Back to the future. Introduction to the Special Issue for the 50th anniversary of the Journal *Studi Organizzativi*

by *Federico Butera**

The purpose of the Special Issue

In this Special Issue we publish a selection of the proceedings of International Conference *Joint Design of Technology. Organization and People Growth*. The conference was organized by Irso (RSO Institute) and it took place on October 12-13-14 1988 in Venice. It moved from the idea that a turning point was taking place in the applications of advanced technologies (a mainly information technologies). From 1963, the period of the first 25 years was characterized by amazing developments of automation and information technology, but the matching of such a tremendous innovation with coeval developments in organization and work was scarce: technology was running ahead. The International Conference in Venice was based on the forecast and hope that during the following 25 years the time should come for relevant developments of anthropocentric technologies and for integration of technology, human organizations and for people growth, in order to render advanced services fully oriented to the user needs and improve the quality of working life.

The Conference took place in the Scuola Grande di San Rocco, a 15th century building whose astonishing ceilings and walls were painted by Tintoretto. 300 participants attended the Conference, whose more than 100 came from foreign countries. Attendees were scholars, students, managers, government and international officers, union leaders. Out of those 300, 50 were speakers, 16 student volunteers, 10 professional journalists. The International Conference had two goals: first, to review the concrete developments of the previous 25 years in designing, implementing and using new technologies jointly with *ex ante* considerations about the quality of working life of the users and the effectiveness of organizations; second,

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to develop proposals for the future. It aimed to explore new options, solutions and methodologies for the future.

Leading representatives of the most relevant areas of research and action in the field made their presentations giving the sense that the time should have come for a leap forward in the integration of design of technology, organization, work and economic and social goals. MIT, UCLA, Wharton School, Brunel, UMIST, Copenhagen Business School, Bocconi, Politecnico di Milano, universities of Gottingen, Manchester, Maastricht, Tokyo, Madrid, Rome, Bologna, Turin, Trento, Parma, Bari and others reported the state of their researches. Independent research centres active in the field, as Tavistock Institute, Kernforschungszentrum Karlsruhe, Arbetslivscentrum Stockholm, CIRP, Censis, Irso, presented their advancements. Executives of leading companies as Apple, Rank Xerox, IBM, Bull, Honeywell, Fiat, Pirelli, SIP, Olivetti, Cerestar, Mandelli, ENEA, F.lli Dioguardi and others presented their experiences and strategies. Employer Confederations participated, as SAF Stockholm, European Association of National Productivity Centre, Assmeccanica. Unions were represented by the CGIL General Secretary and the CISL senior advisor. International institutions were sponsoring the conference as ILO, EEC, D.G. XI, European Foundation for the Improvement of Living and Working Conditions, IFAC, IEA. The Italian government was present with substantive speeches of the Vice Prime Minister and the Minister of University and Research.

Daily press and magazines gave pretty large space to the Conference. The sessions were very dense. More than 3.000 page of the proceedings were produced, now working papers of the RSO Institute. Various networks came across in Venice and developed an intense exchange. Professional associations and friendships became stronger during those three days. A great deal of discussion took place also during lunchtimes and dinners, in Piazza San Marco and strolling in the “calli”, the Venetian tiny streets.

That outstanding event raised many expectations, but unfortunately many of them were unmet in the following years for reasons we will mention in the next paragraphs.

The Conference raised a discussion that today has become extraordinarily actual with the advent of the Fourth Industrial Revolution around the joint and participatory design of technology, organization and work. This is the reason of this Special Issue of *Studi Organizzativi*, to celebrate its 50th anniversary.

Part A of the Special Issue includes the English versions of the full Venice program, the introductory lecture by Federico Butera, the key lectures by Louis E. Davis (UCLA) and Thomas Sheridan (MIT), the contribution of Claudio Ciborra and Gian Francesco Lanzara (University of Trento and Bologna).

Part B includes three papers in English and Italian originally published in the late ’90s by Federico Butera, Sebastiano Bagnara and Gianfranco Dioguardi, when the digital revolution and the globalization began to explode and the end of cold war gave rise to local conflicts and economic crisis. Competition among companies became very severe and planned changes declined. Those contributions proposed a revision of the traditional sociotechnical approach.

