SYSTEMA - White Paper

Project context and issues addressed

Changes and consequences of COVID-19 pandemic

The lack of a vaccine during the current COVID-19 pandemic implied social distancing to be one of the most important and relevant measures that governments and organizations could employ to protect the population. In parallel, there has been a clear effort to not completely stop the economy, and hence working remotely has become the "new normal" worldwide.

There are reports and early estimates[1] indicating that almost 40% of working people in the EU have resorted to fulltime remote work because of the pandemic. Furthermore, a JRC study[2] has found that almost 25% of the entire European workforce, in all sectors, is currently working from home. This is however not completely coming unexpected: even well before the pandemic, various countries and organizations had already started shifting partially to remote working[3].

Nonetheless, the acceleration towards remote working caused by the pandemic also highlighted that not every organization had the infrastructure in place to support such a shift, and even the employees themselves were not prepared enough to resort to such type of working mode and interaction.

Digital Transformation

Consequently, Digital Transformation of organizations and companies that was seen as one of the most difficult managerial tasks in the pre-COVID era, has gained a new urgency and momentum, and many companies are accelerating their efforts towards that direction[4], since it is expected that this trend will not be reverted after the introduction of the vaccine[5] and it will completely transform the future job market and working scenarios in ways that still need to be explored and assessed.

Hence, the current era of Digital Transformation is requiring a radical approach to changing a whole system and not just some of its aspects; For example, such radical changes should not only be aimed at satisfying customer requests but also and mostly be oriented towards a real restructuring of organizations and how they are managed, in order to ultimately increase their value and profitability, through process efficiency and greater effectiveness in general.

In fact, internally, it impacts the entire organization, while externally it influences the strategic positioning on the market as well as the probability of success or failure. Digital Transformation influences the nature of relationships between individuals and

[1] https://www.eurofound.europa.eu/publications/report/2020/living-working-and-covid-19
[2] https://ec.europa.eu/jrc/en/publication/covid-confinement-measures-and-eu-labour-markets
[3] https://www2.deloitte.com/ch/en/pages/human-capital/articles/how-covid-19-contributes-to-a-long-term-boost-in-remote-working.html
[4] https://insights.nordea.com/en/business/post-covid-19-what-next-for-digital-transformation/
[5] https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/how-covid-19-has-pushed-companies-over-the-technology-tipping-point-and-transformed-business-forever

organizational units, which become increasingly complex especially in larger organizations.

Sustainable development

Another characteristic of the COVID-19 pandemic has been that the effort for Sustainable Development of countries and organizations has been momentarily reversed and the focus has shifted to survival[6]. This trend is not expected to continue, because it is becoming clearer and clearer that crises such as those of a pandemic and those that will be caused by climate change can and "have to" be avoided. As a result, Sustainable Development that acquired a prominent importance in the 1980s, has recently entered a new wider awareness phase which is expected to define the policy making of the 2020s (also because of the fundamental role towards achieving the goals in the Agenda 2030).

However, designing and implementing successful sustainable policies is also an extremely complex process, due to their intrinsic systemic nature; such problems have long term horizons, they are characterized by deep levels of uncertainty, tight interdependency among its different aspects, and lengthy time delays between policy actions and their consequences and impacts. The situation is hindered even more by the high costs (that are not solely monetary) that are involved by trial and error attempts (which can be recognized in many of the policies implemented so far from various governments) and by the aforementioned time lags between policies and perceived impacts: in other words, we cannot allow ourselves anymore to try out a policy, wait for its delayed effects and then realize that it was not effective. Furthermore, the rapidly evolving technology, constantly creates new circumstances that may render policies ineffective.

The need for new skills

All the examined limits and issues could be overcome by employing digital skills (programming, data analysis, machine learning): in fact, in the past decade, with the increased penetration of technology and personal computers, digital skills became essential tools for young people that placed them in advantage positions in the market.

However, researchers and policy makers recognized that learning just digital skills is not sufficient in such a changing environment, and there is also the need to promote computational thinking in education. Similarly, there is the need to further enhance youth capabilities by teaching them how to view a system/policy holistically. Furthermore, new skills will be required to develop and/or enhance critical thinking, problem solving capabilities in complex environments and communications skills.

These necessary skills are not only necessary for the achievement of Sustainable Development but also for the task of Digital Transformation itself.

This fact was recognized by the European Commission in the report "Rethinking Education: investing in skills for better socioeconomic outcomes", where they stated:

[6] https://www.ecomatcher.com/whats-next-for-corporate-sustainability-in-a-post-covid19-world/

"*Transversal skills such as the ability to think critically, take initiative, problem solve and work collaboratively will prepare individuals for today's varied and unpredictable career paths*"[7]

.

Project scope and objectives

The SYSTEMA project was conceived to address the incentive of the European Commission, focused on Sustainable Development and Digital Transformation. The partners of the SYSTEMA project believe that the core ability to achieve the transversal skills necessary in the 21st century is to fully understand the dynamics of such problems by means of Systems Thinking (ST).

In brief, Systems Thinking is a learning strategy to understand the world, that emphasizes the relationships among a system's parts, rather than the parts themselves. It is composed of visual, verbal and kinesthetic tools for analysis, with a shared vocabulary for defining problems and finding solutions.

