ESCALATE

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International Adoption of the ESCALATOR Model

Report with Recommendations

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Background to the ESCALATE Project

The ESCALATE project was the subject of a successful application to Key Action 2 – Cooperation for Innovation and the Exchange of Good Practices – of the Erasmus+ programme submitted by West University of Timisoara to the Romanian National Agency. The project has been developed by six partners from five EU countries.

The aim of the project was to assist universities in implementing activities designed to increase the levels of digital competences for employability, upskilling, according with a growing range of employment generated by the digital economy, aligned with the needs of and opportunities offered by the labour market and linked to professional profiles.

The primary focus was to understand digital education disruption and to enable open-source technology and innovative solutions for both educators and students, leading to increased learning-outcomes that meet the learning needs of students whilst also being relevant to the labour market and societal needs (creating a 'better' digital future).

Our target groups were higher education institutions (HEI), education providers, teachers, learners for existing and new digital skills provision. A further target group consisted of those citizens with low levels of digital skills who were risk from digitalization -and facing a keen need to acquire the digital knowledge and use of digital technologies. We have also targeted labour market (LM) forecasters such as labour market observatories as they influence policy in this field directly.

We have therefore sought to help universities understand the scale and depths of the challenges they face from digitalisation - to enable them to formulate effective policy and education system governance - by developing and making freely available new methods and techniques in digital skills acquiring, foresighting and forecasting. We explored the state-of-the-art before developing and testing new materials.

The project has also trialled the exciting potential of new innovative 'Digital Skills Escalators' across selected regions in each partner country. This is a model whereby a region or locality can understand where there are gaps in digital education provision – and is therefore a new way to influence both policymakers and educators – seeking to fill the gaps in provision in a key economically important sector. This report summarises how this was undertaken and provides lessons and recommendations for the future adoption of the Escalator Model.

The Concept of a Skills Escalator

Skills Escalators are relatively new developments that seek to achieve the following two related, but not identical, aims.

1. To ensure a region has sufficient citizens skilled in a particular field/sector critical to economic success.
2. To ensure that the skills and training needed to enter or progress in this field/sector are available locally, at all levels.

The former can be understood as a driver of economic success and the latter is more concerned with inclusive growth. As a project we are looking specifically to develop Digital Escalators where the

skills at the 'lower end' of the qualifications can be quite generic but will link into a very specific key sectoral need at the higher end. Linked to a City or Region's 'smart specialisation'.

A good example of this is the existing Exeter Data Analytics Skills Escalator is relatively broadly defined. It encompasses topics such as:

- Statistical understanding
- Digital and programming skills
- Use of AI and high end algorithm development for the analysis of 'big data'
- The translation of environmental intelligence into new products and services and local growth.

Put simply the Escalator is a pipeline of skills, or perhaps more accurately a 'funnel of skills', linked to a specific smart specialisation sector. The fact that a significant proportion of individuals may apply these skills usefully outside the prioritised smart specialisation sector is not problematic. Having a relatively broad, and some might say flexible focus (in which the 'environmental' focus can be picked up or dropped, as convenient) enables engagement across a wide range of educational and other partner organisations and access to a wider range of opportunities.

The Escalator Model is not intended to be a fixed journey from school to Higher Education and CPD but instead is designed for people to enter and leave when necessary. Its purpose is to promote discussion, engagement and coordinated partnership activity.

The University of Exeter summarized existing practices and lessons learned from their work developing the Exeter Data Analytics Skills Escalator and passed this onto partners who then built policy and stakeholder relationships to enable testing of the model in their own region and policy landscape. The University of Exeter's Escalator Model is illustrated at the rear of the Annex (Graphic Representations of the New Escalator Models) alongside the new models developed by the partners in the project.

Use of the Escalator Model in the ESCALATE Project

Understanding the Policy context in the city/region

It was critical to first understand where responsibility lay for decisions concerning matters such as skills policy, education policy and sectoral priorities such as smart specialisation. This would be the ultimate target audience for the Escalators as they were the ones able to instigate changes. In some settings much of this was centralised making influence more complicated – but there were always key individuals and organisations that could be targeted and informed.

This required liaison with policymakers and an understanding of the economic profile of the area – and where the competitive advantage lay.

Smart Specialisations

National, regional and European-level documents and strategies were examined for each geography to establish the smart specialisations that would be most important to securing long-term high-quality jobs in the region. Of these the partners sought to identify the one sector where the region had a particular strength and where ensuring an effective skills pipeline was most needed.

It is worth noting that these did not need to be large formal sectors - but could be something more specific such as 'photonics' or 'marine biosciences'.

Education and Skills Priorities

European Regions have existing education and skills strategies that will target significant sectoral developments/investments, areas of perceived under-performance and potential future strengths to ensure enterprises have access to the skills they need.

Partners therefore explored their region's education and skills strategic priorities impacting on their chosen smart specialisation sector. This necessitated building relationships with the policymakers who will be critical to implementing the final recommendations from the Escalator work. They were able to identify and describe the parallel regional and local policies that could impact on the Escalator.

As well as policymakers the partners engaged with other important stakeholders critical to driving developments – notably other education institutions, employers and employer representative groups and trade unions. It was also important to identify national priorities influencing the chosen sector.