In Part C of the volume, we publish ten papers in Italian and English produced by members of the Community **Design Together. Technology. Organization. Work** that updated and re-launched the themes and projects of the joint design of technology, organization and work in 2018.

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How the instability of the ’90s froze the developments of joint design

Why, in spite of the impressive concentration of leading actors, the great expectations of the Venice Conference were not fully met in the following years, at least in Italy?

The innovative designs mentioned in the Venice Conference, developed in some exemplary cases in Italy and in the western world, did not largely spread out after the Conference.

The ’90s were times of great geopolitical turmoil and instability: USSR dissolved, Germany was unified, the former Yugoslavia was flamed by bloody civil wars, USA started the Gulf war, Ruanda was theater of a terrible ethnic carnage, Clinton and Blair took the power raising too many expectations destined to be disappointed. In Italy, the first Republic came to an end, the “mani pulite” trial wiped away the political establishment, mafia and hidden power centers murdered judges Falcone and Borsellino, Berlusconi started his political ascent. The European economic instability brought to a deep crisis when on the black Wednesday of September 16, 1992 the Italian lira and the British pound were forced to leave the EMS

(European Monetary System). An institutional uncertainty and economic shrinking lowered the propensity for complex innovation. The roaring development of web technologies was becoming the driving and dominant force of business change (so called .com economy).

The Italian Public Administration was not prone to change. The ideas of New Public Management, popular in the Anglo-Saxon world, did not get any audience.

Private Italian companies felt threatened by the increasing global instability. In the '90s, many companies were convinced that offshoring was the simpler and safer way to reduce manpower costs. Many of them tried the Business Process Reengineering and Lean Production methodologies as a straight and quick way to reduce manufacturing costs. The development of industrial districts in Italy was a vigorous and spontaneous movement, but without design or government of the emerging networks of organization.

In a few words, those increasing global uncertainties hampered the expectations raised in the Venice Conference about far sighted projects of joint design of technology, organization and people developments.

In addition to this, the main Italian actors were not inclined to support the approach underlined in the Conference:

- Confindustria and trade unions preferred national contracts to the bargaining or participative design at company level;
- private business representatives (differently by the State owned agency Intersind) were either cold or hostile towards participative design approach;
- unions did not felt confident with the idea of participation, unlike Germany and Scandinavia;
- the "Red Brigades", who in the '70s and '80s had already attacked Carlo Castellano, Gino Giugni, Ezio Tarantelli, notable promoters of a different world of work and of industrial relations, killed Massimo D'Antona in 1999 and Marco Biagi in 2002. They cast the shadow of a sort of blackmail against the work innovators;
- the most prominent business schools (Bocconi, Bologna BS, LUISS, LIUC) developed very good disciplinary educational programs (technology, business economics, marketing, HR etc.), but not enough cross-disciplinary ones;
- some big companies closed or sharply weakened their famous and multidisciplinary corporate academies (Ifap, Isvor, Eni Castelgandolfo, Olivetti etc.);

- large consultancy companies offered professional services mainly focused in different specific practices as strategy, marketing, cost reduction, scarcely integrated among them.

Sociotechnical participatory joint design agreed at the Venice Conference resulted to be a difficult approach during those economic and cultural difficulties and was not taking into account the incoming digital transformation

The participatory joint design during the increased economic and political instability revealed also some intrinsic scientific and professional weaknesses.

The idea of a production system as a *sociotechnical system and as a living organism* (instead of a rational machine based upon hierarchy and intense division of labor) had not acquired yet neither a strong scientific standing nor a popular diffusion. Managers continued to see organizations as a clockwork rather than an organism, and were reluctant to understand that formal organization is just the tip of an iceberg. Bureaucratic models were hard to die.

Firms preferred *simple theories and engineered methods* rather than approaches requiring individualized clinical and participatory design approaches. Approaches such as business process reengineering, lean, six-sigma consigned changes to consulting companies as in the well known cases of Motorola, and General Electric.

During the ’90s, as said, efficiency and cost reduction, inventory reduction, process simplification, quality improvement, reduction of staff took priority for company management.

Sociotechnical approach, after Olivetti and Volvo, had *no champions*. Sociotechnical approach means *democracy in the workplace*. Western industrial capitalism did not adopt this idea, except in isolated cases, for limited periods, and only in a few countries (Scandinavia, Germany).

