012) e sulle problematiche delle imprese in fase di start up. Convegno del 29 gennaio 2014*, 2014.

¹³⁶ See the Head of Global R&D di Bracco: cf. F. UGGERI, *Il ricercatore e il lavoro che cambia*, in *Boll. Spec. ADAPT*, 2016, n. 4.

¹³⁷ On the deregulation of recruitments on a fixed-time employment contract as initially provided by Decree-Law no. 34/2014 and then by Legislative Decree no. 81/2015, see L. MENGHINI, *Lavoro a tempo determinato* (art. 1, 19-29, 51 e 55), in F. CARINCI (ed.), *Commento al*

marking a step backwards, particularly regarding the repeal of collaboration contracts related to project work¹³⁸. This notwithstanding the fact that employers in research centres viewed this working scheme (see par. 1) as a useful way to balance the interests of both parties and to adapt to the peculiarities of private-sector research, which is performed through projects, cycles, phases and work plans¹³⁹.

This aspect is also evident if one examines par. 1, Article 2 of Legislative Decree no. 81 of 15 June 2015, according to which those performing “employer-organised work”¹⁴⁰, might be seen as engaged in salaried employment, thus making it more difficult to use “continued and coordinated” contracts to carry out research as laid down in par. 3, Article 409 of the Code of Civil Procedure. On this point, the European Commission also provided its opinion, maintaining that the conclusion of research grants and “continued and coordinated” contracts cannot be included in the calculation of personnel costs in Horizon2020 projects¹⁴¹. This is a further step in the wrong direction, also because remuneration and tax systems consider research in terms of hours

d.lgs. 15 giugno 2015, n. 81: le tipologie contrattuali e lo jus variandi, ADAPT University Press, 2015, 153-196. Presently, the only provision promoting private-sector research is contained in par. 3, Article 23 of Legislative Decree no. 81/2015. This rule specifies that the legal minimum number of workers to be hired on fixed-term employment contracts – 20% of permanent staff – does not apply to “temporary contracts concluded between public universities – which also include branches of foreign universities in Italy – public and private research institutions and on-call workers whose work concerns teaching, research in scientific or technological areas, research-related technical advice or management [...]. The fixed-term employment contracts to perform academic research on an exclusive basis can have the same duration as the research project for which they have been concluded”.

¹³⁸ Cf. A. VALLEBONA (ed.), *Il lavoro parasubordinato organizzato dal committente*, Colloqui Giuridici sul Lavoro, 2015, and G. SANTORO-PASSARELLI, *I rapporti di collaborazione organizzati dal committente e le collaborazioni continuative e coordinate ex art. 409, n. 3, c.p.c. (art. 2)*, in F. CARINCI (ed.), *op. cit.*, 9-28.

¹³⁹ One might note that the approval of the Jobs Act and the repeal of project work were followed by an outcry led by Silvio Garattini, the well-known director of the Milano-based Mario Negri Institute. Cf. S. GARATTINI, *op. cit.*, e anche V. ULIVIERI, *Stop ai co.co.pro? Addio ai ricercatori*, in *La nuvola del lavoro – Corriere della Sera*, 16 December 2015.

¹⁴⁰ An analysis of the much-discussed par. 1, Article 2 of Legislative Decree n. 81/2015 is provided in M. TIRABOSCHI, *Il lavoro etero-organizzato*, in M. TIRABOSCHI (ed.), *Le nuove regole del lavoro dopo il Jobs Act. Commento sistematico dei decreti legislativi nn. 22, 23, 80, 81, 148, 149, 150 e 151 del 2015 e delle norme di rilievo lavoristico della legge 28 dicembre 2015, n. 208 (Legge di stabilità per il 2016)*, Giuffrè, 2016, 261-268.

¹⁴¹ See EUROPEAN COMMISSION, *H2020 Programme. Guidance on List of issues applicable to particular countries*, 2016, 4.

worked and not in terms of projects completed, thus regarding this form of employment as the same as traditional white-collar jobs¹⁴².

The parliamentary debate accompanying “phase 3 of the Jobs Act” has been yet another missed opportunity to regulate agile working arrangements and, therefore, private-sector research. At the time of discussing Draft Bill no. 2233 of 8 February 2016, Measures safeguarding “non-entrepreneurial” self-employment and promoting the flexibility of salaried employment, no consideration was given to the proposal that staff “working continuously (including posted workers and apprentices) in industrial and knowledge districts, clusters, technological poles, certified business incubators, innovative start-ups, and certified business networks”, as well as collaborators and employees permanently engaged in research, planning and development activities for private companies, clients or employers” shall be included among those performing agile working¹⁴³.

Following the repeal of project work, ensuring working time flexibility to those performing research in companies is possible by referring to those cases when Legislative Decree no. 66 of 8 April 2003 does not apply, which however are difficult to implement for this type of work and might not be effective without a legal and institutional framework that governs private-sector research. Specifically, par. 1, Article 17 of Legislative Decree no. 66/2003 provides that exceptions can be made to rules on daily rest, breaks and night work in collective agreements concluded with the most representative trade unions in comparable terms. However, no collective agreement is in place regulating research in the private sector (see par. 4), so the only option, which has been poorly explored, would be that of introducing derogations to certain criteria used to assess the maximum duration of one’ performance. Yet this could be done only by means of a decree issued by the Ministry of Labour and Social Policies upon request of the most representative trade unions in comparable terms and for certain specific activities, among which is R&D (par. 2, let. 6 of Article 17 referred to above)

¹⁴² Cf. M. BARTOLONI, *La scure di Bruxelles sui ricercatori italiani: no agli assegnisti nei progetti di Horizon 2020*, in *Scuola 24 – Il Sole 24 Ore*, 5 February 2016.

¹⁴³ In this sense, see Draft Bill no. 229/2016 tabled by a number of Italian senators (Sacconi and D’ascola among others), *Adattamento negoziale delle modalità di lavoro agile nella quarta rivoluzione industriale*. Article 6 (Research) of the law proposal established that work performed by researchers in the private sector should be regarded as agile working and be included in those forms of business model specific to Industry 4.0.

3.2. The New Apprenticeship Contract for Research Purposes

The new apprenticeship contract for research purposes deserves a specific analysis. This working scheme is regulated by Article 45 of Legislative Decree no. 81/2015 and ideally represents an attempt to deal with all the issues described above, either in terms of economic incentives (special subsidies and contribution exemptions) or regulatory benefits (e.g. reduced red tape, work flexibility, the possibility to classify workers into a lower employment grade than that established in the collective agreement or to calculate apprentices' remuneration as a percentage of their length of service).

