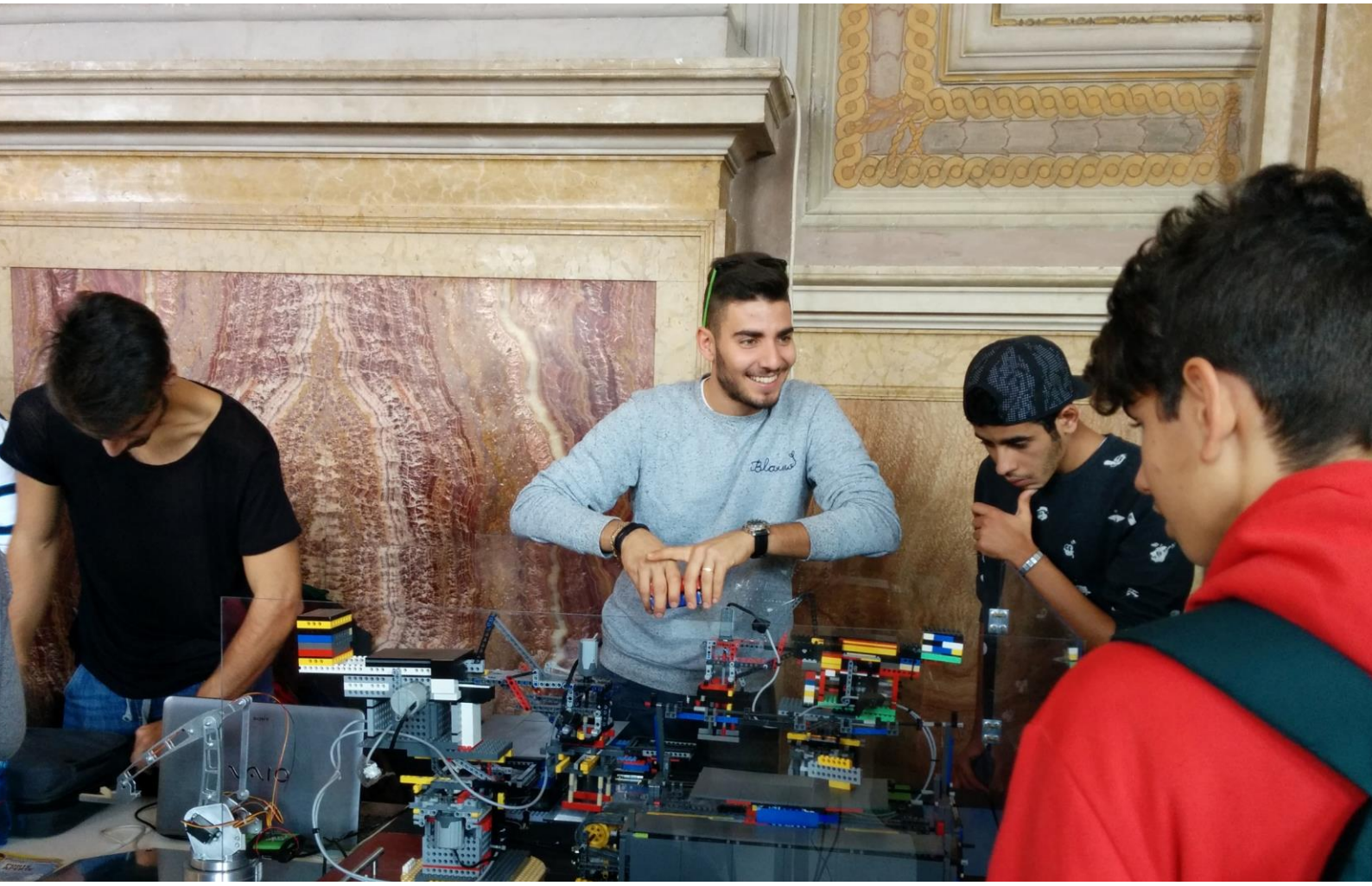
GEN-Y CITY

Developing, attracting & retaining Gen-Y 'creative-tech' talent in European cities



5th Network Meeting, Bologna (IT), 11th – 12th July 2017

Thematic Report:

Fostering a creative-tech culture in a city through the development of a creative-tech talent ecosystem (Part 1: A theoretical framework)

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Introduction

As we know, across the majority of the member states of Europe, interest and achievement levels in Science, Technology, Engineering, Art and Mathematics (STEAM) subjects is declining. This in turn, leads to low levels of entry to STEAM subjects in tertiary education and STEAM careers.