In this context, Systems Thinking will play a crucial role in setting a common and effective mindset that will be more and more needed to deal with two fundamental issues that our world today is facing: the need to strive for a better and sustainable development approach and by accompanying such development through a parallel digital development of our society.

Under this perspective, the SYSTEMA project therefore also aims at addressing the priority of adult education "Extending and Developing the competences of educators and other personnel who support adult education" and other horizontal priorities like "Supporting individuals in acquiring and developing basic skills and key competences" and "Environmental and climate goals" by:

1. developing key competencies focusing on (a) systems thinking skills to improve information-processing, self-direction, problem-solving and communication (b) computational and mathematical skills to translate systems thinking skills into actionable models in the fields of sustainable development and digital transformation
2. leveraging the latest ICT technologies to improve the quality of training
3. developing a comprehensive training approach that will support educational organizations to identify the strengths and weaknesses of their skills development systems.

Hence, at its core, the SYSTEMA project is focused on providing advanced training that will include:

- the ability to know how to observe and grasp the "circular" nature of the world we live in
- building a higher awareness of the role of the "systems" structure in determining their behaviour
- understanding the role and impacts on the behaviour of a system due to its feedback loops

[7] https://www.cedefop.europa.eu/files/com669_en.pdf

- understanding of the presence of systemic delays between actions and impacts
- understanding that there are potentially unexpected consequences for actions

Such skills may appear abstract and vague, but they are exactly what will be needed if we are to face and solve successfully the hard challenges posed by both Sustainable Development and Digital Transformation.

In fact, any attempt to design and implement policies that are oriented towards Sustainable Development will have to be interdisciplinary, innovative and adaptable to any new circumstances created by the rapidly evolving technology. As a result, any attempt towards achieving a proper Sustainable Development will necessarily have to also address the complex aspects of a society undergoing a full Digital Transformation process. Such a process is already oriented towards a real optimization and restructuring of organizations and how they are - effectively and efficiently - managed in order to increase their value and profitability. Which necessarily implies a systemic perspective and vision.

Consequently, the objective of the project will be to prepare and train, through the Systems Thinking (ST) approach, a pool of people that will become the trainers of next generations and who will in turn be needed in public and private organizations across Europe.

The target groups and stakeholders will include:

- Adult Trainers/Educators in Professional Education and in High Educational Institutions
- Teachers/Professors/Researchers
- Private/Public Managers (policy makers)

These will be selected mostly starting from the two target topics (Sustainable Development and Digital Transformation), in which the current educational gaps will be addressed by exploiting the power of ST.

For this purpose, there will be the need to establish how to introduce the common language of ST to the target groups and secondly how to declinate and verticalize it in the target topics.

ST will become the common language that will allow getting to a higher stage in understanding the true problems in sustainable development and digital transformation. After taking the course in ST, educators will have the chance to tackle problems in their fields with a renovated capability of addressing many interdependent and circular issues thanks to the new skills that will allow them to deal with dynamic complexity.

The project will also evaluate its effectiveness in bringing educators to a higher level in understanding complex dynamics in their field of expertise by means of specific cognitive tests.

Project consortium

To achieve these goals, each partner of the SYSTEMA consortium brings its own experience and expertise on the issue.

- **SYDIC** represents the international System Dynamics Society in Italy and is a multidisciplinary research association that hosts more than 40 members, most of them are academics and researchers dealing with the System Dynamics (SD) and Systems Thinking (ST) disciplines**.** It can transfer the Systems Thinking and System Dynamics methodology which is the key enabling element to develop the skills addressed by the project and produce simulative models underpinning social complex dynamics, as well as the experience in the management of already 3 EU projects and their dissemination & communication.

- **INTELLEGERE** was established in 2014 with the mission to help people to understand each other, in a world that is becoming smaller and smaller, globalized and continuously changing. In the 2017 It launched Digital Education Lab (DEL), a digital education school for children and teenagers where coding, robotics, electro-tinkering, etc. are not only digital skills to transfer to students, but even a way to let them acquire important soft skills.

- **University of Macedonia** is a State University under the responsibility of the Greek Ministry of Education, with four faculties consisting of eight undergraduate academic departments covering thirty graduate programs (Master Degrees) in disciplines with a high demand in the labour market.

- **The Academy of Code** was established in 2014 with the mission to improve the level of understanding of computer programming and overall digital literacy within the Irish education system.

- **CSICY** is a Research and Development organization which focuses on fostering social innovation that can bring about a positive change to local, national, regional and global contexts. CSICY is working closely to address market, social, economic and cultural challenges with governments, local administrative agencies, non for-profit agencies, commercial entities, and educational institutions.

- **KOMPASS** is a Center for Entrepreneurship, established in 2000, as a public entity in the city of Frankfurt. It is an active and pivotal member of the RheinMain Network, consisting of more than 20 local and regional institutions engaged in economic development, including industry clusters, banks, universities, employee and employer associations, and chambers of commerce.

- **ASVIS** is the Italian Alliance for Sustainable Development. Its aims are to raise the awareness of the Italian society, economic stakeholders and institutions about the importance of the 2030 Agenda for Sustainable Development, and to mobilize them in order to pursue the SDGs.