Not much research has been carried out or is available in the literature on this contractual relationship, which is governed by Legislative Decree no. 167 of 14 September 2011 (the so-called Consolidated Text on apprenticeships). The latter is an attempt to further evolve the "apprenticeships for higher education" as regulated by Article 50 of Legislative Decree no. 276¹⁴⁴ of 10 September 2003 which, following the changes made to par. 3, Article 23 of Law-Decree no. 112 of 25 June 2008, as amended by Law no. 133 of 6 August 2008, already provided for the opportunity to enter into apprenticeship contracts to obtain a PhD degree¹⁴⁵. The little appeal held by this form of employment to industrial relations actors¹⁴⁶, regional institutions¹⁴⁷, and employers – particularly in relation to its costs and bureaucratic hurdles when implementing¹⁴⁸ it and accessing to relevant incentives¹⁴⁹ – prompted Italy's

¹⁴⁴ A comparison with legislation in other countries is provided in P.A. VARESI, *Il ruolo delle Università nella promozione dei tirocini formativi e di orientamento e dell'apprendistato "alto"*, in P. REGGIANI GELMINI, M. TIRABOSCHI (eds.), *Scuola, Università e Mercato del lavoro dopo la Riforma Biagi. Le politiche per la transizione dai percorsi educativi e formativi al mercato del lavoro*, Giuffrè, 2006, 419-430. See also L. MENGHINI, *La disciplina dell'apprendistato per l'alta formazione*, in M. BROLLO, M.G. MATTAROLO, L. MENGHINI (eds.), *Contratti di lavoro flessibili e contratti formativi*, Ipsoa, 2004, 215 and ff., and more recently, F. CARINCI, *E tu lavorerai come apprendista (L'apprendistato da contratto "speciale" a contratto "quasi-unico")*, Working Paper CSDLE "Massimo D'Antona" – IT, 2012, n. 145.

¹⁴⁵ Cf. M. TIRABOSCHI, *L'apprendistato di alta formazione*, in M. TIRABOSCHI (ed.), *La riforma del lavoro pubblico e privato e il nuovo welfare*, Giuffrè, 2008, 101-110, esp. 105-106.

¹⁴⁶ This topic has been discussed at length in M. TIRABOSCHI, *Dottorati industriali, apprendistato per la ricerca, formazione in ambiente di lavoro. Il caso italiano nel contesto internazionale e comparato*, cit., par. 4.

¹⁴⁷ Few Regions regulated and implemented advanced-level apprenticeship contracts. An overview of regional legislation for this working scheme is provided in www.fareapprendistato.it.

¹⁴⁸ The hurdles to implement advanced-level apprenticeships, which are partly due to the fact that regional authorities and collective bargaining fail to apply relevant legislation, are detailed in ISFOL's reports. As documented by these reports, this working scheme is still poorly used despite it has been in place for more than eight years. Only 50 out of the 446,227 contracts

lawmakers to introduce the Consolidated Text¹⁵⁰ and a simplified form of apprenticeship for research purposes. In many respects, the latter resembles the “third-level apprenticeship contract”¹⁵¹ implemented in Italy and gives access to a number of those incentives referred to when discussing the Fixo project managed by Italia Lavoro¹⁵². This contractual scheme is purposely unrelated to the formal education system (e.g. that enabling one to pursue higher education or doctoral degrees) as it aims at promoting the establishment of private research centres and facilities¹⁵³ and hence the creation of “intermediate labour markets” favouring industry-university collaboration (see par. 1) as is the case in other countries¹⁵⁴.

Simply put, following the amendments contained in the 2011 Consolidated Text, third-level apprenticeship contracts¹⁵⁵ can now serve a dual purpose. They can be used to engage in higher and postgraduate education and to conclude employment contracts for research purposes that, however, will not provide any qualification. Therefore, and unlike what was originally established by Article 50 of Legislative Decree no. 276/2003, this second option is

concluded in 2014 concerned advanced-level apprenticeships (in 2015 they were 100 out of a total of 410,213). Cf. ISFOL, *Verso il sistema duale. XVI monitoraggio sull'apprendistato*, 2016, 89-90.

¹⁴⁹ I know from personal experience that accessing the financial and tax benefits available at regional level related to apprenticeship contracts to pursue a Doctoral degree is an exhausting and time-consuming process and procedures are often unclear.

¹⁵⁰ A detailed analysis is offered in M. TIRABOSCHI, *Impianto e quadro regolatorio*, in M. TIRABOSCHI (ed.), *Il Testo Unico dell'apprendistato e le nuove regole sui tirocini. Commentario al decreto legislativo 14 settembre 2011, n. 167, e all'articolo 11 del decreto legge 13 agosto 2011, n. 138, convertito con modifiche nella legge 14 settembre 2011, n. 148*, cit., 367-375. See also E. RENDA, A. SALERNI, *L'apprendistato di alta formazione e ricerca: luci e ombre*, in *Quaderni di Economia del Lavoro*, 2013, n. 99, 49-72, and D. GAROFALO, *Gli interventi legislativi sul contratto di apprendistato successivi al T.U. del 2011*, in *DLRI*, 2014, n. 143, 427-459.

¹⁵¹ Cf. C. ROMEO, *L'apprendistato di alta formazione e di ricerca*, in *MGL*, 2012, n. 4, par. 4.

¹⁵² *Supra*, footnote 91.

¹⁵³ C. ROMEO, *op. cit.*, seems to neglect this point, perhaps because of the biased views characterising academic research.

¹⁵⁴ See the comparison provided in M. TIRABOSCHI, *Dottorati industriali, apprendistato per la ricerca, formazione in ambiente di lavoro. Il caso italiano nel contesto internazionale e comparato*, cit., par. 5. See also the comparative analysis provided by EUROPEAN COMMISSION, *Study on higher Vocational Education and Training in the EU. Final Report*, European Union, 2016.

¹⁵⁵ This approach can be seen in Article 6 of Legislative Decree no. 167/2011 establishing that training schemes entered by those concluding advanced-level apprenticeship contracts considered public training standards, while apprenticeships for research purposes were considered to be as similar as vocational apprenticeships. In this latter case, training standards were defined in national collective bargaining. On this point, see L. RUSTICO, M. TIRABOSCHI, *Standard professionali e standard formativi*, in M. TIRABOSCHI (ed.), *Il Testo Unico dell'apprendistato e le nuove regole sui tirocini. Commentario al decreto legislativo 14 settembre 2011, n. 167, e all'articolo 11 del decreto legge 13 agosto 2011, n. 138, convertito con modifiche nella legge 14 settembre 2011, n. 148*, cit., 423-444. See also the Circular no. 29 of 15 November 2011 issued by the Ministry of Labour.

specifically provided to train young researchers that will be recruited in the private sector. Consequently, both the apprenticeship contract for research purposes and advanced-level apprenticeships to pursue a doctoral degree introduced by the 2008 reform were seen as an opportunity for small and medium-sized enterprises, to invest in research and innovation, to give new momentum to business productivity and renewal and to facilitate the establishment of spin-offs, business networks and research infrastructure allowing for private-public collaboration which still lacks in Italy. It was also for this reason that it was established that apprenticeship contracts for research purposes could be concluded not only by universities but only by “other research and educational bodies, included those officially authorised at regional or national level to engage in activities related to business, work, training, innovation and technological transfer”¹⁵⁶. This wording made reference to the provision helping to match labour demand and supply contained in Article 6 of Legislative Decree no. 276/2003 as amended by Law-Decree no. 98 of 6 July 2011 and by Law no. 111 of 15 July 2011, according to which research-based apprenticeships were not intended as mere employment contracts but as placement tools necessary to establish a system matching labour demand and supply in private-sector research¹⁵⁷.

However, judging from the poor implementation of this working scheme and the few provisions governing it laid down in regional regulations¹⁵⁸ and collective agreements¹⁵⁹, the apprenticeship reform has been nowhere near to

¹⁵⁶ Par. 2, Article 5 of Legislative Decree 167/2011.

¹⁵⁷ On this point, cf. S. SPATTINI, *Riforma dell'apprendistato e nuovo placement*, in M. TIRABOSCHI (ed.), *Il Testo Unico dell'apprendistato e le nuove regole sui tirocini. Commentario al decreto legislativo 14 settembre 2011, n. 167, e all'articolo 11 del decreto legge 13 agosto 2011, n. 138, convertito con modifiche nella legge 14 settembre 2011, n. 148*, cit., 126-130. See also C. CORDELLA, *Note in tema di profili formativi nel contratto di apprendistato*, Working Paper CSDLE “Massimo D’Antona” – IT, 2014, n. 224, 33.