By 2020, it's estimated that more than 800,000 technology posts will be unfilled due to the skills gap, and the number of lower level positions that will require increasing technical skills and abilities is increasing. This situation has the potential to impact adversely on the future global competitiveness of Europe.

In response to this issue, countries and cities across the whole of Europe are trying to re-establish a creative-technical culture in their city.

However, this cannot be done very easily by adopting a 'corporate' or 'organisational' outlook, and thinking only about the services that a single organisation delivers. In reality, the widespread re-establishment of a technical culture in a city, or within any locality, requires a 'total place' based approach, with city administrations leading a range of organisations to come together to overcome this 'market failure' to create a stronger creative-tech 'ecosystem' in the city.

An 'eco-system' is a complex network or interconnected system of different organisations, groups, bodies and individuals that all work together for the pursuit of a common goal.

Why is Bologna such an ideal place to consider such issues?

Bologna is the land of creative innovation, often compared to California's Silicon Valley, and of technical excellence, home to large international industrial, mechanics, electro mechanics and mechatronics.

In recent years, new realities and new synergies are emerging in Bologna. As examples of good practices, project Partners were able to visit and appreciate;

- The regenerated and abandoned public space and start-up incubator "Serre dei Giardini Margherita";
- The place for films' archival conservation and restoration Cineteca (http://www.cinetecadibologna.it/);
- The Arcangeli High School of Fine Arts (http://www.liceoarcangeli.gov.it);
- The Opificio Golinelli Foundation (http://www.fondazionegolinelli.it);
- The Ducati Museum and Enterprise (http://www.ducati.it) and
- Bologna's Heritage Industrial Museum (http://www.museibologna.it/patrimonioindustriale)

All the facilities visited were active in promoting cultural and industrial vitality to the wider population of the city and demonstrating how creativity and technology are important in the growth of its citizens through the constant search for innovation, the rediscovery of history and traditions, the education and formation, and the use of technology in a sustainable way.

In addition, during the first day of the study visit, Incredibol! – l'Innovazione Creativa di Bologna (Bologna's Creative Innovation) was presented. It's a project promoted by the Municipality of Bologna and the Emilia-Romagna Region, in order to support innovative professionals and businesses in the cultural and creative field, in particular during their start-up phase. From this initiative were born dozens of new creative companies led by young people.

Creativity and technique, the two flagships of the Bologna's economy, often struggle to talk. To curb youth emigration, partners in the city have sought to actively develop synergies between these two-industrial areas that could represent the real competitive advantage of the territory.

To improve the working opportunities of young people, Bologna is working on two main directions. On the one hand, the Metropolitan Strategic Plan that includes its policies of entrepreneurship promotion and innovation, training and services for work. On the other hand, the revival of technical culture.

Finally, in order to revitalize and attract the city to young people, a fundamental role is that of urban regeneration that can make spaces once degraded new areas of urban life. As an example of this, the partners were able to visit the Giardino del Guasto, a little green lung in an urban geography stifled by cement and torn apart by an increasingly progressive degradation; a micro contemporary art park that teaches how cement and steel can be sustainable materials.

But what can less developed cities do in this regard? How can cities use the frameworks examined in the first of the two reports from this transnational visit to help shape their own GEN-Y creative-tech talent development, retention and attraction strategies?

This report aims to consider what elements of delivery a creative-tech talent ecosystem needs to impact on, and put forward a range of theoretical frameworks for cities to use, in developing their own eco-system 'maps'.

Why has society's perception of science and technology changed?

A recent major review within the UK[12] identified four key cultural factors that have influenced the separation of science from society, resulting in an increased need for scientists to engage with public audiences:

- The loss of expertise and authority of scientists;
- A change in the nature of knowledge production;
- Improved communications and a proliferation of sources of information; and
- The democratic deficit.

These factors are equally valid in other parts of Europe, especially within more developed societies.

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[1] Benneworth P, 2009, "The challenges for 21st century science: A review of the evidence base surrounding the value of public engagement by scientists", working paper prepared for the Science for All Expert Group, Centre for Higher Education Policy Studies, Universiteit Twente

[2] Science for All Expert Group, 2010 Science for All: Report and Action Plan from the Science for All Expert Group Department for Business Innovation and Skills (The Stationery Office, London)

The authors of the review go on to explain how these changes have impacted on the public understanding of science and why it's important to communicate science to the general public.

The loss of expertise and authority of scientists

Developments in recent years have seen a significant shift in public trust of scientists. A special Eurobarometer report on Science and Technology in 2010[3] noted that within Europe the majority of citizens feel that "scientists cannot be trusted to tell the truth about controversial scientific and technological issues".

The main reason given within this report for this reduced level of trust of scientists was their increasing reliance on funding from industrial and private sources. However, other issues also have a part to play.