Mapping of the Smart Specialisation Skills

Each country having identified their own smart specialisation sector – critical to jobs and economic success in their region – needed then to map the regions 'smart specialisation skills pipeline' – which is an attempt to map the sector critical education provided from school age to the workplace. This includes:

- academic and vocational qualifications at all levels
- adult education and CPD opportunities
- mapping regional training providers
- identifying if external (non-local) providers are active in this sector in the region

This was done as it was pivotal to ensure that residents in each of the regions involved could benefit from the growth of the smart specialisation sector is an important part of the 'Escalator' concept. We envisage, based on existing experiences - that the Escalator includes elements both of traditional digital inclusion whilst also recognizing the sector has real potential for jobs growth in good quality, well paid vocations.

Each partner mapped details on activities around:

- What smart specialisation digital skills are taught at all levels / ages of schooling
- What smart specialisation digital skills are taught at Colleges
- What smart specialisation digital skills are taught at Universities
- What CPD opportunities are available – especially in your smart specialisation digital sector
- How is the region raising young peoples' awareness, interest and attainment in digital skills and careers
- Where there are smart specialisation digital skills gaps in the workplace (and exploring mechanisms to fill these)
- How is the region seeking to ensure smart specialisation appropriate digital skills are delivered across a region's schools

- Are there models of workplace assessment for the smart specialisation digital skills weaknesses? What are they?
- Is there community delivery of smart specialisation digital skills for digital inclusion? What form do they take (ESF etc.)?
- Is the region ensuring growing access to vocational and academic courses in smart specialisation digital skills at school and 16-18 levels
- Is the region encouraging 'retention' for those taking digital qualifications – and how?
- Are universities aware of the priority sector and training graduates and postgraduates for it? If yes – how?
- Are universities encouraging placements and internships opportunities in the sector

Establish Escalator partners

The partners needed to build relationships with a number of stakeholders to help ensure impact form their work – and initially to confirm the choice of the smart specialisation sector. This included:

- Policymakers at various levels
- VET Providers
- HEIs
- Education and Training organisations
- Unions
- Economic development agencies

Identify Aligned Investments

The literature and policy review work that supported the choice of smart specialisation sector also identified some of the aligned investments that could add value to the Escalator proposition. It also identified where similar innovations and activities in the region existed and who else was active in this topic. Other investments included where private sector and public sector interventions were taking place.

Model creation

The Escalator Models (Annex) included all levels of academic and vocational learning and is designed to help establish where there is:

- A gap in provision regionally that is holding back the sector
- Insufficient provision or variety of provision (with similar consequences to the above)
- Duplications in provision
- Inappropriate provision

Regional variations

The table below summarises the sectors and regions covered in the pilots:

Country	**Region**	**Smart Specialisation Role**
Romania	Timis County	Software Development
Germany	Saxony-Anhalt	Medical Technology
Spain	Basque Region	Digital skills in the Circular Economy
Italy	Lombardy Region	Data Scientist
Scotland	Stirling Sub-Region	Cyber Security Analytics
England	Greater Exeter Region	Climate/Life Data Analytics

Lessons from the International Trials

In this section we explore what was learnt by the partners as they trialled this new approach in their own regions, working in distinct new sectors and with differing demographics, geographies and policy environments. We also explore the rational for smart specialisation choices.

Choice of Smart Specialisation Skill

Stirling Sub-Region, Scotland

The global cyber security workforce is a fast-growing area of well-paid jobs (salaries £22-90,000 in Scotland), with an estimated required growth of around 89% in the next few years[1]. In Europe alone the job shortage is 168,000 with similar shortages and high growth requirements likely in the UK, Scotland and Stirling.

Cyber security was chosen as the smart specialisation sector as it is a growing area of digital skills at both regional and national levels, as well as internationally. Estimates indicate that there is a cyber security shortage of over 3 million, almost as many as currently work in the field (3.5 million). Our data suggests that the global cybersecurity workforce needs to grow by 89% to effectively defend organizations critical assets.

Education institutions were responding in different ways with the newer universities, for example, offering more 'cyber Security' courses whilst the more traditional universities still taught Data Science. Nonetheless nationally (Scotland) there was still a very strong steer towards greater Cyber Security training and courses.

Employers revealed that they needed employees with experience rather than just graduates and consequently poached employees from other enterprises. A clear need for internships, placements and higher-level apprenticeships would appear to be a rational response to this.

Within the broad area of cyber security, specific needs in the next two years were estimated to include: cloud computing security (40%); risk assessment, analysis and management (28%); security analysis (28%); and governance, risk management and compliance (26%)" (p. 35). These are positioned near the top of the Skills Escalator. A challenge therefore was - how people can be assisted to develop skills in order to progress towards these types of jobs from lower skills levels? In addition to high level skills, basic general cyber security is needed by all staff using digital technology across the economy and society.

Timis County, Romania

Romania chose the Software development sector, which is important for employment, but also a sector suffering from a large external migration. The emergence and subsequent fast-growth of the regional software development sector has been sustainable in the past due to the presence of a pre-existing high skilled labour force with an established network of employers in the sector.

Quarterly research by the Regional Labour Market Observatory (2020) analysing online job vacancies also identified ICT as one of the most dynamic sectors for Timis county. Simultaneously, software developer was identified as one of the most needed positions in the ICT sector for Timis County's labour market.

[1] ISC2 Cybersecurity Workforce Study, 2020

Software development was chosen following desk research and informal interviews with employers in the sector. The automotive sector is also large regionally, but importantly - also required software development skills in increasing volumes. The more targeted (top of the escalator) sector is probably automotive related software development - this is a rapidly growing sector with two universities that specialise in informatics. This has led to a number of relocations including Oracle, Microsoft and IBM.

Interestingly the new major employers mainly provide their own training to employees – and do not tend to need higher than degree level posts. As there is a shortage of the graduates they need, they employ students without informatics background - from many faculties - including social sciences and humanities. Indicating a regional shortage of suitably skilled people.