¹⁵⁸ Sardinia, Apulia, Abruzzi, Lazio, Marche and the Autonomous Province of Trento are the only administrations that have put in place specific measures to regulate apprenticeships for research purposes unrelated to academic programmes in higher education. See ISFOL, *op. cit.*, 95, *Quadro 4.1 – Tipologia di percorsi di apprendistato di alta formazione e di ricerca previsti negli Accordi di cui all'art. 5 del D.lgs. 167/2011*. Yet these working schemes could be implemented without regional regulations on apprenticeships. Pursuant to Par. 5, Article 5 of Legislative Decree no. 167/2011: “absent provisions at the regional level, apprenticeship contracts for research purposes can be concluded by means of specific agreements between employers, their representatives and universities, vocational schools, research and training bodies as specified in par. 4, without this translating into new or additional costs for the national government”.

¹⁵⁹ At the time of concluding specific inter-confederal agreements on apprenticeships and renewing existing collective agreements, the parties failed to regulate advanced-level apprenticeships and those for research purposes, leaving these working arrangements without an effective legal framework – particularly as regards employment grade and remuneration –

fulfilling the objectives set down by lawmakers¹⁶⁰. This failure can be explained by the lack of a culture promoting company-based research careers by employers and public institutions, which has led many to confuse apprenticeships for research purposes with those used to obtain a PhD degree¹⁶¹.

Compounding the picture is the new provision on apprenticeships contained in Article 45 of Legislative Decree no. 81/2015 (the Jobs Act) that repeals the rules laid down in the 2011 Consolidated Text¹⁶² and adds further bureaucratic and operational hurdles to conclude apprenticeship contracts for research purposes¹⁶³. Specifically, while the Consolidated Text streamlined apprenticeship legislation, among others leaving to regional authorities and social partners more leeway to implement this contractual scheme, the Jobs Act goes in the opposite direction¹⁶⁴, favouring more centralised regulation which entails higher red tape and administrative burdens¹⁶⁵. The entry into

encouraging employers to make use of this form of employment. An overview of collective bargaining on apprenticeships is offered in www.fareapprendistato.it.

¹⁶⁰ No monitoring activity is in place specifically addressing the use of apprenticeship contracts for research purposes, and even the Isfol reports referred to above considers all types of apprenticeships in an indiscriminate way. Some statistics can be extrapolated from the report of Italia Lavoro (updated to June 2016) concerning the use of benefits within the *FlxO* programme. As of June 2016, incentives have been claimed for 715 apprenticeship contracts (this figure includes both advanced-level apprenticeship contracts and apprenticeship contracts for research purposes). Arguably, most of them are apprenticeship contracts for research purposes, particularly because of the low numbers of apprentices on advanced-level apprenticeship contracts reported by the Isfol report.

¹⁶¹ On this point, see for example C. ROMEO, *op. cit.*, who stresses the confusion among experts and employers, particularly as regards some theoretical aspects. Cf. Decree no. 7400 of 27 July 2016 issued by Regione Lombardia, *Avviso pubblico per l'apprendistato di alta formazione e di ricerca (art. 45 d.lgs. 81/2015)*. While making continual reference to apprenticeships for research purposes, this provision ends up confusing this working scheme with advanced-level apprenticeships.

¹⁶² The repeal of the 2011 Consolidated Text on apprenticeships is still widely debated, especially because Legislative Decree no. 81/2015 does not regulate the shift from the previous to the new legal framework while awaiting new rules and collective agreements concluded at the regional level.

¹⁶³ Cf. D. GAROFALO, *L'apprendistato nel decreto legislativo n. 81/2015* (art. 41-47), in F. CARINCI (edit), *op. cit.*, 241-293 and esp. 273-276. See also M. TIRABOSCHI, *L'apprendistato dopo il Jobs Act*, in F. CARINCI (ed.), *Jobs Act: un primo bilancio. Atti del XI Seminario di Bertinoro-Bologna del 22-23 ottobre 2015*, ADAPT University Press, 2016, 306-330.

¹⁶⁴ Cf. L. BOBBA, *Jobs Act e apprendistato, la svolta c'è*, in *Boll. ADAPT*, 2015, n. 30. See also A. BIANCOLINI, A. SIMONCINI, *Il nuovo ordinamento dell'apprendistato di primo e terzo livello*, in *FOP – Formazione Orientamento Professionale*, 2016, n. 1, 14-19.

¹⁶⁵ Cf. M. TIRABOSCHI, *Apprendistato di terzo livello: la semplificazione può attendere*, in M. TIRABOSCHI (ed.), *Le nuove regole del lavoro dopo il Jobs Act. Commento sistematico dei decreti legislativi*

force of the bulky Inter-Ministerial Decree of 12 October 2015¹⁶⁶ made apprenticeships more cumbersome to implement, because it applies to all higher-education apprenticeship contracts¹⁶⁷ wholesale, and requires the conclusion of a protocol between the training body¹⁶⁸ and the employer specifying the responsibilities of both parties. A sample of the protocol is provided by the Inter-Ministerial Decree and, however adaptable to each case, is a rather lengthy document that fails to provide operators and labour inspectors with parameters to be used if one moves away from the indications contained in the provision.

To sum up, the employer who wants to hire apprentices to carry out research must demonstrate to possess the necessary requirements as regards infrastructure, expertise and training. The employment relationship shall last between 6 months and 3 years and can be further extended “if special needs arise related to the research project”. Apprentices’ training consists of on-the-job and off-the-job training, the latter being carried out by the training body. Training content and duration are defined in the individual training plan¹⁶⁹ and depend on the apprentice’s research project and tasks at the company.

nn. 22, 23, 80, 81, 148, 149, 150 e 151 del 2015 e delle norme di rilievo lavoristico della legge 28 dicembre 2015, n. 208 (Legge di stabilità per il 2016), cit., 204-211.

¹⁶⁶ “Definizione degli standard formativi dell’apprendistato e criteri generali per la realizzazione dei percorsi di apprendistato, in attuazione dell’articolo 46, comma 1, del decreto legislativo 15 giugno 2015, n. 81” published in Gazzetta Ufficiale no. 296 of 21 December 2015.

¹⁶⁷ Many authors (e.g. A. BIANCOLINI, A. SIMONCINI, *op. cit.*, p.16) have credited the Jobs Act with providing “a uniform set of rules that apply to all types of apprenticeships”. Nevertheless, this might turn into an obstacle in practical terms, because these apprenticeship schemes are significantly different from one another, especially apprenticeship contracts for research purposes, which cannot be used to obtain academic degrees.

¹⁶⁸ Besides providing a list of high-school institutions, training and vocational centers, those dealing with adult education, vocational schools, universities and centres specialised in music and dance education, the Inter-Ministerial Decree of 12 October 2015 also refers to “other research and training bodies which have been authorised at the regional, national or Community level to foster entrepreneurship, employment, professions, innovation and technological transfer”. These latter bodies are those that are interested the most in concluding apprenticeships for research purposes, because they are engaged in activities not leading to the issuing of academic certifications having legal value.