In the ’90s, that idea was not really in the mainstream of industrial and political arena. Sociotechnical approach did not became a strong *academic domain* and did not gain an appropriate academic space. Trist, Emery, Davis, Sheridan were never nominated for the Nobel Prize. Few researches and few scientific publications appeared within the general shrinking of empirical researches in organization sciences. Sociotechnical gurus have always distanced themselves from the academic arena. Sociotechnical approach did not build *large schools* so determinant in the diffusion like

those for industrial engineers in Taylor-Fordism nor academies in lean production.

As a result, no strong *professional community of sociotechnicians* emerged.

Why the sociotechnical perspective returns to be up to date today

Today, in 2020, we are living in a context where panic is mounting that digital technologies may destroy jobs and take command; jobless society prophecies are spreading; a situation of an unprecedented pandemic is generating huge fatalities and economic recession; half of the population has been at home without knowing whether to get back to the good or bad jobs they had before.

In this dramatic context, may we really think of giving value to jobs and people? Yes. This means not just spending rhetoric words or issuing new laws, but creating ecosystems, platforms, contexts, organizations, common goods, products, services of high economic and social value that may both help recovering economy and society from the effect of the pandemic and enhance the response to new unmet needs of large portions of the world's population.

The polar star of that double helix strategy should be the development of new *sustainable productive and social systems,* as stated by ONU, EU and European governments. This is a long and complex road, but is viable with both bottom-up exercises of participative design and with top-down robust public policies.

Advanced technologies, innovative organizations and valuable jobs may be the driving force for creating economic and social value, sustainable development and the main weapon against unemployment and underemployment. Faced with the technological revolution underway and the growth of polarization and inequality, the *augmentation of work*, as the World Economic Forum names it, is necessary and possible where digital technologies augment the effectiveness and the value of work, versus simple cost saving automation.

It is necessary to design or to recraft the *work itself*, both highly skilled and humble jobs. What does *work itself* mean? Many things, as the set of activities, responsibilities, results, relationships, skills; training and growth paths; rights; physical, psychological, economic and professional working conditions; and, above all, social identities: in a word, what creates value

for society and for the person, the «wealth of nations» as Adam Smith stated.

We envision a work that can be not a condemnation and fatigue, not a commodity; on the contrary, a source of freedom and dignity.

The three levels of action: public policies and joint design in the single organizations

All of this requires three levels of interacting actions not confined within the silos of bureaucratic responsibilities:

1. *industrial policies* at European, national and territorial level oriented to favor structural changes, suitable for an open economy;
2. *social policies* relating to the new welfare, professional retraining, protection of the weaker groups, inclusion, training;
3. *joint design and development* in private companies and Public Administration of integrated systems of i) enabling technologies (building possibilities for action and interaction); ii) innovative forms of business and organization (such as integral companies, flexible network organizations, agile and distributed responsibility organizations, self-regulated teams); iii) *"hybrid" and "augmented" roles, professions* (with domain, digital and social skills). This is the Sociotechnical Approach 2.0.

In the past, these three levels of action were adopted simultaneously in cases like the German program "Humanisierung der Arbeit", the Scandinavian program "Industrial Democracy", the diffusion of Lean Production models in Japan. In Italy, this was accomplished recently in Emilia-Romagna with the remarkable results of the Work Pact in Emilia-Romagna.

There are no good recipes and solutions for everyone and everywhere. Results should come out from *participatory design*, carried out together by companies, institutions, the education system, trade unions and, above all, by workers and users, discussing and sharing objectives of productivity, sustainability, quality of life.

The content of the Special Issue

The papers have been selected, invited and edited by the editor, without the double peer review adopted in the regular issues of the journal.

At the beginning of part A, we publish the **program** of the Venice Conference. The schedule included three days of plenary and parallel sessions around three big issues: 1) Designing technology and developing human resources; 2) Designing technology and flexible organizations; 3) Designing technology and strategies for innovation. Parallel sessions touched areas of experiences and design like Man-machine interfaces and human abilities; Technology and the future of work systems; Factory and office of the future; Technology and the firm.