Saxony-Anhalt, Germany

Medical technology was chosen as the smart specialisation sector because it is an industry that is one of the growth sectors internationally and nationally and there has been a particular push in recent years to create structures to promote this industry in the state of Saxony-Anhalt. As subpart of the health sector, medical technology is also characterised by innovation and digitalisation dynamics. At the same time, there are also overlaps with the state's initiatives to shape the digital transformation and to promote the development of digital skills in addition to cooperation structures between business and science.

To prepare for the European Union's Structural Funds period, the state government of Saxony-Anhalt summarised the framework for action in a "Saxony-Anhalt Regional Innovation Strategy 2014-2020" in 2013. This outlines the state's contribution to achieving the overarching goals of the Europe 2020 Strategy: "smart", "sustainable" and "socially inclusive" growth. Within the framework of the Regional Innovation Strategy, important lead and growth markets were identified for Saxony-Anhalt in 2014 on the basis of the existing core competences and specialisation advantages in the field of science and business and with a view to the future global challenges for the state. One of these lead markets is the field of "Health and Medicine" which is also to be strengthened in the new innovation strategy of the state of Saxony-Anhalt until 2027 through the promotion of research projects, knowledge transfer and infrastructure. Medical technology is taking an increasingly important place within the lead market of "health and medicine".

- Around 120 companies are active in the medtech market in Saxony-Anhalt - from small and medium-sized enterprises to global players. The portfolio ranges from production (e. g. plastic tubes, diagnostic detectors, ambulances, cryogenics) to hardware and software (e. g. medical imaging, telemedicine) to services (e. g. gas sterilisation, medical device propagation, distribution).
- In the Halberstadt region, the focus is on plastics. The location has cluster potential.
- The focus at the Neuromedizin-Zentrum Magdeburg is the development of state-of-the-art medical technology devices.
- Cooperation between science, research and companies is increasingly taking place via specific medical technology networks and clusters (Cluster Med-Tech, Stimulate, InnoMed)

Basque Region, Spain

The Basque Government were very involved in the work of the project in Spain and were pivotal in selecting Circular economy sector as the key smart specialisation sector that they are pursuing. This

is a major priority sector for the Basque Government. At the national level it is also a priority sector that government is pursuing.

Within this rapidly expanding sector there is a need for underpinning skills in data analysis and data analytics. Interviews with policymakers stressed concerns as to how digitalisation could help support the move to adopt the circular economy within local enterprises. There was a particular concern that many companies did not understand where their skills gaps and needs were – and that linkages with digitalisation would be key to alleviating problems and encouraging the take up of the kind of roles needed regionally.

Lombardy Region, Italy

In contrast to the Basque Government/Policy driven work in Bilbao, the work in Lombardy was very much driven from the perspective of pressing employer need. In Lombardy the partner chose the smart specialisation skill of "Data scientist" – which was very much in high demand in the region – which was evidenced through labour market investigations, literature research and interviews with employers. Data Scientists were finding their entry into work was very swift and there was considerable divergence from what would more typically be called 'data analysts'.

The partners found it difficult to engage with policymakers who were less willing to talk about specifics and the needs of particular employers and sectors. Nonetheless, the partner found that education providers – most notably universities – were aware of the needs of the sector and were themselves responding with an increasing offer (by size and diversification). This offer stressed digital skills within the curriculum and more higher level degrees in particular.

Within the region Pirelli were first company of scale to develop the roles of Data Scientist and along with Microsoft they have both initiated conversations with universities to help ensure there are sufficient data Scientists entering the labour market. Microsoft now finances the PhD courses of around 100 data scientists at PhD level.

The partner found that despite the clear labour market need there was still a lack of definition of this role and profile and that the existing pre-university education curriculum was not very dynamic and it was difficult to introduce new elements or to teach in new ways.

Exeter Sub-Region, England

Data Analytics skills were chosen in Exeter – with a particular link at higher levels to Life Sciences and Environmental Intelligence. This was the logical choice as the sub-region has a globally significant employer (Met Office) which provides much of the weather data globally along with a cluster of supply chains, data analytics employers and a University with a specialisation in Green Futures and Environmental Intelligence.

As the developer of the Escalator Model the University of Exeter was able to guide and lead the partners as they sought to choose their own key sector and to map the relevant partners, stakeholders, interventions and education and training offer.

Stakeholder Engagement

On the whole partners had considerable success in engaging stakeholders and the key policy and employer contacts necessary to progress the development of the Escalators.

In Scotland “Everyone was really forthcoming” and partners found the Scottish Government, in particular, was very open to discussions and freely provided the information and contacts that they needed. Partners felt that the topic was very much the right one and consequently policymakers were listening. Discussions in Scotland involved the Trade Unions who also welcomed the fact that skills development and better jobs were at the heart of the work. Discussions with stakeholders were broad and included work-based and Further Education/VET provision.

In Romania the stakeholders were very much either employers (some large such as Continental Tyres, Flextronic and Delphi) or regional policymakers. Employer conversations targeted Human Resources and associated research centres. Partners also spoke to the Regional Development Agency (which covers 4 counties) and was funded by policymakers. They spoke to Romanian Trade Unions with national confederations and targeted ones that knew about their own specific geography. They concluded that all conversations had been helpful, but the large companies had the best information on what the immediate needs were - and where they couldn’t get certain skills and graduates. Policymakers were slightly less informed/engaged - citing the mobility of the workforce in this sector. The Regional Development Agency was helpful as it did not have a particular political position or driver. There was clearly a major employer appetite for engaging with this topic and companies were very interested - suggesting the need for more round tables, seminars and workshops to explore this and related skills topics.

