



Report of the High-Level Review Committee

Review of the National Digital Competences
Initiative, Portugal INCoDE.2030

December 2019

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1. Introduction

In 2019, Manuel Heitor, Minister of Science, Technology and Higher Education initiated the creation of the INCoDe.2030 High Level Review Committee (HLRC) on the following basis:

“INCoDe.2030 requires a continuous assessment and external peer review in international comparison and making use of the best criteria and international practices. The goal [of the HLRC] is to visit Portugal, one or twice a year, to review a few projects and activities, and help the management of INCoDe.2030 to move forward and guarantee a continuous upgrade, as well as to achieve the goal of digital leadership in a few areas by 2030.”

The inaugural High-Level Review Committee for INCoDe.2030 panel members, and co-authors of this review, are:

- **Laurent Crouzet**
French Ministry for Higher Education Research and Innovation,
General Directorate for Research and Innovation,
Head of Digital Services and Infrastructures Department
- **Donatella Castelli**
National Research Council of Italy (CNR),
Istituto di Scienza e Tecnologie dell’Informazione “A. Faedo”,
Head of the Networked Multimedia Systems Lab
- **Nora McGregor**
British Library,
Digital Scholarship Department,
Digital Curator

Over the course of three intensive days in June 2019, the committee visited a number of representative projects from across the five Axis. For details of this visit, see “Appendix A: Preparing the visit of the High Level Group that will assess the activities of INCoDe.2030”. Mindful of the constraints inherent in such a short visit, and that meeting with all key coordinators of the Axes, and projects within them, was not possible in this time, where the High Level Review Committee has offered specific recommendations at individual Axis level such advices are provided solely within the context afforded by this review visit.

The HLRC provide here programme level recommendations in the following areas:

- Vision & Axis
- Strategy & Action Planning
- Organisation & Resources

2. Findings and further context to recommendations

2.1. Vision & Axis (Action Lines)

A strong digital economy is vital for innovation, growth, jobs and the competitiveness of a country. Emerging, increasingly pervasive, digital technologies may lay the ground for new types of jobs, thus strongly influencing the potential growth of the labor market, but a

workforce with appropriate digital skilling is required to truly capitalize on such opportunities. This requires not only increasing the number, and supporting the development of, more skilled professionals for the Information & Communication Technology sector, but across all sectors of society, from healthcare, education, arts & culture, business and finance, to charities and the environment. Individuals and organizations must be able to appropriately understand, exploit and often also to contribute to new available technologies in their own sectors and to change their working practices appropriately. Moreover, every citizen needs to have at least basic digital skills in order to live, work, learn and participate in an evolving society that is progressively more influenced by these technologies. Addressing this important digital skills challenge requires both a long-term strategy but also immediate actions to face the already fast-changing economy.

INCoDe.2030's vision is robust and clearly articulates the main challenges the nation faces in digital reskilling and upskilling, outlining three particular goals¹:

- Stimulate employability and professional training and specialisation in digital technologies and applications, in order to respond to an increasing market demand and to promote qualified jobs in a higher value added economy;
- Generalise digital access, use and literacy, in order to fully exercise citizenship and to promote inclusion in an increasingly dematerialised society, where many social interactions happen on the internet and are increasingly mediated by electronic devices;
- Ensure strong participation in international R&D networks and the production of knowledge in digital areas.

The INCoDe.2030 initiative can be seen as an important coordinator working across the Axis to bring together, and to light, different initiatives and projects aimed at meeting these challenges. By acting as a useful connector and intermediary, it is in a powerful position to facilitate the networking, cross-disciplinary knowledge exchange and sharing of best practices, experiences and material so crucial to meeting this vision.

Recommendation 1: INCoDe.2030 should benefit from continuous support from Government.

The magnitude of the digital skills challenge requires a long-term strategy. INCoDe.2030 is a young initiative in a context in which the experiences, also in other parts of the world, are not yet consolidated. The committee has been very impressed with the articulation of the INCoDe.2030 vision, and the number of activities already underway across all Axis of the program in order to meet that vision. Further time, support and investment from Government, is required to further organize and embed the process at national level to achieve this vision.

Recommendation 2: keep focusing efforts on supporting and bolstering cross-disciplinary and cross-sector networking activities across all Axis.

¹ https://www.incode2030.gov.pt/sites/default/files/portugal_incode_en_web_single_0.pdf

The HLRC notes that INCoDe.2030 has proven, in particular, to be an effective umbrella under which relationships between different entities (Industry and Education for example) have been successfully brokered. By anticipating and analyzing skills needs and developing new partnerships between schools, research institutions, industries and public administrations INCoDe2030 is concretely acting to address this challenge.

Recommendation 3: play a central role in capturing project details, best practices and other useful resources from initiatives underway across the Axes and turning this into actionable data.