¹⁶⁹ The sample of the individual training plan attached to the Interministerial Decree no. 12 October 2015 is overly school-oriented. Aspects like learning units, training hours and related credits might sound like foreign concepts to employers in the private sector where research is developed according to objectives and results. At a first glance, those hired through apprenticeship contracts for research purposes are not under the obligation to compile the individual training plan, which is mandatory for the other two apprenticeship schemes, due to their links with the national education system. For this reason, the decision of Regione Lombardia to make individual training plans mandatory also for apprenticeships to carry out research is puzzling. See no. X/4676, section 3, par. 1.2 of the Decree of Regional Committee

Somewhat surprisingly, the provision contained in par. 11, Article 5 of Inter-Ministerial Decree of 12 October 2015 determines that on-the-job training for apprentices hired on apprenticeship contracts for research purposes shall be at least 20% of their annual working time, while off-the-job training is not mandatory. This rule adopts a “quantitative” approach, in the sense that all apprentices, regardless of their activities and the industry they operate in, have to undergo a certain amount of on-the-job training. Furthermore, the fact that the training body is no longer required to provide off-the-job training, questions the original aim of this form of employment and deprives it of its research content, which was the underlying principle of the 2011 Consolidated Text. Concluding an apprenticeship contract without the obligation to cooperate with a high-level training body seems pointless and increases the risk to make a fraudulent use of this working scheme just to access generous benefits at regional and national level and to enjoy tax credits, as permitted by the law¹⁷⁰.

Notwithstanding the shortcomings referred to above, the Inter-Ministerial Decree of 12 October 2015 has the merit of defining a comprehensive set of rules on research-based apprenticeships that might be implemented without specific regional provisions, thus reasserting the autonomous nature of this working scheme as compared to apprenticeship contracts entered into to obtain a PhD¹⁷¹. One cannot fail to note that making this form of employment fully operational will once again depend on collective bargaining at a sectoral

specifying that “Pursuant to par. 5, Article 45 of Legislative Decree 81/2015, for the purposes of concluding an apprenticeship contract, either those for research purposes or advanced-level ones, the training institution and the employer should compile the relevant protocol (Annex 1), the individual training plan (Annex 1a) and the individual report (Annex 2) enclosed to the Interministerial Decree no. 12 October 2015”.

¹⁷⁰ Par. 3, Article 45 of Legislative Decree no. 81/2015 provides for remuneration to be paid to the apprentice that does not include the hours they engage in off-the-job training, whereas the hours spent in on-the-job training are paid as a percentage of total remuneration (10%). The actual hours worked by the apprentice are paid according to the traditional calculation (i.e. the possibility to classifying workers into a lower employment grade than that established in the collective agreement or by calculating apprentices’ remuneration as a percentage of their length of service). The fact that apprentices hired to carry out research are not under the obligation to take part in research activities might encourage employers to make use of these working schemes only to have access to financial benefits.

¹⁷¹ Par. 3, Article 10 of Inter-Ministerial Decree of 12 October 2015 establishes that the provisions therein shall be enforced within six months from its entry into force. This transitional period ended on 22 June 2016, starting from which the Regions that have not laid down a specific set of rules on apprenticeships will be compelled to apply the Interministerial Decree. At the time of writing, only the following regions have ratified the indications contained in the Interministerial Decree, namely: Piedmont, Lombardy, Friuli Venezia Giulia, Emilia Romagna, Basilicata, and Sicily.

level, which however does not seem to be interested in this working scheme, among others because of the lack of a network of private companies that can recruit apprentices at the end of their educational path¹⁷².

Against this background, where negative aspects outnumber positive ones, a provision that is worth a mention is the Interconfederal Agreement on Apprenticeship concluded pursuant to Articles 43 and 45 of Legislative Decree no. 81/2015, that was concluded by Confindustria, Cgil, Cisl and Uil on 18 May 2016. The agreement contains few, though essential, terms defining when research-based apprenticeships¹⁷³ can be used, also in relation to remuneration, an aspect that has generated controversy and limited the use of this contractual scheme¹⁷⁴. Equally important is the well-established practice to make reference by analogy to legislation regulating vocational apprenticeships laid down in the Interconfederal Agreement of 18 May 2016 for all those aspects not covered by collective agreements.

4. In search of Identity: What Collective Bargaining does (and does not) say about Researchers in the Private Sector

Collective bargaining does not provide any element to define researchers in the private sector, therefore they are still “figures in search of identity” and, if the public sector is excluded, without a labour market where they can find employment¹⁷⁵. Undoubtedly, researchers in Italy are still trained to pursue an academic career¹⁷⁶ or to join public research centres. They struggle to find

¹⁷² Among the few regulatory interventions related to this issue, mention should be made of the renewal of the collective agreement of 12 May 2016 by the national association of cultural institutions (Federculture), that attempted at providing a contractual framework regulating apprenticeship contracts for research purposes. The full version of the collective agreement is available at www.fareapprendistato.it. For a comment on this collective agreement, see R. BERLESE, *L'apprendistato nel settore culturale. Il rinnovato ccnl di Federculture*, in *Boll. ADAPT*, 2016, n. 22.

¹⁷³ The agreement is not concerned with apprenticeships for research purposes on an exclusive basis, but it refers to all types of apprenticeship schemes leading to an academic qualification, though the one in place to pursue research can be considered more like a kind of vocational or trade apprenticeship. A critical analysis of the agreement and its effects is offered in A. BALSAMO, *Apprendistato “duale”. Prime valutazioni sull'accordo interconfederale e i suoi effetti in materia di retribuzione*, in *Boll. ADAPT*, 2016, n. 18.

¹⁷⁴ The agreement provides that apprentices engaged in research can be given up to two employment grades lower than those established by the collective agreement in the first half of the apprenticeship contract. For the latter half, the apprentice can only be given one employment grade lower than that determined by law.

¹⁷⁵ I share this view which was the same expressed in G. SIRILLI (ed.), *op. cit.*, p. 32.

¹⁷⁶ I have discussed this topic at length in M. TIRABOSCHI, *Dottorati industriali, apprendistato per la ricerca, formazione in ambiente di lavoro. Il caso italiano nel contesto internazionale e comparato*, cit., par. 1.

employment in the private sector¹⁷⁷ and they regard this possibility as a second best or even as “a failure, because they have not managed to obtain a university job”¹⁷⁸. The unclear identity of this professional figure, either in terms of career or remuneration, also affects the match between labour demand and supply, which is not systemised and is difficult for both employers¹⁷⁹ and graduates.¹⁸⁰ Unlike the public sector¹⁸¹, no national collective agreement is in place for employers and companies (including foundations, non-profit and for-profit institutions) operating in the private sector performing research. The only exception which is frequently referred to in literature, though applying to a narrow area¹⁸², is the Autonomous Province of Trento. Starting from 2005, this province has converted research centres – which were previously equated to provincial bodies – into non-profit foundations as far as staff remuneration and regulation were concerned, by concluding a specific collective agreement¹⁸³. This was done in compliance with the European Charter for

¹⁷⁷ Whatever the evaluation of project work, what is certain is that the lack of resources makes researchers’ transition from a master’s or a doctoral degree to stable employment particularly challenging also in relation to pension rights, economic safeguards and gender issues (e.g. disadvantages in employment terms resulting from maternity). See G. SIRILLI (ed.), *op. cit.*, esp. 36-37.

¹⁷⁸ J. SUGARS, E. PEARCE, *Competenze trasferibili e occupabilità dei dottori di ricerca: Indagine sul panorama attuale (Report finale)*, DOCENT – Doctors in Enterprise, 2010, WP1/D1.3, p. 8, where reference is made to an old-fashioned, though prevailing, mentality. Yet Italy represents an exception in the international context. Cf. K. VANDEVELDE, *Intersectoral Mobility*, Report from the 2014 ERAC mutual learning workshop on Human Resources and Mobility, 2014, 15.