According to an Ipsos MORI study into Public Attitudes to Science (2011) high-levels of press coverage for major controversial scientific topics such as climate change or genetically modified foods have led to a wide degree of polarisation and uncertainty in public opinion, a situation that is made worse by high profile disagreements between 'respected' scientists on either side of the scientific argument.

Changes in the way knowledge is produced

Within the scientific sphere, research developments are arguably frequently achieved in a more interactive and interdisciplinary manner than in the past, requiring multiple inputs from different areas of expertise. In times of economic and financial difficulties it can be hard for the public to appreciate the need to invest in such research.

These changes in how knowledge is produced and in the areas of expertise that are required, can result in the public placing a lower value on science (and scientists), thereby increasing the need for communication efforts to overcome this issue.

The proliferation of sources of information and the need for improved communications

With the increased use of technology, traditional channels of communication are now being challenged. Increasingly, young people are increasingly relying on 'on demand' narrowcast media channels (Netflix, You-Tube etc.) rather than the traditional broadcast channels that parents relied on. The pace at which these developments have taken place and the proliferation of the media has also placed pressures on the science communication community to reach audiences. These changes are also coming into effect at an ever-younger age.

A deepening democratic deficit

Recent changes in the nature of decision-making processes have created a 'democratic deficit', whereby political-scientific decisions are increasingly made outside of the public arena. This is in part due to the increasing complexity of governance, and the ever-growing numbers and varieties of stakeholders and lobby groups.

[3] Eurobarometer, Science and Technology Report, June 2010

Arguably, for some people, the European Commission's increasing role in determining the direction of scientific research is creating further disconnects from local decision making. In parallel with these processes, voter apathy within many developed countries have created a disconnect between the public and democratic processes.

If citizens are to be involved in decisions about the appropriate use of such funding, traditional voting approaches to democratic engagement will no longer suffice, and alternative approaches will need to be found.

The need to re-establish a technical culture in society

Collectively, these changes point towards the need to re-establish a technical culture in society, by improving public engagement with Science and Technology.

Public Engagement with Science and Technology involves scientists and the general public working together, allowing people with varied backgrounds and scientific expertise to articulate and contribute their perspectives, ideas, knowledge, and values in response to scientific questions or science-related controversies.

The process is framed as a multi-directional dialogue among people that allows all the participants to learn.

But how can cities organise such activities? What models exist for designing such frameworks? How can cities create 'whole place' eco-systems for stimulating change?

A framework for influencing young people's career aspirations

The creation of strong 'eco-systems' for stimulating creative-tech talent in a city requires city administrations to consider carefully what the key drivers are that influence young people to pursue creative-technical careers; what the key barriers are; what 'strategic assets' the city has to work with; how they can plug delivery gaps; and how they can encourage greater partnership working in pursuit of common goals.

Partnership initiatives between schools and business

Throughout childhood and adolescence, individuals spend a substantial time in school. In response to this issue, a vast array of international, national and regional initiatives have been developed across Europe to try to increase students' interest in STEAM studies and careers. They include measures aimed at increasing students interest in creative-tech careers by, for example;

- Making STEAM lessons at school more 'fun', by developing new and improved teaching approaches;
- Giving students a better understanding of the relevance of STEAM to life through informal and formal education, linking the world of work in STEAM and the classroom;
- Engaging students in awareness-raising activities around STEAM jobs; and
- Organising STEAM fairs.

Many of the initiatives designed to inspire young people into STEAM careers are built on improving school-industry partnerships. Such partnerships promote a wide range of experiences that try to equip young people with what it's like to work in the creative-tech professions, helping students and teachers profit by gaining an

insight into the world of work, learning through first-hand experience about the needs of industry. The diagram below illustrates the different types of cooperation and actors involved in such partnerships.