In Lombardy, the partners spoke to employers, unions, educator and policymakers. They found little easy engagement with policy levels as policy itself did not seem to be ‘data/evidence driven’. Consequently, they had to engage directly with employers in particular. It was helpful that the partner university in Italy already had strong relationships with a number of major employers. Unfortunately the lack of engagement from policy is a potential barrier to change as there is insufficient flexibility in degree level (and below) delivery – limiting how education providers can respond.

In Spain, the partners spoke extensively to policymakers in the Environmental Agency of Basque Government and the Qualifications Agency (vocational). Further, they brokered relationships with the person responsible for the development of the Circular Economy in the Basque region and with the person from the digitalisation strategy within the University of the Basque Country. They consulted extensively with both employers and employer representatives. Finally, they also spoke with Mondragon Group (Europe’s largest cooperative) – as they are interested in similar developments around the circular economy. Partners recognised that the key strength in choosing this sector was the fit to policy priorities and stakeholders understood how there was a need for new courses and new styles of delivery. Providers were positive about the potential linkages between digitalisation and the circular economy.

In Germany, the following stakeholders and interested parties were consulted and will be involved in the future as part of deeper discussions and implementation of the ideas behind the Escalator model. The key stakeholders were:

Policy stakeholder:

- State capital Magdeburg
- Ministry of Economy and Ministry of Education of Saxony-Anhalt

Economy/networks:

- AWSA - Employers' and Business Associations Saxony-Anhalt e. V.
- Chamber of Commerce and Industry, IHK
- Association of German Engineers, Saxony-Anhalt Regional Office
- Association of the IT and Multimedia Industry Saxony-Anhalt e. V.
  - Cluster Med-Tech, Medical Technology Cluster of the State of Saxony-Anhalt
  - Stimulate, Research Campus
  - InnoMed e.V.

In terms of education sector, the partners focussed primarily on consultations with the universities in Saxony-Anhalt – in the corresponding faculties.

In England, when establishing the original escalator, the key stakeholders were quickly identified as being the local authority (Exeter City Council), Exeter College (which is the main provider of both VET and 16-18 years education), the University of Exeter and a number of important large employers, most notably the Met Office and Oxygen House – both of whom had struggled to recruit suitably skilled staff – citing data analytics as the key obstacle to recruitment. Extensive mapping and conversations led by the University of Exeter led to the first iteration of the Escalator graphic. This directly led to investments and new delivery in a diverse number of areas as diverse as Degree Apprenticeships, Digital Bootcamps and Data Science PhDs.

Labour Market Analysis

Partners were selected based on a recognised ability to analyse the labour market, with a number being in the ENRLMM international network for regional labour market experts. Partners relied on the following for their analysis of what was being delivered and where the gaps were:

- Available national, regional and European reports
- Details of pay scales and remuneration by sector
- Skills Ovate and Skills Panorama
- National Skills leads (typically within Education Departments)
- Discussions with stakeholders
- Academic and research surveys
- National and regional surveys
- Regional Development Agencies
- VET providers
- Sector experts
- Education institutions

Taking the Escalator Models forward

In this section we explore where the opportunities to take the Escalator work forward exist and where some of the barriers are. The policymakers and those consulted as part of devising the escalators have already received the final drafts to help with their work in the Smart Specialisation sectors.

In Scotland the greatest scope for activity would appear to be within the larger local authorities – many of whom who have strategies in related areas. There are clusters of cyber security organisation in cities such as Glasgow and Edinburgh. At the national level, the Scottish Government has expressed a desire to develop and grow this field independent of UK government priorities.

Dundee is also a potential location given its internationally significant concentration of jobs in the computer-game sector. Consideration was also given to a more national model that sought to use the Escalator to drive content that could be accessed by smaller enterprises for whom cyber security was a key issue, but support was often hard to find or prohibitively expensive.

The partners in Scotland felt that a larger study and a greater number and range of employers, employees, students, potential students, educationalists, trainers and policy makers would probably raise more issues and help the unpacking of issues raised. In addition, the geographic focus could be expanded to Central Scotland, and indeed all of Scotland, especially given the inter-inter-connectedness of so many areas.

In Romania the partners had successfully engaged with policymakers in the City administration and though this had taken sometime there was considerable interest in the model and how it could be used to help boost jobs in the local economy. The university too was interested in building on existing delivery. The universities in Timisoara attract students from the broader region and therefore have a role in linking people into the major smart specialisation sectors. Software Developer jobs are better paid than most locally and nationally and have highest salaries in Romanian economy - this attracts graduates from other subjects, indeed some do degrees in subjects such as sociology - then do a 1 year's course after being recruited into the software sector. A major driver for the work remains the migration to Bucharest and further afield which is considerable – with those in the sector receiving considerable financial uplift on relocation.

In Italy the major obstacle to moving forward was the lack of interest in skills within the policy structures of the region. Nonetheless they are confident that working with employers and the university of Milano-Bicocca they can take forward the model as a good practice and seek to influence the availability of higher-level qualifications.

In the Basque region partners can probably take the work forward through a number of initiatives in the sector – including one to 'train the trainers'. Universities in the region also saw the potential to modify their curricula and new regional initiatives already exist to facilitate such modification in the Circular Economy. There are also initiatives to help boost the skills in existing businesses via existing sectoral bodies such as the Basque Circular Hub. They can also look at mature companies too. There is a circular economy classroom to initiate and develop a collaborative project to involve as many professionals as possible. The uni will launch a new offer joint with business offer linked with VET for businesses and adults in work.