¹⁷⁹ As rightly pointed out by G. SIRILLI (ed.), *op. cit.*, p. 34 “on-the-job training is enough for employers to qualify a professional as a researcher, even when they do not have academic qualifications: it is not unusual in industry to find researchers that only possess a high school diploma”. At the community level, par. 1.3 of the Communication from the Commission referred to above concerning the regulation on state aid for research and development and innovation defines “highly qualified personnel” as staff having a tertiary education degree and at least five years of relevant professional experience, which may also include doctoral training.

¹⁸⁰ They still confound research in the private sector with academic research. In this sense, it is significant that par. 7 of the Commission recommendation of 11 March 2005 specifies that “enhanced and more visible career prospects also contribute to the building of a positive public attitude towards the researchers’ profession, and thereby encourage more young people to embark on careers in research”.

¹⁸¹ Cf. The national collective agreement for non-executive staff of bodies and institutions engaged in research and experimentation for the 2006-2009 period and the 2006-2007 financial period, 13 May 2009, published on the Aran website, heading: *Contrattazione*, voce *Comparti, Ricerca*.

¹⁸² Cf. G. SIRILLI (ed.), *op. cit.*, 32, and A. CRIVELLI, *Ricerca privata: quale contratto?*, in *Trieste Città della Scienza Magazine*, 2010, n. 12, *Ricerca e Carriera*.

¹⁸³ Cf. the collective agreement concluded at local level concerning staff working at foundations as laid down in Law no. 14 of 2 August 2005 and concluded on 28 September between Fondazione Edmund Mach, Fondazione Bruno Kessler and Cgil, Cisl, Uil.

Researchers already mentioned in the previous chapters (par. 2)¹⁸⁴ concerning some important aspects related to research: acknowledgement of private-sector researchers' qualifications, employment grades, career advancement, incentives and inter-sectorial mobility.

Little information is available as regards other companies. In some cases, no collective agreement is in place, as is the case of the *Istituto italiano di tecnologia* based in Genoa¹⁸⁵; in other cases, the collective agreement used in the services sector¹⁸⁶ is implemented, which however does not make provisions for researchers in the private sector (e.g. this is the case of the “*Mario Negri*” *Istituto di ricerche farmacologiche* and the Telethon Foundation¹⁸⁷).

One should also note that a number of agreements concluded at the company level have been concluded to help researchers to move out from unstable working conditions (e.g. project work), to provide them with stable employment¹⁸⁸ and to avoid that workers hired to perform employer-organised work are in fact engaged in salaried employment, as laid down in Article 2 of Legislative Decree no. 81/2015¹⁸⁹.

¹⁸⁴ Cf. par. 3, Article 2 of the collective agreement mentioned in the previous footnote.

¹⁸⁵ This is what I was told during a personal communication with IIT's HR director that has laid down a legally classification of private-sector research as a form of collaborative and coordinated work performed on a project-by-project basis.

¹⁸⁶ The national collective agreement concerning staff working in the services and distribution sector concluded on 30 March 2015 makes a passing reference to the “research executives” in relation to advertising agencies, without providing any further information on the tasks they carry out.

¹⁸⁷ As one can read in the disciplinary system published on the website of the Foundation (Section: *About us*, heading: *Code of Ethics and Model 231*), Telethon “draws on the national collective agreement concluded in the tertiary section and, for some staff, to that of journalists, executives operating in manufacturing and executives working in trade”.

¹⁸⁸ An example of this is the supplementary collective agreement concluded on 18 September 2015 by the Istituto scientifico romagnolo per lo studio e la cura dei tumori (IRST) involving 44 collaborators engaged in research activities, 32 staff engaged in research and technology support activities and 10 collaborators operating in the field of managerial technology. Out of a total of 54 collaborators, 17 were hired on open-ended employment contracts and 37 were recruited through fixed-term employment contracts. The additional cost for the institutions was some €382,000 per year, minus a saving of €376,000 for the following three year resulting from exemptions from paying contributions if staff were recruited on open-ended employment contracts in 2015, pursuant to par. 118 ff. of the single article of Law no. 190/2014.

¹⁸⁹ Cf. the Agreement of 28 December 2015 between Federculture, FP Cgil, Cisl FP, Uil FPL and Uilpa concerning institutions engaged in cultural events, which makes provision for researchers. On this point, see L. IMBERTI, *L'eccezione è la regola?! Gli accordi collettivi in deroga alla disciplina delle collaborazioni organizzate dal committente*, in *Diritto delle Relazioni Industriali*, 2016, n. 2, 393-430.

A detailed analysis of a database containing as many as 1,500 collective agreements concluded at the company level¹⁹⁰ reveals that a little number of them regulate and promote this peculiar form of employment, regardless of what is stated in the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers¹⁹¹. Among them, mention should be made of the collective agreement concluded on 23 July 2007 between Sincrotrone Trieste S.C.p.A. and trade unions operating at company and local level (Fiom-Cgil, Uilm-Uil e Ugl Metallmeccanici). By derogating from the national collective agreement¹⁹², the agreement lays down measures enabling one to “autonomously determine his/her working time between 00.00 am and 12.00 pm¹⁹³, providing vocational training as a way to promote horizontal mobility that shall be registered in a ‘booklet for vocational training and retraining’¹⁹⁴”. Importantly, the agreement under discussion sets down specific clauses allowing for harmonisation of and deviation from the provisions laid down at the national level, with the only purpose of “taking into account the peculiarities of laboratory personnel and with the aim of defining programmes facilitating its growth both in terms of skills and remuneration”¹⁹⁵. In the agreement, mention is also made of complex forms of variable pay¹⁹⁶ linked to remuneration items that “cannot be associated to those laid down by the national collective agreement currently in force”¹⁹⁷ as specifically related to research.

Analysing the few studies on research in the private sector, there seems to be a lack of awareness that speaking of “human resources for global competition”

¹⁹⁰ See ADAPT’s database collecting collective agreements concluded at company and local level in www.farecontrattazione.it.

¹⁹¹ This is the case of Sincrotrone Trieste S.C.p.a (see the following note) which has ratified the European Charter of Researchers and since 2006 has adopted the relative Code of Conduct.

¹⁹² In particular, see par. 5, Article 1 of the Agreement of 23 July 2007 between Sincrotrone Trieste S.C.p.A. and trade union representatives operating at the company level. It is specified that “the terms of the present agreement, which derogates from the national collective agreement, have been agreed upon by the parties taking into account the company’s specific organisational needs and production” which is built upon an internationally-recognised research laboratory specialised in the production of synchrotron light and its usage in the field of materials science. As detailed in the premises of the agreement “the company mission is to promote cultural, social and economic growth; basic and applied research in major fields; scientific and technical training; knowledge and technological transfer”. An analysis of this case study in terms of industrial relations is provided in A. Crivelli, op. cit.

¹⁹³ Accordo Sincrotrone Trieste 23 July 2007, cit., art. 7, *Orario di lavoro del personale impegnato in attività di ricerca*, par. 2.

¹⁹⁴ Art. 31, *Formazione e aggiornamento professionale*, par. 7.

¹⁹⁵ Cf. la *Dichiarazione delle parti* contenuta all’art. 3.

¹⁹⁶ Art. 42, *Premio di risultato*.