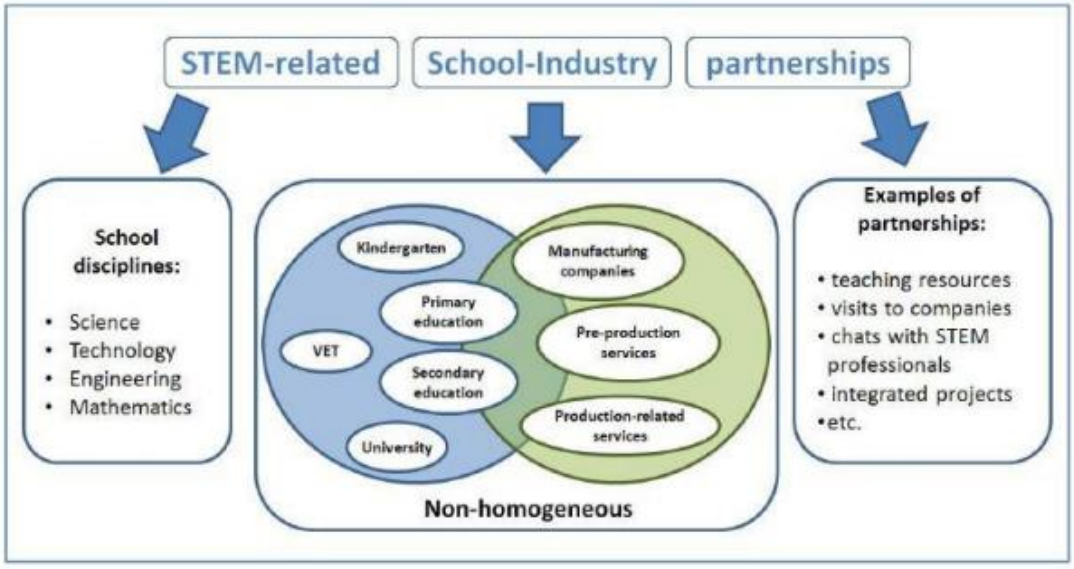

Fig. 1: Schematic of school-industry partnerships. Source: Crecim, UAB

The above framework, developed by CRECIM at the Autonomous University of Barcelona, categorises initiatives and projects according to the following factors:

A. Students' engagement in the study of STEAM in school: this factor relates to innovative approaches such as inquiry-based learning and contextualisation of STEAM topics in classroom activities, which aim to make STEAM learning a more engaging process.
B. Career information: this factor relates to initiatives that address the issue that many students have an unrealistic perception of scientific and technical careers, and hence give students more access to "real life" job information and role models in STEAM.
C. Personal characteristics: role playing, self–efficacy allowing students to understand that how their own personal characteristics might help them in STEAM studies or jobs.
D. Social perception of the industry work related to STEAM – helping students to better understand social and ethical aspects of the STEAM industry.

In terms of working arrangements, CRECIM also identified four common types of initiative:

1. Providing resources for schools to promote the improvement of scientific or technological knowledge potentially related to the company (materials, ambassadors, courses, etc.)
2. Establishing direct communication between STEM professionals and students.
3. Giving accessibility of the company premises to schools/to students.
4. Engaging STEM professionals with students' work.

Case Study: Relaunching a technical education in Bologna

In the Metropolitan Strategic Plan, a priority project was "the relaunch of technical education", which aimed to qualify technical schools and more generally to enhance connections between doing and thinking, and the ability to master even creatively technical processes - as a fundamental competence of citizenship.

The project fits into the broader “Manufacturing Renaissance" strategy, which aims to give new vigour, to the Bolognese tradition in mechanics, mechatronics and automation (whilst also considering ICT innovation).

The project is coordinated by the Metropolitan City and conducted jointly by a public-private partnership consisting of: Association of Autonomous Schools of Bologna; Aster; Bologna Chamber of Commerce; CNA Bologna; Municipality of Bologna; ITS Maker Foundation; Emilia-Romagna Region; Regional and Local Education Public Department; Unindustria Bologna; schools involved in the project.

The project started with 9 Institutes of the manufacturing area (mechanics, electronics, ICT, chemistry, graphics, logistics, fashion), very different in geographic location, size, kind of students, study courses, degree of innovation, relations systems. These Institutes formed a network and made an analysis of their educational service, identifying 4 principal areas of intervention: incoming guidance in connection with lower secondary schools, and welcome programs in early grades; partnership with companies; curricular, methodological and organizational innovation; and network activities between institutes.

Through joint working teams the 9 Institutes have come to define many improvements, including;

- ‘Open days’ in technical institutes for lower secondary school teachers;
- Promotion of technical culture in the three years of lower secondary school, with interventions and workshops conducted by upper secondary students;
- Production of facsimiles of conventions and standard procedures for the stabilization of multi-year partnerships with companies;
- Dissemination of repertoires of possible integrated activities for alternating school-work, and technical assistance for their implementation;
- Implementation of digital platforms for cooperative learning between institutes and companies;
- Realization of seminars in companies for educators (school principals, teachers, trainers, counsellors);
- Experimental curriculum integrations aimed at additional diplomas in technical;
- Activation of a “Technoragazze desk” in each Institute, managed by female teachers of technical subjects and addressed to female students or young girls interested in enrolling in technical schools.

Starting from spring 2015, the project was extended to the institutes covering accounting, finance, marketing, business information systems, international relations and tourism and, from September 2015, to food, agroindustry, buildings, environment, territory courses.