In the first chapter, **Federico Butera** gives a detailed overview of the contributions presented in the Conference. Then he makes some introductory remarks on the point that modern technology has not deterministic social effects: it upsets the present situation but only human decisions and designs may reset – for good or bad – work, organization and society. He sets what could be the practical and scientific domain of the «joint design of technology, organization and people growth» and proposes an agenda for research and action.

In the second chapter, in the keynote lecture, the late **Louis E. Davis** from UCLA gives a brief history of successes and failures of 40 years of sociotechnical design whose he was one of the most prominent leaders. His paper addresses the central themes of the Venice International Conference, namely the mutual interdependence of technology and social organization; the causal factors in organizational environments, which are complex, chaotic and global; the complex interplay between technologies and organization; the processes of joint design. These themes are developed from viewpoints of both organizational choice and the satisfaction of multiple objectives of living organizations.

The keynote lecture of **Thomas Sheridan** from MIT, one of the fathers of industrial robotics, draws the history of forty-five years of man-machine systems and the prospects for advanced robotics. He identifies three phases: a) studies and design of the physical human-machine interface, i.e., displays and controls; b) the transformation of systems engineering models to characterize the entire closed-loop communication, decision and control system containing the human operator; c) the application of computers to aiding and implementing operator decision. Technologies of advanced computers, sensors, robot effectors and the techniques of artificial intelligence and control were producing a new phase of telerobotics, which portends fundamental change in the way people work. Society now may decide what mix of human and machine is best to produce desired goods and services and to satisfy the aspirations of workers and organizations.

In chapter 4, the late **Claudio Ciborra** and **Giovan Francesco Lanzara** propose a post-modern approach to design new automated systems more oriented to action and intervention, a sort of *bricolage*. This approach moves from the point that it is difficult to predict and plan from the beginning the final configuration of a system, its impact and externalities. Through a variety of methods, it rather helps the various actors involved in the design effort to reflect about their own practice. This process however takes place not in a chaos but within what they define the *formative context*, that is the set of unwritten social scripts that govern the invention of alternative forms of work, the ways of setting and solving problems, the modes of conflict resolution, the revision of the existing institutional arrangements, the plans for their further transformation.

Part B includes the today revision of three papers written at the end of the ’90s by Butera, Bagnara, Dioguardi, when the turbulence of the decade was decreasing and the web revolution was taking off. They revisited the theory of sociotechnical systems and the theory of the firm.

In chapter 5, **Federico Butera** notes that, at the end of the ’90s, digital technologies already took command upsetting global value chains, business models, services, organizational functioning, work. Business Process Reengineering, Lean Production, CSCW (Computer Supported Cooperative Work) became very popular approaches among managers overshadowing the STS (sociotechnical approach). In this chapter, a reconsideration of sociotechnical approach is proposed in line with the digital revolution and the new emergencies. The positive aspects of those approaches are partly incorporated in the proposal of a Sociotechnical approach 2.0 which require however *going back to the basic*, namely strengthen process-centered organization, quality of working life, process of design and change. The STS 2.0 may be renamed as *joint engineering (or design) of information technology, business processes, organization and work* and should be considered as an elective area of collaboration among different disciplines and actors for successful organizational design.

In a seminal essay by the end of ’90s, **Sebastiano Bagnara, Michele Mariani and Oronzo Parlangeli** note that the coeval cognitive psychology and sociotechnics developed without any reciprocal contacts, “without seeing each other”. Cognitive psychology and cognitive ergonomics had a tremendous development in the design of digital artefacts but were not engaged into group behavior and organizational change. On the contrary sociotechnic did not afford the issues of mental and cognitive behavior in digital setting. Now the challenge to protect the quality of working life of

knowledge workers in new knowledge jobs requires a new alliance between cognitive psychology and sociotechnics.

In chapter 7, **Gianfranco Dioguardi** revises his important paper firstly published in the '90s: *Twenty memorandums for an evolving organization*. The changed scenario at the end of the 20th century influences the behavior of the companies and the organizational models. Current changes are premises to build a new general theory of the firm. A theory which may include the small firms and the big ones, the microeconomic attitude – focused upon specific decision-making issues – and the macroeconomic conception – where the firm becomes the promoter of development. As technology evolves and develops, entrepreneurs, managers, professionals assert themselves as the main actors capable of structuring their decisions on daily actions and of controlling the material and information flow at the same time, without the constraint of being the owner of fixed production means or being a box in an organization chart, or being in an employee position. He/ she operates within "organizational fields" of different organizations aiming at similar goals and they should innovate beyond the boundaries of an individual company.