¹⁹⁷ Art. 43, *Elemento aggiuntivo di professionalità*, par. 2.

means first and foremost training valuable professionals, i.e. researchers, “dealing with generating, advancing, disseminating and implementing technological and scientific knowledge and that either possess higher education qualifications or have gained skills through work experience and training”¹⁹⁸. Yet collective bargaining in the private sector, that should regulate the match between “marketable skills” and “their market value”, does not facilitate researchers’ training¹⁹⁹ and employment²⁰⁰. No support is provided by collective bargaining to researchers at the initial stage of their career (i.e. during apprenticeships, see par. 3.2) or later on, for instance in the context of employment grading systems, within which this occupation is not contemplated as regards tasks, duties, professional profile, career advancement, mobility and remuneration. Consequently, in terms of employment grading, researchers are equated to lower-level professional figures, usually white-collar workers or middle managers²⁰¹, thus downplaying their role.

Besides the lack of collective agreements regulating research in the private sector, the 400 collective agreements concluded at the national level do not provide measures to promote research in each sector. This aspect is even more serious if one considers that industrial relations actors have spoken many fine

¹⁹⁸ See G. SIRILLI (ed.), *op. cit.*, 29, who makes reference to research carried out by R. FLORIDA, I. TINAGLI, *Europe in the Creative Age*, Demos, 2004, promoted and financed by the Heinz School of Public Policy and Management of the Carnegie Mellon University, according to which intellectual competition will be the real challenge for the global economy in the new millennium.

¹⁹⁹ I have already provided evidence in support of the resistance of the industrial relations systems towards doctoral programmes carried out in companies and apprenticeship contracts for research purposes, notwithstanding the generous benefits provided by the *FLxO* programme referred to in footnote 91. Cf. M. TIRABOSCHI, *Dottorati industriali, apprendistato per la ricerca, formazione in ambiente di lavoro. Il caso italiano nel contesto internazionale e comparato*, cit., par. 4. On the prejudice of the social partners towards in-company training see G. BERTAGNA, *Apprendistato e formazione in impresa*, in M. TIRABOSCHI (ed.), *Il Testo Unico dell'apprendistato e le nuove regole sui tirocini. Commentario al decreto legislativo 14 settembre 2011, n. 167, e all'articolo 11 del decreto legge 13 agosto 2011, n. 138, convertito con modifiche nella legge 14 settembre 2011, n. 148*, cit., 105-125.

²⁰⁰ On this point, which plays a key role in relation to inter-sectorial mobility and career prospects, cf. OECD, *Transferable Skills Training for Researchers. Supporting Career Development and Research*, 2012.

²⁰¹ See for example the job classification and grading system for technical experts and researchers consisting of a basic level (white-collar workers), expert level (white-collar workers), and senior level (middle management) and their related remuneration levels (ranging between a minimum of €21,000 to a maximum of €60,000) detailed in Annex B of the supplementary collective agreement concluded on 21 June 2007 between the representatives of CRS4 and trade union representatives operating at the company level. See also the supplementary collective agreement of 23 April 2013 between Guglielmo Tagliacarne, Filcams-Cgil Roma, Fisascat-Cisl Roma, and company-level trade unions.

words about key aspects such as innovation and productivity²⁰² in the last 15 years. These concepts also appeared in a number of relevant documents, among others the agreement between Cgil, Cisl and Uil for a modern industrial relations system concluded on 14 January 2016, stating that “the growing added value of production and services, which is essential for quality-based competitive development, calls for a significant investment *in research, innovation and human resources*” (emphasis added).

At a national level, few collective agreements make reference to researchers, which are usually classified as white-collar workers or middle managers. For illustration purposes, mention should be made of the national collective agreement concluded on 5 December 2012 by Federmeccanica-Assistal and Fim-Cisl, Uilm-Uil, Fismic, Ugl Metalmeccanici, which places researchers at level 7 of the relevant collective agreement and defines²⁰³ them as workers who perform activities “following general instructions and with the necessary knowledge of relevant industries, planning and operational processes to fulfil business objectives and to implement and to develop them by devising work plans and by searching for innovative methodologies and cooperation with other workers, if needed”. Some collective agreements in other sectors (e.g. the food, craft, services, energy, building, and agricultural industry) also make provisions for professionals that make use of their skills to develop new processes and products, yet without providing a legal and conceptual framework, also concerning performance assessment, that takes account of the specific nature of research carried out in the private sector, especially in relation to tasks, skills, career advancement and remuneration²⁰⁴. These collective agreements examined in this sector fail to take into account the evolution of researchers, particularly the fact that “the complexity of research careers today demands a new type of researcher, whom we would like to describe as an “entrepreneurial researcher”. This implies that a researcher

²⁰² Significantly, empirical evidence shows that the current structure of collective bargaining has given rise to a detrimental form of “guaranteed profit” reducing employers’ willingness to promote productivity through investments in innovation. The compromise arrived at between remuneration strategies aimed at limiting labour costs and the little use of decentralised bargaining enabled companies, even small-sized ones, to remain competitive without innovate. On this point, cf. L. TRONTI, *The Italian productivity slow-down: the role of the bargaining model*, in *International Journal of Manpower*, 2010, vol. 31, n. 7, 770-792. On the links between investments in research and productivity, see OECD *The Future of Productivity*, cit., esp. 53-58.

²⁰³ On the unsuitability of the national collective agreement in the mechanical sector to define the particulars of research, see the enlightening research by A. CRIVELLI, *op. cit.*

²⁰⁴ These few provisions in collective bargaining are not sufficient to do justice to researchers’ wealth of knowledge. Cf. M. ORI, *Lezione di employability/7: management e leadership, le competenze di un ricercatore*, in *Boll. ADAPT*, 2013, n. 32. See also the Table in OECD, *Transferable Skills Training for Researchers. Supporting Career Development and Research*, cit., 20.

should be innovative, risk-oriented, prepared to take leadership and respond to different tasks in parallel, often even holding more than one position at a time”²⁰⁵.

The national collective agreement concluded on 15 October 2015 between Federchimica-Farindustria and Filctem-Cgil, Femca-Cisl, Uiltec-Uil deserves a special mention, in that “it puts in place a system that best fulfils research needs”²⁰⁶. Article 4 (Personnel Classification) makes reference to researchers’ skills and grades²⁰⁷, detailing their career path ranging from the “apprentice” researchers²⁰⁸ to senior scientists, including positions like research unit or lab coordinator and specifying their tasks.

Equally important is the collective agreement concluded in the rubber and plastics industries concluded on 10 December 2015 between *Federazione Gomma Plastica, Associazione Italiana Ricostruttori Pneumatici* (AIRP) and Filctem-Cgil, Femca-Cisl, Uiltec-Uil. This agreement defines the researcher as the worker who is required to perform “research into new reactions, processes and materials to define the use of experimental methodologies and measurement techniques and mathematical methods of simulation”. The researcher is also tasked with “planning in detail the different operational stages, defining with the principal and other bodies concerned ways to conduct trials and experimentations, selecting appropriate techniques, methods and appraisal”, overseeing “trials and elaborations”, processing “experimental data obtained by verifying methodologies and calculation strategies on the basis of the objectives set down”, and drafting “final and intermediate reports on the topics analysed” that will be discussed with the principal.