This framework provides us with an initial framework for considering how to develop creative-tech talent ecosystems, which are built upon industry-business partnerships. Whilst the number of School-Industry partnership initiatives across Europe are too many to list here, European Schoolnet and the European Roundtable of Industrialists (ERT) developed a programme, entitled the ingenious Project was a multi-stakeholder initiative to share best practice in the establishment of such school-industry partnerships. This project subsequently evolved into the STEM Alliance. In addition, the case study overleaf shows how Bologna has relaunched technical education in the city.

A process which extends beyond the school gates

However, establishing a successful 'creative-tech' eco-system to inspire young people into 'creative-tech' careers also requires cities to think more widely about **HOW** best to engage learners on a variety of levels, including:

- **In the classroom** – potentially by increasing learners interest in STEAM (Science, Technology, Engineering, Art and Maths) by enlivening STEAM lessons with new and improved teaching practices;
- **Work experiences** – potentially, in the work place, by giving learners a better understanding of the relevance of STEM to life; and engaging learners in inspiring awareness-raising activities around STEAM jobs and careers;
- **In the community** - through public engagement activities and events, like STEAM or Science fairs; and
- **In the media** – which of course is increasingly moving towards 'on demand' narrowcast communication, rather than broadcast;

All of these measures have achieved some degree of success in the past, but need to work together to create a sufficiently pervasive and impactful change campaign if they are to achieve success. However, successful 'eco-system' design also requires cities to think carefully about **WHEN** to target learners; **WHO** the key influencers of behaviour are; **WHAT** the barriers are to take up etc.

Even when sufficient consideration has been given to these issues, other factors may also come into play.

For example, evidence from a UK survey of over 9,000 pupils aged 10/11 shows that even though the majority of children enjoy science at school at this age; have parents who are supportive of them studying science; hold positive views of scientists and even undertake science-related activities in their spare time; less than 17% of them actually aspire to a career in science[4].

Studies also indicate that, after the age of 10/11, children's science attitudes start to decline (notably from ages 10-14)[5] with a further diminishing of science aspirations.

[4] 'Doing' science versus 'being' a scientist: Examining 10/11-year-old schoolchildren's constructions of science through the lens of identity. Archer, L., DeWitt, J., Osborne, J., Dillon, J., Willis, B. & Wong, B. (2010). Science Education.

[5] Attitudes towards science: A review of the literature and its implications. International Journal of Science Education

The need for a constant process of creative-tech inspiration

Collectively, this data suggests that increasing participation levels in creative-tech careers is not simply about increasing primary aged pupil's interest in science or technology, or about making the subject more 'fun'. This research suggests there is actually a disconnect between young people's science and technology interests and aspirations, with even those who enjoy the subject sometimes deciding from an early age not to pursue careers in the topic.

Research actually also shows that young people's aspirations are strongly influenced by their social backgrounds and family contexts[6], where identity and cultural factors can play a significant role in influencing young people's career choices[7]. This evidence suggests young people need to be exposed to a constant process of creative-tech inspiration if they are to consider science a 'conceivable' career option.

The importance of individual values and beliefs in influencing career choice

Numerous authors have also identified how important an individuals' expectations, values or beliefs are in influencing their behaviour. In the 1980s, Jacquelyn Eccles expanded research into so called 'expectancy-value theories' into the field of education, identifying that students' achievement and achievement related choices (e.g. career aspirations/choices) are most directly influenced psychologically by their own ability, perceived competence (e.g., expectations for success), and the subjective task 'value' individuals attach to the various available options. By subjective task value, Eccles meant;

- **Interest value** (liking or enjoyment);
- **Utility value** (the value of the task for helping to fulfil personal goals);
- **Attainment value** (the link between the task and the individual's sense of self and identity); and
- **Cost** (the anticipated psychological, economic, and social costs of various possible tasks or choices).

What this research tells us is that when individuals feel confident that they can learn and be successful in particular subject areas, they are more likely to persist and engage in these subjects more deeply.

According to Eccles, value-related beliefs are even stronger predictors of decisions and beliefs such as career aspirations and choices - both of which are heavily influenced by a highly personal 'in-person' hierarchy of expectations for success and subjective task values.

These 'expectancy-value theories' also link individual differences in motivational beliefs to experiences in school, peer, and family contexts.