In Germany the Escalate partners have identified that the Federal Ministry of Education and Research is seeking to fund projects on the topic of "Research for the development of competences for a digitally shaped world". This opens up opportunities for the further development of the Escalator model. It is the intention of the partners to continue to utilise the Escalator model in the medical technology sector - in order to research the topic of the structured development and promotion of digital competences (in partnership with other regional stakeholders).

In England (Exeter sub-region) the model has become firmly established as a route to growing and expanding the quantity and quality of jobs in data analytics and life/environmental sciences. The Escalator has been used as key indicator for how regional partners can collaborate within new regional Civic University Agreements (CUA). As well as continuing to grow the Data Analytics Escalator the CUA partners are now committed to creating a new escalator in the Health sector – where there are persistent skills gaps and vacancies.

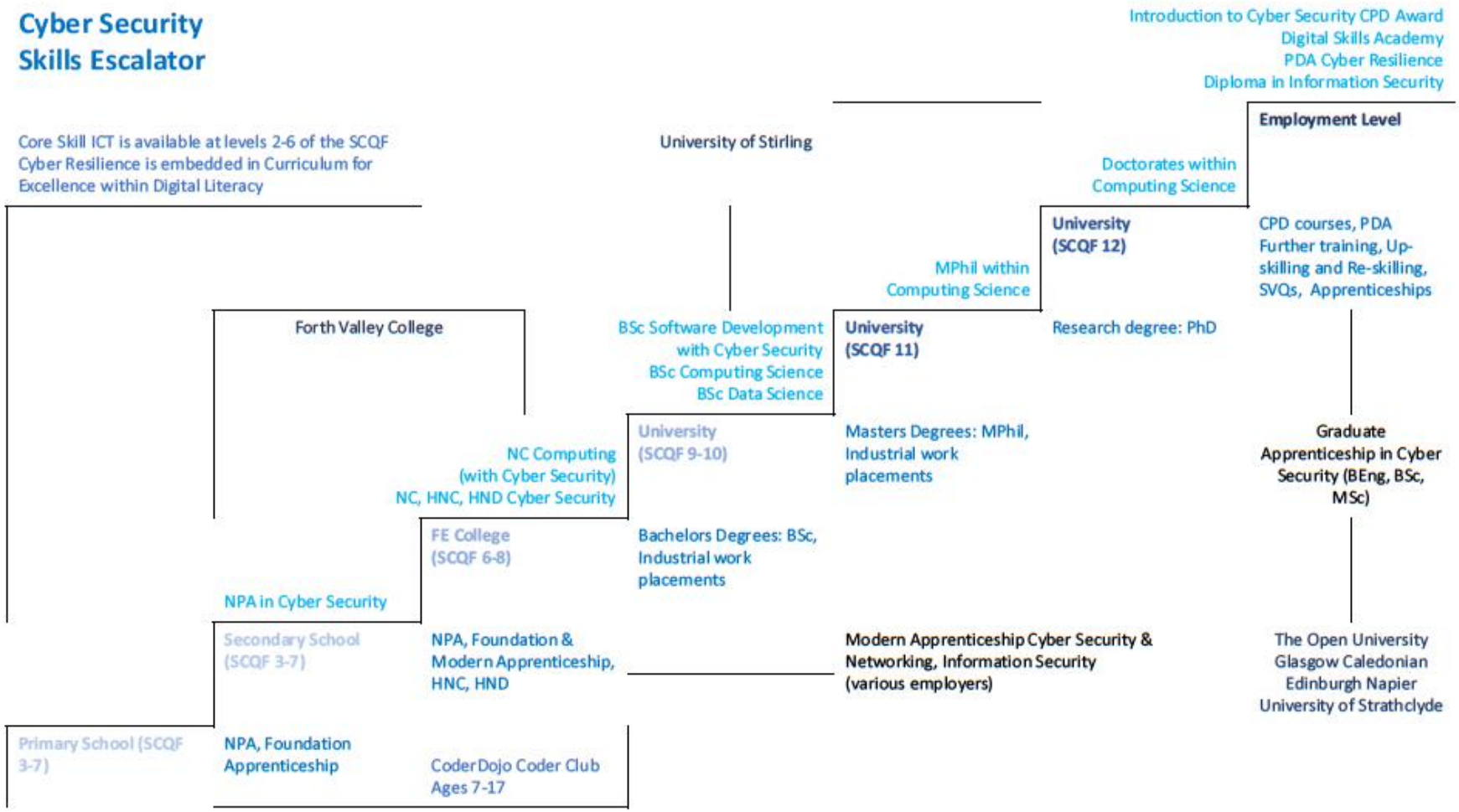
Recommendations for Future Users of Escalator Models

The partners identified the following lessons, based on their own experiences for those looking to utilise this new model:

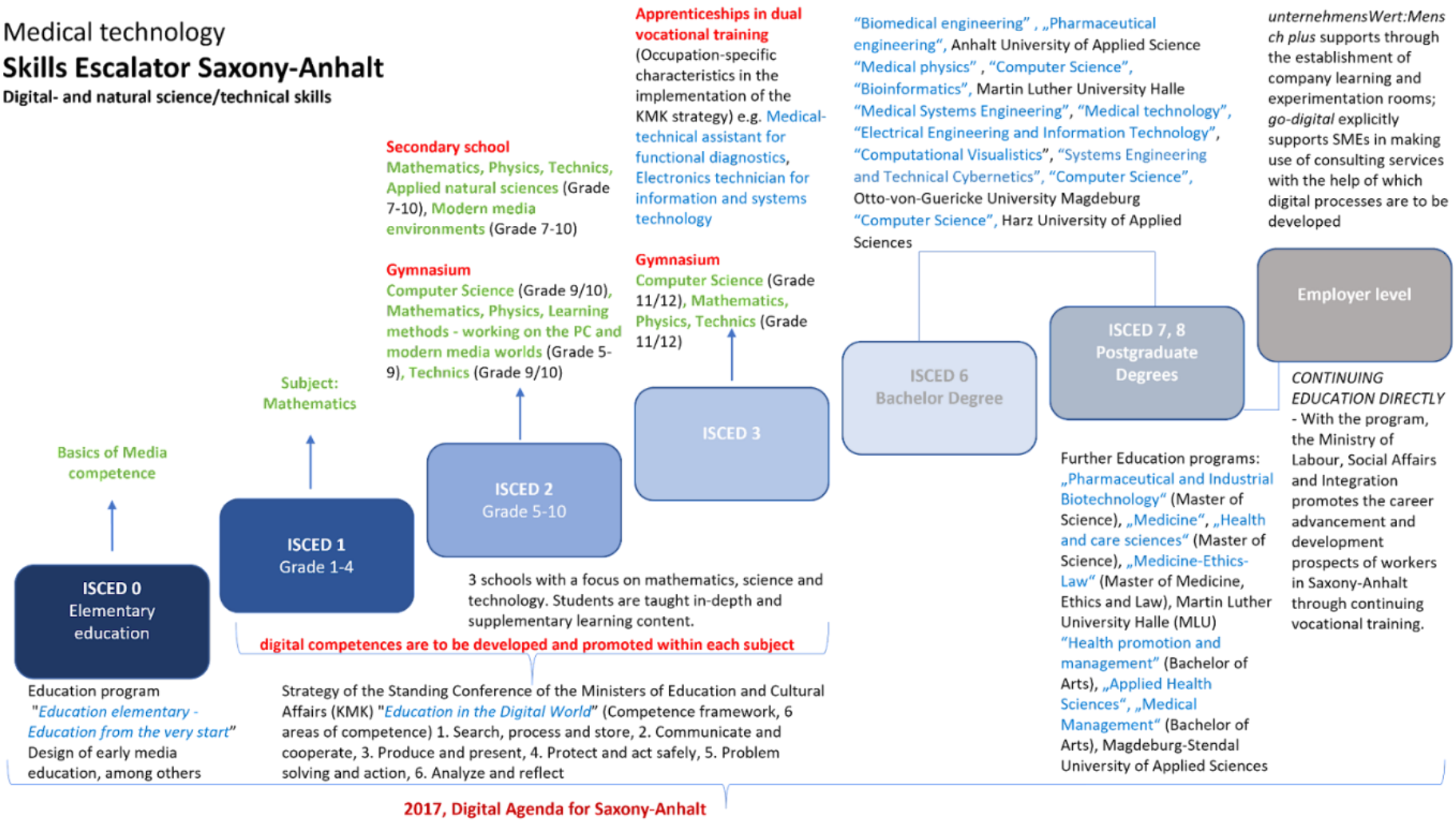
1. Be sure to start with a short survey or series of meetings to establish institutional demand and support for the work, as this will be critical to success later. Win the arguments for action early – the Escalator is then the approach for achieving these (and identifying which actions are most needed.
2. Ensure you spend sufficient time on intelligence gathering. You need to know exactly what is already there and what is missing – to gain the trust of stakeholders. Try to collect data at the regional area in a very systematic way with workshops, qualitative interviews and possibly questionnaires.
3. Use employers to demonstrate what are the essential skills they need in your smart specialisation sector.
4. Ensure the lifelong learning element is present in the Escalator.
5. If possible, speak or survey those who are already working in these jobs.
6. Perhaps provide a specialised network or Task and Finish Group to explore the education ecosystem in the County and to make recommendations.
7. Bring together policymakers from different parts of regional governance (smart specialisation and digitalisation for example) as this often doesn't normally happen – but working across 'silos' is often key.
8. Be thinking about how the results are taken forward from the very start.
9. It can be very difficult to make general statements about the development of digital skills in large sectors. The Escalator model is therefore likely to be more appropriate for concrete and specific activities and vocations in terms of understanding its orientation and of visual representation. Therefore, it could be better to differentiate between individual areas of activity in the context of a new or expanded creation of the Escalator model in relation to some larger sectors.