5. The Need for Legislative Action to Acknowledge and Establish a Labour Market for Researchers in Companies and the Private Sector. A Proposal for System Regulation and a Legal Framework for this form of Employment

Following the reasoning developed thus far and in view of putting forward some operational proposals, it might be useful to recall that the concept of a “researcher” bears relevance not only in social and professional terms (e.g. tasks performed, skills and responsibilities) but also in legal terms, in that “it

²⁰⁵ EXPERT GROUP ON THE RESEARCH PROFESSION, *op. cit.*, 29.

²⁰⁶ A. CRIVELLI, *op. cit.*

²⁰⁷ As is known, the national collective agreement concluded in the chemical and pharmaceutical sector was one of the first arrangements to move beyond the old grading system which is no longer suitable for the new business organisational models.

²⁰⁸ The national collective agreement concluded in the chemical and pharmaceutical sector is one of the few arrangements regulating apprenticeship contracts for research purposes.

reflects an employee's status as defined and regulated at a national level"²⁰⁹. If this approach is taken, and with collective bargaining failing to clearly define this professional profile and its market value, it is not surprising that Italy's legislation and public opinion mostly think of "researchers" as "those working at universities and public research centres"²¹⁰. Besides clashing with reality – especially if one considers the way innovation has developed²¹¹ – this assumption conflicts with many EU initiatives intended to establish a fully-fledged "European Research Area" (see par. 2) which still struggles to take off. A number of EC policy documents, the European Charter for Researchers referred to before and the Code of Conduct for the Recruitment of Researchers take a more straightforward position and move beyond the traditional distinction between the public and private sector, pursuing the objective to eliminate distinctions between industries and barriers to researchers' geographical and professional mobility²¹² to promote further cooperation between public-sector and private-sector research. As things stand now, this appears to be the only way to create "a single labour market for researchers"²¹³ that is acknowledged by companies and workers because it is built on specific training and qualifications (e.g. industrial PhDs set up in agreement with companies or apprenticeship contracts for higher education and research), which also ensure researchers fair remuneration and proper status²¹⁴, adequate social protection²¹⁵, effective career paths and retraining

²⁰⁹ G. SIRILLI (ed.), *op. cit.*, 33.

²¹⁰ *Ibidem*.

²¹¹ Cf. S. JOHNSON, *Where Good Ideas Come from. The Natural History of Innovation*, Riverhead Books, 2010, according to whom innovation is not the result of researchers working in ivory towers or disruptive strokes of genius. Historically, innovative ideas originate from shared processes, connectivity and the ability to combine insights from different settings. A connected mind is the engine of innovation leading to scientific and technological progress.

²¹² Researchers' inter-sectorial mobility which «in the broadest sense of the term, refers to all possible bridges that can be built between university, industry and other sectors of employment» is covered in the detailed analysis by K. VANDELDE, *op. cit.*, 2014, *passim*, p. 3.

²¹³ This is indeed the main objective of the European Area for Research. Cf. EUROPEAN COMMISSION, *Realising a single labour market for researchers. Report of the ERA Expert Group*, *cit.*, and also EXPERT GROUP ON THE RESEARCH PROFESSION, *op. cit.*, p. 8.

²¹⁴ See the EXPERT GROUP ON THE RESEARCH PROFESSION, *op. cit.*, esp. 20, where it is argued that "pay and remuneration remain some of the main factors that reduce the appeal of research careers and encourage graduates to develop their careers elsewhere" and that "the gender pay gap in research persists, failing one of the basic beliefs of the research profession, meritocracy". A comparative analysis concerning researchers' remuneration and rules is provided in IDEA CONSULT, *Support for continued data collection and analysis concerning mobility patterns and career paths of researchers. Deliverable 8 – Final report MORE2*, 2013, esp. 100 and ff. and 204 and ff. See also DELOITTE, *op. cit.*, 69 and ff.

²¹⁵ As already pointed out in footnote 60, social security coverage is a major obstacle to researchers' inter-sectorial and geographical mobility. Cf. anche K. VANDELDE, *op. cit.*, p. 14.

programmes without considering differences between the private and the public sector. EU institutions' emphasis on "the contribution that researchers can provide in terms of knowledge innovation and development", as well as the focus on "intra-European mobility and the blurring of both sectoral and geographical boundaries"²¹⁶ entail "the dismantling of current recruitment processes and working conditions, which should be updated for the sake of a common approach where no dividing line exists in legal and geographical terms"²¹⁷. This is particularly the case if one aims at establishing a single labour market featuring skills and expertise which are specific to researchers²¹⁸.

Putting forward proposals to give back dignity to this form of employment also in the private sector and catch up with other countries is challenging. An essential starting point is acknowledging this profession²¹⁹, as the European Charter of Researchers clearly points out: "this should commence at the beginning of their careers, namely at postgraduate level, and should include all levels, regardless of their classification at national level (e.g. employee, postgraduate student, doctoral candidate, postdoctoral fellow, civil servants)"⁽²²⁰⁾.

Absent this bottom-up process, which should be promoted by the industrial relations system as was the case in the 1980s at the time of defining the category of middle and top management²²¹, it is up to lawmakers to promote the acknowledgment of those engaged in research and to fully implement the European Charter of Researchers and the Code of Conduct. This does not mean giving the researcher formal recognition, but setting up rules regulating recruitment and evaluation practices, professional profiles, careers, working conditions, mobility and re-training programmes, skills certification and thus forth²²².

²¹⁶ G. SIRILLI (ed.), *op. cit.*, p. 33.

²¹⁷ G. SIRILLI (ed.), *op. cit.*, 33. The same approach is taken by K. VANDEVELDE, *op. cit.*, 4., where it is stressed that "fostering inter-sectorial mobility of researchers has triggered new methods of research training and development, making researchers better suited for the challenges of the current labour market; it has fostered research collaboration; continues to build sufficient critical mass; and intensifies R&D activity in particular areas".

²¹⁸ Cf. K. VANDEVELDE, *op. cit.*

²¹⁹ Cf. the Recommendation of the Commission of 11 March 2005, *cit.*, heading: *General Principles and Requirements for Employers and Financers*

²²⁰ *Ibidem.*

²²¹ On the political and trade union events leading to the acknowledgment of "middle-managers" as a legal category see P. TOSI, *Commento alla legge n. 190/1985*, in *NLCC*, 1986, 1 ff., and A. GARILLI, *Autonomia sindacale e riconoscimento normativo dei quadri d'azienda: a proposito della recente legge 13 maggio 1985, n. 190*, in *Rivista Critica del Diritto Privato*, 1985, 369 and ff.

²²² On the need to establish a "research" system, see EXPERT GROUP ON THE RESEARCH PROFESSION, *op. cit.*, p. 15.

Against this background, the harmonisation of professional paths in the private and the public sector and the recognition of the key role of inter-sectorial mobility leave no room for repealing and overhauling current legislation on researchers, which is strictly based on the academic career²²³, and call for the setting up of a new set of rules for research in the private sector²²⁴. Once implemented, this new and comprehensive system could favour the elimination of legal barriers between private-sector and public-sector research which cannot take place merely through formal and legal procedures.

One might note that the Jobs Act reasserts the relevance of legal categories used to classify workers²²⁵ – though the former are doomed to disappear following the evolution of professional profiles and trades²²⁶ – and opens up to the possibility to include researchers in the list provided in Article 2095. This move would make researchers the cornerstone of the new classification system, as has been the case with middle-managers following changes to work organisation occurred at the end of the last century²²⁷. This is a necessary choice to prevent that researchers operating in the private sector fall within

²²³ Cf. Law no. 240/2010 *Norme in materia di organizzazione delle università, di personale accademico e reclutamento, nonché delega al Governo per incentivare la qualità e l'efficienza del sistema universitario*, published in the supplementary document no. 11 of Gazzetta Ufficiale n. 10 of 14 January 2011.