Thus, Eccles and her colleagues suggest that teachers, peers, and parents are in a position to create opportunities for students to engage in a variety of STEAM and non-STEAM related activities through educational experiences,

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[6] Science aspirations, capital & family habitus: How families shape children's engagement and identification with science; Gilmartin, S. K., Li, E., & Aschbacher, P. (2006)

[7] Is science me? High school students' identities, participation and aspirations in science, engineering, and medicine. Journal of Research in Science Teaching, Brickhouse, N. W., Lowery, P., & Schultz, K. (2000).

special programs, etc. These experiences, in turn, provide young people with information about their own competence and emotional memories of various activities. Over time, feedback from these activities and memories accumulate to inform the development of competence beliefs and subjective task values, which – in turn - influence engagement in various educational activities, as well as future educational and occupational aspirations.

As educational and occupational aspirations begin to emerge and stabilize, they influence the value individuals attach to possible educational and occupational choices. Over time, these processes shape career identities and aspirations and individual educational choices. Because these psychological processes take place within larger 'eco-systems', they are also influenced by wider biological, cultural, and social processes—processes that are linked to genetic behaviour, gender stereotypes, class structures, social barriers, responsibilities and demands, and random life events.

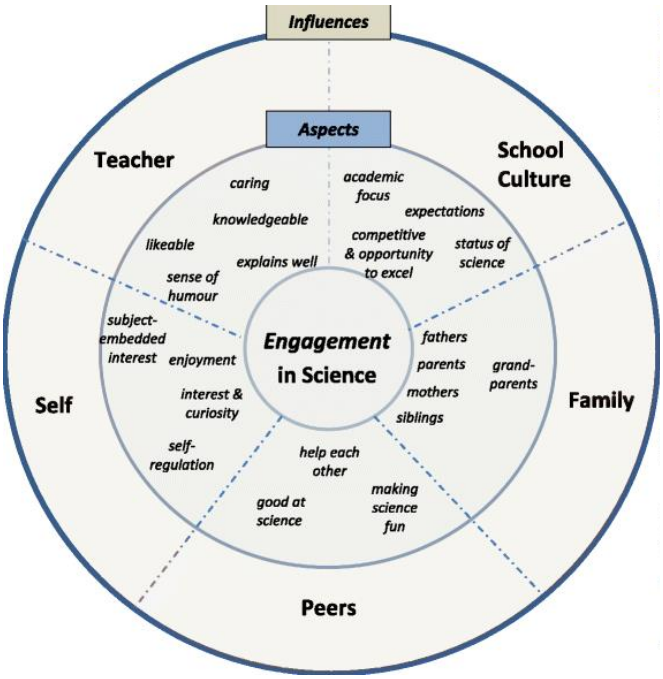

Fig.2: Factors impacting on individual's engagement in science
Adapted from Female senior secondary physics students' engagement in science: a qualitative study of constructive influences, Mary C. Oliver, Amanda Woods-McConney International Journal of STEM Education2017

For these reasons, for a creative-tech inspiration programme to be really effective, it also needs to extend beyond traditional industry-school partnerships to influence those elements shown in Fig.2, namely the individual; their peers; the teacher; the school culture; and the family. **Thus, this provides us with a more developed model for considering the first element of a potential eco-system for influencing the development of creative-tech talent.**

An example of a particular initiative in Bologna that has been designed particularly well to target young people to pursue STEAM careers – and that has developed particular service offers for the various influencers of young people – is the Golinelli Foundation, which is explained in the case study overleaf.

The role played by different influencers

Teachers expectations can affect students' self-expectations and performance, by increasing their beliefs about their own competence. However, teacher-expectancy effects are mediated by teacher-student interactions.

Case Study: The Opificio Golinelli Foundation (http://www.fondazionegolinelli.it)

The Golinelli Foundation was born in Bologna in 1988 through the vision of the entrepreneur and philanthropist Marino Golinelli.

The Golinelli Foundation is a unique example of a fully operational private foundation, inspired by the model of American philanthropic foundations, which deals in an integrated way with education, training and culture to foster the intellectual and ethical growth of young people and society with the objective to contribute to the sustainable development of the country.

One of the most important strategic goals of the Foundation is to provide young people, tomorrow's future citizens, with tools that enable them to grow responsibly, civilly and socially, encouraging the emergence of ethical behaviours, for a more cohesive society. Young people are able to develop in an innovative and competitive way in an increasingly globalized, complex, multicultural and unpredictable world.