ANNEX Graphic Representations of the New Escalator Models

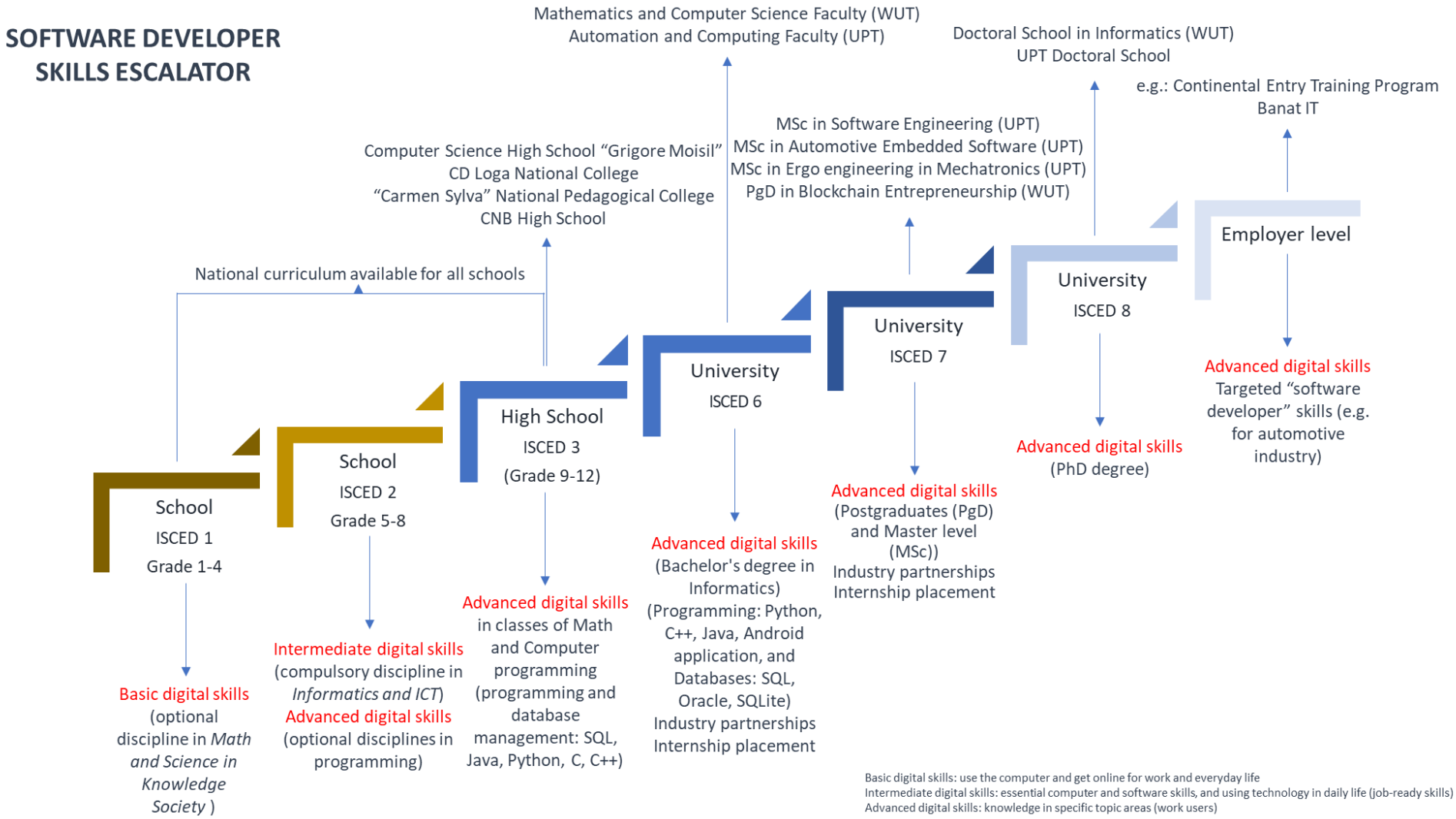
Cyber Security Escalator for Stirling, Scotland



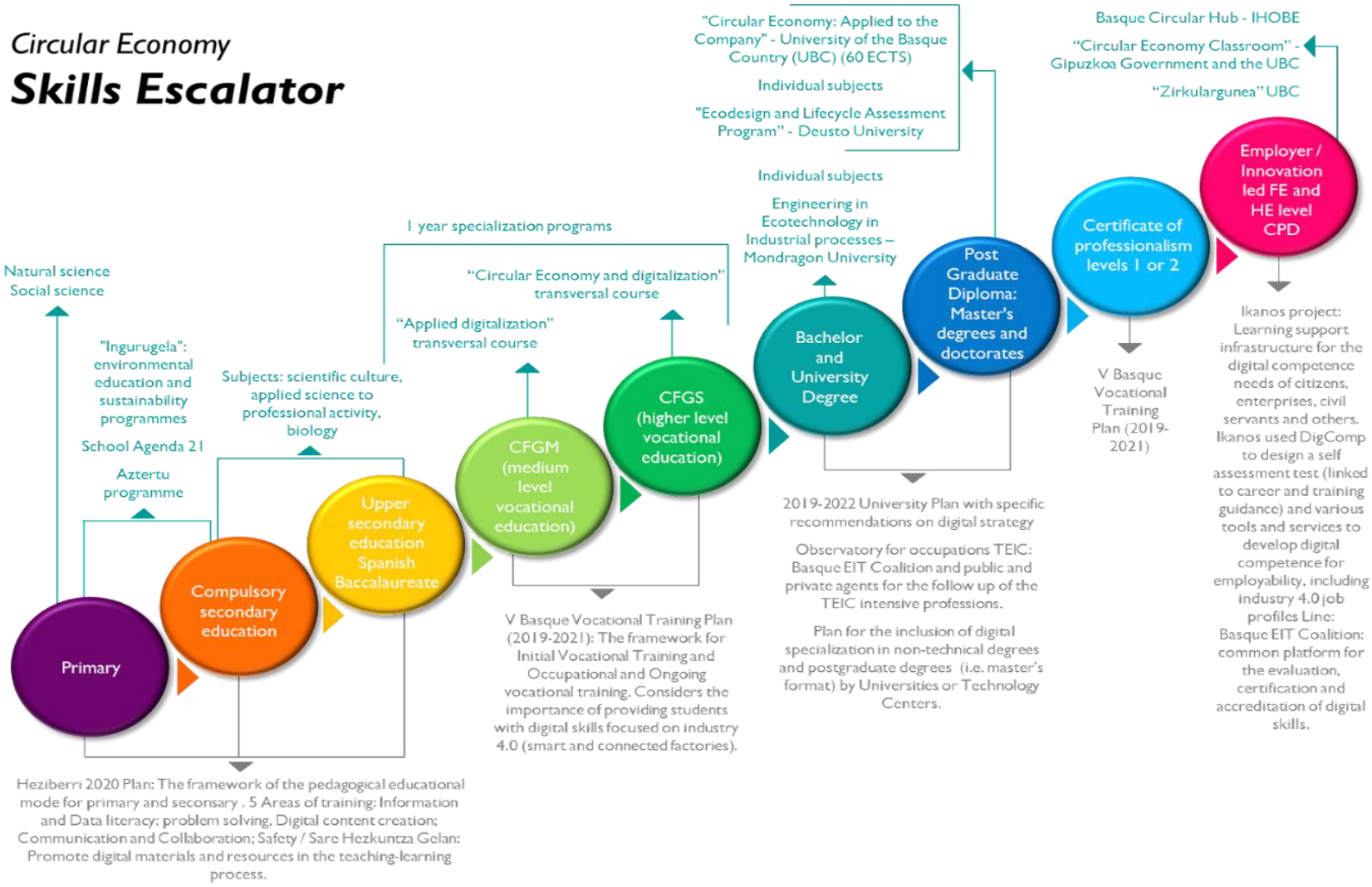
Medical Technology Escalator for Saxony-Anhalt, Germany