In Part C, in chapter 8 – *Increase the value of work through participatory design* – **Federico Butera** confutes the prophecies of work losing the race against the machines and of a jobless society. "Growing the cake" of qualified services and products for a huge amount of world population which is lacking in housing, infrastructures, education, medical care and for a planet threatened by climate change: this may be the main weapon for not being scared of technology. Technology displaces a great amount of blue and white collars jobs and also knowledge work, but it also may augment existing and new jobs. Technological development moreover may generate new jobs that do not yet exist. The Fourth Industrial Revolution is built upon three pillars: technology, organization and work, which should be designed together and through the cooperation of institutions, companies, Public Administrations, research, schools, unions, media. The three levels of action for designing the Fourth Industrial Revolution are the definition of national and regional policies in a European framework, joint design of specific systems, cultural movements. A huge repertoire of solutions to be combined together to implement joint design is now opening: people centered technologies, platforms, ecosystems, network organizations, sociotechnical teams, integral firms, open roles, broadband professions and much more.

In chapter 9 – *Organization design 4.0: towards a review of the sociotechnical principles* – **Emilio Bartezzaghi, Raffaella Cagliano,**

Filomena Canterino, Silvia Gilardi, Marco Guerci and Emanuela Shaba give a detailed account of a recent empirical research. Through the analysis of three companies that invested in digital technologies and redesigned their organization, this study provides evidence on how, in those cases, the design principles developed by sociotechnical theory are optimally declined. They maintain that this perspective could become again central in both theory and managerial practices. Three sociotechnical principles emerge from the case studies: adoption of a wide field of action that includes social and technical aspects; extended participation; experimental nature of the process. Moreover, these principles have been enriched adopting also a) agile design methodologies managing the process upon short, iterative continuous experimentation cycles; b) design thinking methodologies. Lessons are drawn for design practices and for education programs.

In chapter 10, **Attila Bruni, Francesco Miele, Daniel Pittino and Lia Tirabeni** propose the paper in English *On the dualistic nature of power and (digital) technology in organizing processes*, which is also the introduction of next Special Issue *of Studi Organizzativi*. Their contribution focuses upon the relationship between power and technology. The present debate tend to polarize in two main stances: alarmists or techno-optimists. The utopian and dystopian scenarios about power relations and technological change have become part of the collective imaginary but, at the same time, they reduce the complexities and ambiguities of the phenomenon finally missing the more intricate and often ambiguous dynamics of what happens. The paper first explores how the concept of power has been treated in sociology and organization theory. Then the focus shifts towards the role of digital technologies with respect to automation processes and control dynamics. Finally, the authors deal with the transformations occurring in jobs and professions in relation to digital technologies. Technologies in action become the situ where a continuous dialogue between control and resistance, domination and emancipation, constriction and enablement takes place. Overcoming a dualistic approach could help in understanding these dichotomies in terms of a continuum. The paper shows how the concept of *sociomateriality* appears particularly apt to explore and to afford the intrinsic entanglement of power and digital technologies.

In chapter 11– *Who is afraid of hybrid jobs?* – **Paolo Gubitta** explores the diffusion of hybrid work, which for him means a job that "combines" and "integrates" technical, managerial, professional or relational skills with IT and digital skills, the knowledge to communicate in social networks, the

skills to interact with other people mediated by the use of digital technologies. Conceived in such a way, hybrid work concerns not only knowledge workers or new jobs not existing before, but also includes the traditional ones (and, in particular, to manufacturing ones) modified by the adoption of digital technologies. Three lines of action are proposed: a) either to design or to craft new roles encompassing the increasing capabilities required by digital technologies (not only operational digital skills); b) hybrid work organization, as work group functioning, leadership, mentoring and others; c) continuous training, fast and easy to adopt. Not doing these, we risk an increased potential polarization.