²²⁴ In order to better understand the scope and the content of the regulatory proposal drafted in the considerations that follow, see the Draft Bill *Riconoscimento e valorizzazione del lavoro di ricerca nel settore privato* that I wrote for ADAPT and Gruppo Bracco which is available in Osservatorio ADAPT - *Il lavoro di ricerca nel privato* (in <http://moodle.adaptland.it>). The legal framework was subsequently used as a starting point for two draft bills submitted to the Parliament during the XVIII Legislation, namely the Draft Bill no. 3654/2016 tabled by a number of members of the Parliament (among whom were Vignali and Palmieri), titled *Modifica all'articolo 2095 Cod. Civ., concernente l'introduzione della figura del ricercatore, e disciplina dell'attività di ricerca nel settore privato* and the Draft Bill n. 2229/2016, cit.

²²⁵ This aspect can be seen in the new rules laid down by Article 3 of Legislative Decree no. 81/2015 concerning changes to one's tasks, which is possible only within the same legal category. See the criticisms made by P. Ichino, *Appunti irriverenti sui nuovi decreti attuativi della riforma del lavoro*, in www.pietroichino.it, 27 July 2015. See also C. Pisani, *La nuova disciplina del mutamento di mansioni*, Giappichelli, 2015; F. Liso, *Brevi osservazioni sulla revisione della disciplina delle mansioni contenuta nel decreto legislativo n. 81/2015 e su alcune recenti tendenze di politica legislativa in materia di rapporto di lavoro*, Working Paper CSDLE "Massimo d'Antona" – IT, 2015, n. 257; M. BROLLO, *Disciplina delle mansioni* (art. 3), in F. CARINCI (ed.), *Commento al d.lgs. 15 giugno 2015, n. 81: le tipologie contrattuali e lo jus variandi*, cit., 29-90.

²²⁶ On this topic, see A. GARILLI, *Le categorie dei prestatori di lavoro*, Jovene, 1988, esp. 237-301.

²²⁷ As pointed out by F. UGGERI, *op. cit.*, "In the past, it was workers classified by the Civil Code as middle-managers who produced a significant change in work organisation. Today, researchers aim to obtain legal status, which is as necessary as unavoidable. This will serve as an example to review the world of work, as current organisational models hamper cooperation between the demand and the supply side. Making use of them is counterproductive and anachronistic. Globalisation has eliminated those barriers that have never existed for researchers. History has taught us that wall exist only to be broken".

those legal and conceptual categories used to classify researchers in the public sector, especially now that recognition of private-sector research is still pending.

In this sense, and judging by the views of most legal opinion and case law, legal categories have always “marked the position of workers, in that it sums up their professional status and as such is an essential element of the employment relationship”²²⁸. This point has been made by a number of authors when commenting on the emergence of highly-skilled occupations²²⁹ and also characterises the development of the legal classification of work in our country. If based on the logic of status underpinning Article 2095 of the Civil Code, labour legislation regulating research would bear great political and cultural significance, particularly in relation to the promotion of this form of employment in the private sector. In other words, and as exemplified in the 1985 law enforced to acknowledge middle and top managers, including researchers in the legal category of the employee “constitutes a return to the very principles of labour law, or at least goes in that direction, as a shift takes place from one’s contract to status”²³⁰ with the latter that is the distinctive trait of those engaging in research, rather than remuneration or applicable legislation.

Classifying private-sector researchers making use of the legal categories employed for workers should prompt collective bargaining, also that carried out at the company level, to determine which professional qualifications are needed in each sector to define researchers’ remuneration and applicable rules. In line with what is stated in the European Charter for Researchers and the proposal for a European Framework for Research Careers²³¹, legislation and collective bargaining might to some extent move away from what is laid down in individual employment contracts and classify researchers in consideration of their merit, qualifications, length of service, responsibilities, experience and skills also in managerial and coordination roles.

The particulars of research in the private sectors shall be regulated by the parties in compliance with legislation and the relevant collective agreement, though it is also possible to perform research on an autonomous basis through project work – as laid down by Article 61 and following of Legislative Decree no. 276/2003 – if this way of working is consistent with work performance in organisational terms. Research can also be conducted autonomously or on a project-by-project basis by teams that have been awarded national or

²²⁸ A. GARILLI, *Le categorie dei prestatori di lavoro*, cit., p. 3.

²²⁹ p. 4.

²³⁰ *Ibidem*.

²³¹ EUROPEAN COMMISSION, *Towards a European Framework for Research Careers*, 2011, p. 2.

international tenders to carry out technological development and research until funding expires²³². Taking into account the peculiar nature of this form of employment, it is essential to devise special training and re-training schemes, skills certification systems, and programmes helping researchers to re-enter the labour market pursuant to Article 23 of Legislative Decree no. 150 of 14 September 2015. Further measures should also be devised in relation to business networks, industrial districts, and the posting of research staff to promote private-public cooperation. Specifically, the provisions on business networks should also apply to teams established following the awarding of tenders to engage in technological development and research. Ad hoc economic incentives shall also be allocated to companies and public-sector institutions favouring senior researchers' mobility and recruitment and helping them to promote dialogue between private and public research entities, which still struggle to interact. Still, on this issue, amendments could be made to the regulation of production districts and business networks laid down in Article 3 of Decree-Law no. 5 of 10 February 2009, as converted by Law no. 33 of 9 April 2009, to allow public and private universities, laboratories, research centres to join them, whatever their legal nature.

The Minister of Labour and Social Policies should also set up a database of researchers hired by private companies to monitor compliance with relevant legislation and collective agreements. This database could also be used to allocate economic incentives to companies or researchers, and to facilitate mobility or re-employment of the latter, especially if the database is integrated with the national employment information service (Article 15 of Legislative Decree 276/2003). Lastly, a problem might arise concerning the moral and economic rights of private-sector researchers' creative works that might need attention and regulation²³³. This is a particularly pressing issue in a time when research is often carried out cooperatively and through disruptive technology that might clash with the strict norms on intellectual property currently in place²³⁴.

²³² This is the perspective taken by MoP Capua in the Draft Bill no. 1962 tabled by the Presidency of the Chamber of Deputies on 16 January 2014, *Disposizioni per la valorizzazione della ricerca indipendente*.

²³³ A first attempt to deal with the issue is offered in G. BRASCHI, *I diritti sulle opere dell'ingegno create dal ricercatore che lavora in azienda e nel settore privato in generale*.

²³⁴ A fascinating analysis of the issue is provided in B.H. HALL, *Open Innovation & Intellectual Property Rights. The Two-edged Sword*, in *Japan Spotlight*, January-February 2010 (which is also available in the Osservatorio ADAPT *Il lavoro di ricerca nel privato*, in <http://moodle.adaptland.it>). Cf. also B.H. HALL, *Is intellectual property important for future manufacturing activities?*, Future of Manufacturing Project Evidence Paper, 2013, n. 12; N. LEE, S. NYSTÉN-HAARALA, L. HUHTILAINEN, *Interfacing Intellectual property rights and Open innovation*, in M. TORKKELI (ed.), *Frontiers of Open Innovation*, Lappeenranta University of Technology Research Report, 2010, n.

225; J. HAGEDOORN, A.-K. RIDDER, *Open innovation, contracts, and intellectual property rights: an exploratory empirical study*, UNU-MERIT Working Paper, 2012, n. 025.

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