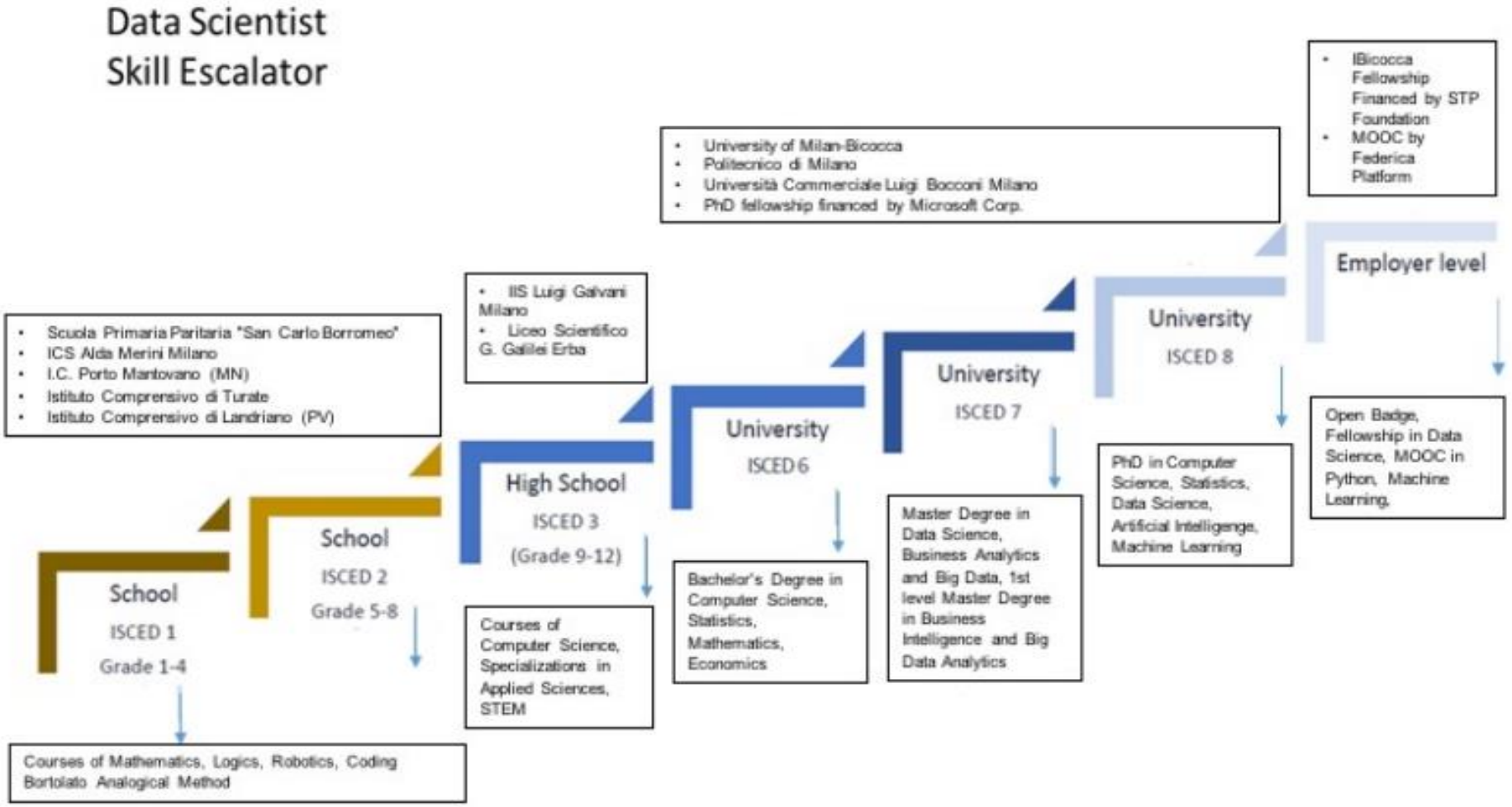
Software Developer Escalator for Timis County, Romania



Circular Economy Escalator for Basque Region, Spain



Data Scientist Escalator for Lombardy Region, Italy



Updated Data Analytics Skills Escalator for Exeter, England