In chapter 12 – *Love stories between organization and technology at digital times* – **Marcello Martinez** assumes that the organization and information processing are an "old couple" and the study of their "love story" is at the basis of organizational thinking. Being part of an organization, individuals achieve a superior information processing, through procedures, routines, roles, structures, languages, shared values etc. For a first perspective, new technologies innovate and create new procedures, processes, structures, interactions of decision-makers or designers. Therefore, the organizational form should be the result of the IT and technological design, rationally designed for optimizing the management of information system: people resistance is frequent in these approaches. A second perspective sees IT applications as the empowerment of existing good or bad decision-making processes, giving them a doping effect: informatization of defective processes is a possible consequence. The third perspective pays attention to interaction (human-computer interaction theory) between the digital technologies and people working in an organization: correct but complex way of dealing this relationship. How solve the controversial relationships between organization and technology in the digital age, which raise fears? Perhaps Gabriel García Márquez gives a suggestion using the love story metaphor: «Answer him yes even if you are dying of fear, even if you will regret it, because in any case you will regret it for a lifetime if you answer it not».

Human-machine learning is the process analyzed by **Ruggero Cesaria** in chapter 13, when technology learns from man, optimizes what has been learned and, subsequently, teaches man. Comau has created Vir.GIL, a robot that first learns the most difficult operations from the expert worker, then improves them, standardizes them and makes them accessible, in real time, to the apprentice. In the FCA Melfi Academy, an example of integration between work and learning has been operating since many years: workers learn by simulating the different operations and, at the same

time, workers and machine improve the process in terms of quality and waste reduction. Work and learning interplay each other through the digital platform, classrooms, simulators and production lines. The idea of "learning in the flow of work" is proposed: I learn while I work; and I do it together with the technology I interact with. The trainer, in the future will develop the "man-machine" whole: a challenge both for new generations of sociotechnical design and of trainers. In his paper, Cesaria also points out that education is a global and highly profitable sector. Due to a worldwide expenditure of 6,000 billion dollars, it far exceeds the automotive sector which barely reaches 4,000 billion dollars. Digital revolution puts more at risk traditional education than manufacturing. Mooc platforms as Udacity, Coursera, Duolingo attract more than 100 million students: and it is just a beginning. As a conclusion, digitization is leading to an incorporation of learning into work (and vice versa).

In chapter 14 – *Why enterprise 4.0 is for the human being. Towards society 5.0* – **Nicola Intini and Corrado La Forgia** give a wide excursus along the various phases of technological revolutions they see as managers in a leading international company. At the end, they describe the Japanese *society 5.0 program* based upon the "5th Science and Technology Basic Plan". The visionary idea is to overcome age, gender, language and geographic barriers thanks to the intelligent and responsible use of new technologies. And here it may be the leap forward: in addition to improving production processes, products and new business models, technological innovation should be developed for improving living conditions with solutions of social problems (mobility for the elderly, health care, smart cities that adapt traffic, heating and lighting according to changing environmental conditions). This could be of great help in facing global crises such as the one under way for the Covid-19: the possibilities offered by telemedicine, assistance robots in hospitals, social distancing technologies, tracking technologies could represent important help in waiting for a vaccine.

In chapter 15 – *The work is a white sheet to be written* – **Marco Bentivogli**, thanks to his union experiences and responsibilities, states that the new industrial revolution, that of robots and artificial intelligence, cannot be stopped. But, in order to make it an opportunity, we have to guide it. It will be essential for the future of our country and our democratic system to work on the technological transition, to understand the skills of the future, to rethink times and spaces of work, to design a different educational system and a new system of representation and rights. Policies developed to be implemented in the next 2-3 years are ineffective and

harmful; we must go further, about 20 to 30 years. The work as we know it today will undergo profound changes and repetitive tasks, which have a low level of professionalization, and skills simply will disappear. We must create new types of work, with higher productivity and more satisfying for people. Technology is not bad for work, but its absence is. Few have the courage to say that our country lost thousands of jobs due to the lack of investments. We should pursue a model in which men and women free themselves not from work but "within" work, reducing fatigue and limiting repetitive and alienating jobs, widening the spaces in which to field one's intelligence, imagination and humanity, in which the human will always be unbeatable.

Giorgio De Michelis and Alfonso Fuggetta wrote chapter 16, *Support for technological and organizational innovation of Italian companies. Ecosystem of innovation and public intervention*. Italy is among the top manufacturing countries in the world and is second in Europe after Germany. However, the digitalization of our companies lags behind that of their competitors. The amount of funding that the State has to provide on behalf of our companies' innovation is certainly one of the key. However, it is also important that loans find well-defined and well-equipped projects in terms of resources and skills in companies.