The Golinelli Foundation believes in the hands-on approach: knowledge gained through direct experimentation. It promotes public debate-debate with scientists, researchers, communicators of science, in a public engagement logic. The activities of the Golinelli Foundation focusses in six different areas, covering different themes and involving different publics;

- The School of Ideas is the design area dedicated to children and teenagers from 12 months to 13 years old, to schools (nurseries, kindergartens, primary and secondary schools) and families. It offers interactive workshops and activities with a hands-on approach where young participants have the opportunity to experiment with science using state- of-the-art technologies and instrumentation;
- Science in practice is the design area that Fondazione Golinelli dedicates to teenagers aged 14 to 19. It aims to turn students into a passion for science and technology and is the largest "single place" experimental science laboratory for our country's educational goals. The kids have the opportunity to experience authentic hands-on experience by experimenting with innovative techniques of biotechnology, biochemistry, molecular biology, microbiology and genetics.
- Giardino delle imprese is the project area of the Golinelli Foundation, founded in 2014 with the aim of enhancing and promoting entrepreneurial culture among young people.
- The Golinelli Foundation has designed and built from 2005 to 2014, Science in the Square, the format capable of transforming cities, towns and urban areas into a temporary science centre.
- Educating to educate is the design area that the Foundation dedicates to the up- dating and the permanent formation of teachers of every order and degree. It promotes interactive and participatory learning with the aim of innovating "doing school" and involving over 3000 teachers a year.
- Art Science and Knowledge is the design area of Fondazione Golinelli that offers the public opportunities for learning and discussion on individual scientific themes of significant relevance and complexity.

Collectively these various activities are designed to target the different influences of technical culture.

Berndt & Murphy, 2002; Ryan, 2001, Wang & Eccles, 2012; and Wentzel, 1998 found that the norms and characteristics of peers profoundly influenced young people's academic achievement, beliefs, and behaviours. Garcia-Reid, 2007; Juvonen, Wang and Espinoza, 2011 found that friendships characterized by self-disclosure, pro-social behaviour, and support are linked to increased involvement in school, whereas friendships characterized by conflict, rivalry, and rejection are associated with disengagement from school.

Kindermann (1993, 2007) found that young people who associate with highly engaged peers increase their own engagement over time and Stake & Nickens, (2005) found that young people with peers who are supportive of science are more likely to imagine themselves as future scientists relative to those who do not have science-supportive peers.

Wigfield et al. (2006) and Xie & Shauman (2003) identify that the family is the most important setting outside of the school in shaping student motivational beliefs. Holland (1985) and Spera (2005) have identified that parents influence their children's academic motivation, achievement, and educational and career interests through the home environments they create, the values they endorse, and the experiences they provide.

Garcia-Coll & Pachter (2002) have shown that culture and ethnicity influence values, goals, and general belief systems, and subsequently impact parents' behaviours and children's motivations.

The role of large scale public events and 'whole place' interventions

In light of the importance that a range of stakeholders play in influencing young people's attitudes and opinions of Science, Technology and creative-tech careers, large scale public events/programmes and 'whole place' interventions (like Science Festivals, Public Debate Programmes, Smart City Programmes, Civic or Community Tech Programmes etc.) can also be particularly useful in shaping resident's attitudes towards Science and Technology (in addition to more targeted interventions between schools and business).

These kind of large scale events and interventions can play a significant role in helping shape residents understanding of the role of science and technology in their daily lives and target a range of the above influencers, to change their understanding of the role of science.

One framework which illustrates how smart city design can support the promotion of science

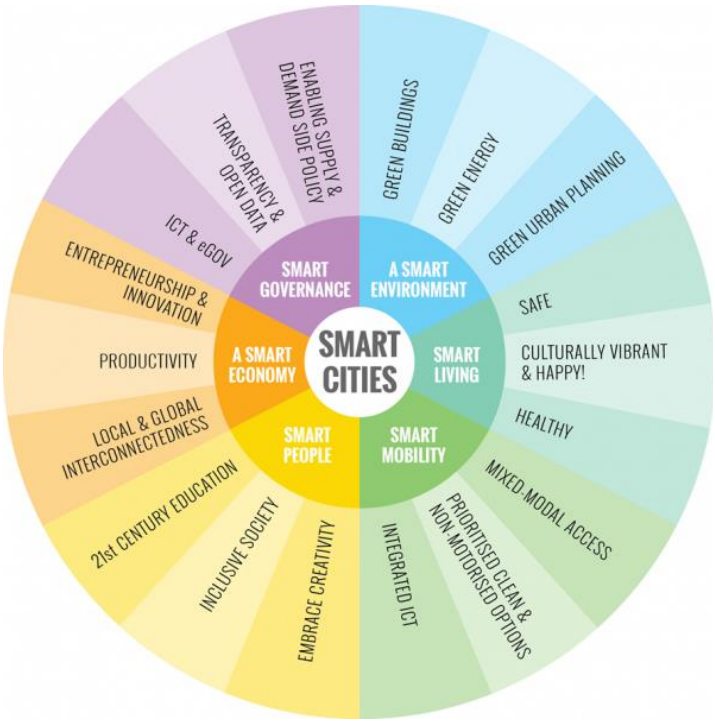

Fig.3: The Smart Cities Mandala: European Union & Giffinger et al

and technologies in cities is provided by the Smart Cities Mandala, shown opposite, which consists of six main components;