If companies do not have these capabilities, it is vital that public funding first contributes to giving them form and substance. A context, an environment, an "innovation ecosystem" is needed which may be promoted. There are two different paradigms on how to reduce the distance between SMEs and innovation: on one hand, bringing to SMEs "innovation" solutions developed by technology suppliers; on the other hand (much better), help SMEs to design the systems they need. Real innovation centers (*Technology Innovation Center – Tic*) are needed to support the second paradigm, to support projects that realize the vision of companies. Three models are available in Europe: 1) *Autonomous operating structure*, as the case of Fraunhofer in Germany or Cefriel, FBK (Bruno Kessler Foundation), Links Foundation (Leading Innovation and Knowledge for Society) in Italy. They offer to SMEs their capabilities and experiences accumulated in services they already offer on the market; 2) *brokering structures and Program/Project Management (PM*). They, as in the case of the British Catapult, do not have their own operating structure and offer services of brokering, market analysis, project and program management, lobbying and networking activities; 3) s*ervice platforms* that offers a set of infrastructural capabilities and services enabling innovation activities, as in the case of CalIT (California Institute for Telecommunications and

Information Technology). The Italian cases of Competence Center 4.0, falling out all three paradigms, and their weakness are examined. The paper maintains the superiority of the first paradigm as in the very successful Fraunhofer case, explaining carefully its advantages and properties and how to develop it in Italy.

In chapter 17 – originally prepared for OECD – **Patrizio Bianchi and Sandrine Labory** explore *What policies, initiatives or programs can support attracting, embedding and reshaping Global Value Chains in regions?* Digital globalization is characterized by large growth of data flows, not so much of product flows as in the past decades. As a consequence, GVCs are reshaping and emerging with a number of clear tendencies: smart manufacturing makes the strategy of searching for low labor-cost territories less important, while territories with dense knowledge and competencies, supported by appropriate infrastructure and institutions, provide the conditions for GVC reshaping and emergence. Since territories are hubs of knowledge and competencies, regional industrial policy should favor structural changes and outline four main policy elements. First, developing capabilities for industrial development, namely appropriate skills, infrastructure, knowledge base; second, enhancing networking in order to exploit complementarities, within and outside the regional industrial system; third, policy governance should be participative; and fourth, policy coherence should be ensured, between government levels but also between policy fields. The authors explain how to do it and show European examples.

Chapter 18 contains the position paper of **Community Progettare insieme. Tecnologia. Organizzazione. Lavoro (Design Together. Technology. Organization. Work)**. The future of work in the Fourth Industrial Revolution will not be the negative or positive effect of technologies. The problems and opportunities of work will not be determined by the classic option between market or State, but by the design of the new productive and social world. Design is the true alternative to dystopic and utopian scenarios. How can this be done? By designing together technology, organization and work in sociotechnical systems, that is in ecosystems, platforms, territories, cities, Public Administrations, companies, voluntary organizations, professional systems. Social actors such as central and territorial institutions, businesses, public organizations, research, the Universities, the Education, trade unions, the media and, above all, workers and consumers should be called to design together, with participatory approaches. It will be necessary to promote a series of European, national, regional and sectoral pacts to jointly design markets,

organizations, new companies that we do not know yet. The levers to activate are industrial policies, social policies, the design of individual sociotechnical systems through the participation of intermediate bodies, workers and citizens. We founded the "Design Together" Community with the vision of encouraging the creation of value added in our country – which has a strong productivity deficit and social cohesion – through the enhancement of work and the training of competent and capable workers and citizens. More than one hundred scholars, entrepreneurs and managers, political leaders, public officers, union leaders, journalists are partners of this voluntary and non-profit Community, which organizes meeting and conferences and supports projects carried on by the members. This is the logo of the Community.

They commit to develop and communicate their own researches and projects oriented to bring on the ground the vision and goals we share. They moreover witness that is possible to develop double helix projects in order to face at the same time present emergencies and to prepare a desirable future; to adopt interdisciplinary knowledge and approach for innovation; to overcome their internal organizational silos for innovating; to share positive actions with different stakeholders; to educate managers, workers, users to master new competencies and a new culture.