- A Smart Environment: Green buildings, green energy, green urban planning
- Smart Living: Safe, culturally vibrant and happy, healthy
- Smart Mobility: Mixed modal access, prioritised clean and non-motorised options, integrated ICT
- Smart People: 21st century education, inclusive society, embrace creativity
- Smart Economy: Entrepreneurship and innovation, productivity, local and global interconnectivity
- Smart Governance: ICT and e-Governance, transparency and open date and enabling supply and demand side policy
- This kind of framework can be useful for engaging residents in conceiving how science and technology might impact on their day to day lives and overlay the more targeted interventions aimed at young people in schools, colleges and other educational establishments.

Conclusions

- There is a range of convincing evidence to suggest that a range of cultural issues have influenced the separation of science from society, resulting in an increased need for cities to improve resident's engagement with science and technology, if they are to re-instate a technical culture in society.
- This separation is impacting on young people's career choices, potentially turning them away from creative-tech careers and potentially undermining the future prosperity of Europe.
- In order to address this market failure, cities need to actively promote science and technology to their residents to re-engage them in this important subject. Nowhere is this more important than with young people, in order to help shape their future career options.
- In this Transnational Exchange Report, we summarise the learning from a study visit to Bologna, and examine some of the potential frameworks that cities might adopt to deliver creative-tech inspiration programmes which can impact on the individual, local communities, sub-cultures and cultures.
- Ultimately, this work has concluded that cities need to design and deliver a range of partnership-based interactions, that operate at different levels within a creative-tech eco-system – rather than just thinking about the activities of their own organisation - if they are to effect genuine behaviour change in the residents of the city.
- Bologna was an ideal place to witness the different elements of an effective creative-tech ecosystem, because of its experience and maturity in delivering these kinds of programmes.

Case Study: The strategic plan to re-establish a technical culture in Bologna

One city that has established a goal to re-establish a strong technical culture in the city is Bologna.

The Strategic Plan of the Metropolitan City of Bologna (PSM) defines thegeneral, sectoral and transversal development objectivesfor the metropolitan area, in the medium and long term, identifying the intervention priorities, the resources needed to pursue them and the method of implementation.

The objectives of the PSM are;

1. **The identity of metropolitan Bologna: an ideal place to live and to develop new projects**
2. Urban and environmental regeneration for beautiful, safe and healthy cities
3. More mobility and less greenhouse gases
4. **Manufacturing, new industry and school as development engines**
5. **Bologna metropolitan as capital of cultural production and creativity. Open, free and easy access to knowledge**
6. **A fair and equal educational system from early childhood to university**
7. Health and Welfare: the well-being chain generating wealth

Eco-system policies for the promotion of technical-scientific culture include;

- An annual festival of technical culture (IV edition, October-December2017)
- Network actions for the relaunch of specific study addresses, within the Smart Specialization Strategy (S3) of Emilia-Romagna Region and in collaboration with the polytechnic network, the research and innovation system, and the production system
- Actions for the enhancement of technical culture in primary and secondary school
- Actions for the development of technical culture in a gender perspective
- Actions for the enhancement of knowledge and skills of foreign students or students of foreign origin
- Actions to promote new entrepreneurship

Within school-work experience, network projects involve schools, public bodies, companies and their associations and the third-sector in designing and effectively developing innovative and potentially durable services and/or products, responding to the social, economic and cultural development needs of communities. Policies and actions which promote active inclusion in education and training include

- Actions for young people and teenagers' wellbeing, and for contrasting training and school dropout
- Actions aimed at supporting foreign students and at developing a metropolitan governance model for the reception system for unaccompanied minors
- Actions for the integration of education and training for pupils and young people with disabilities
- Enhancement of Professional Training for teens (IeFP) in the Network of School Agencies and Services involved in the prevention of risk behaviours among adolescents.

Promotion of equal opportunities and contrast to gender stereotypes and violence in school paths include actions aimed at tackling gender stereotypes in school and training choices, and in paths for employability and work programs for schools (e.g. gender education, dissemination of good practices)

School inclusion activities which promote the development of technical culture can also involve the community in developing social inclusion incubators. In addition, in accordance with the Metropolitan Strategic Plan partners in Bologna are developing Technical Institutes, Professional Institutes and Vocational Training Centre's; promoting a Fair of ideas) and Innetworking2017 (to bring together schools, research labs and innovative start-ups)