The committee notes that INCoDe.2030 provides a unique vantage point from which the exceptional work of the many Axis and associated Ministries can be seen, acknowledged and best practices shared. The HLRC therefore recommends the initiative focus on the development of activities and actions that strengthen and leverage this position, supporting the aims and goals of individual Axis with the resources and expertise extant across all, to a singular end. For instance, the INCoDe.2030 Project team is in an ideal position to create and maintain a Web accessible and searchable catalogue of INCoDe.2030 initiatives, turning this into actionable data. Each initiative, from the Creative Communities for Inclusion (CCDI) pilot project in Barcelos supporting Roma women to access the internet, to the Mobile Learning of Mathematics with the MILAGE Learn+ platform, should be described with a minimal set of common metadata to facilitate knowledge search and exchange and thus, wider adoption. Through this project catalogue, anyone looking for resources to plan a new initiative or implement an existing one, would be facilitated in finding the necessary resources, including contacts, efficiently. Putting in place better mechanisms for knowledge sharing across the initiatives, increases the potential for economies of scale to be achieved in the rolling out of digital skill initiatives across the country. For example, with proper coordination, the HLRC noted Inclusion activities and pilots currently underway could access best practices from similar initiatives undertaken in other Axes previously. Conversely, new Inclusion initiatives could promote investment in existing Library infrastructure in order to leverage this system already in place, complementing existing digital inclusion initiatives in that sector and providing an opportunity for a wide and efficient rollout of its important initiatives.

Recommendation 4: the Axes must be reviewed regularly as part of the Strategic planning exercises (see Recommendation 15 and 16) to ensure they are relevant and meeting the needs of the initiative.

The current Axes (Inclusion, Education, Qualification, Specialization, Research) are robust, researched and designed to cover needs across sectors of a population that differs for education, age, and employment conditions. The distribution in these sectors and the needs associated with them are expected to evolve however, as useful interventions, for instance in the educational system and societal conditions, are made over time. It is thus important that Axes are not interpreted as fixed action lines but rather as a useful way to structure and organize the different actions at a time, with a view that how such actions are organized and amplified in the future may necessarily change over the course of the programme to reflect new priorities.

Recommendation 5: ensure concrete actions to address the important issues such as gender balance, and unconscious bias, are enacted across all Axes, not only Inclusion.

The INCoDe.2030 vision is to be lauded for its human centric approach that acknowledges the sociological and economic elements of building digital skills. The committee recommends this remains clearly articulated and bolstered through expanding activities that address barriers to inclusion across all Axes. It is essential for practical strategies to be addressed formally at all levels and across all Axes. In particular, working to put into action the latest research and advice from European-level inclusion initiatives, such as the European Commission Women in Digital initiative, could see INCoDe.2030 play a groundbreaking role in ensuring equal access to digital skills and opportunities across the country²

Recommendation 6: explicitly include data sharing, management and exploitation across all the axes as these specific ICT skills will become mandatory in all research areas (data-driven research) and innovation (data economy).

Big data are giving rise to a new economy and are view as “the fuel of the future”. Data-driven services are now being developed to serve a large variety of sectors and for serving a variety of purposes, from embedding intelligence in ICT tools, to support decision making processes, to empower new scientific approaches. This trend is expected to largely increase in the future driven also by a large number of start-ups that will use data to make new markets.

This radical change require appropriate skills not only for the management of data but also for their exploitations. Training on basic notions for supporting these activities should be included in all the Educational Curricula while new professional profiles, like data steward, for the curation and preservation of data, and data scientists, for the development of software services for data integration and processing and analytics, should be formed by Universities.

Recommendation 7: regarding Axis 2 Education, the HLRC recommends INCoDe.2030 leverage their position to support networks that regularly bring together employers and teachers together to exchange ideas and review the computing curriculum. This can ensure teaching stays up to date, that other school subject qualifications provide a foundation for a broader range of digital careers.

The HLRC views INCoDe.2030’s position as network facilitator to be of utmost importance in bringing cross-disciplinary actors together for the common purpose of improving digital skills. INCoDe.2030 should play a key role in cultivating and sustaining dialogue and connections between future employers (from across a range of sectors) and educators on topics pertaining to digital skills, to ensure national ICT curriculum guidelines for schools remain relevant. Supporting such networks can help ensure students of all ages have ample awareness of the range of digital careers available to them, and the most current knowledge of the digital skills required to enter them.

Recommendation 8: regarding Axis 2 Education, continue to support and promote engagement for women with digital through innovative robotics and coding competitions.

The HLRC was very impressed with the range of opportunities created for students to enter into the world of robotics through support of school clubs and providing financial assistance for teams to travel and participate in national competitions. The HLRC recommends these – why disengagements continue to expand, with special resources and attention in action plans allocated to increasing activities that can redress the gender imbalance in take-up of these opportunities, particularly in robotics. INCoDe.2030 must use its position to ensure that knowledge and best practices gleaned from initiatives aimed at tackling digital inclusion for women, particularly those falling under its own umbrella, are shared, available to, and implemented across all Axes.

Recommendation 9: regarding Axis 3 Qualification, continue to benefit from regional implementation via Polytechnic institutes and look to expand industry partnerships, which provide crucial work experience opportunities alongside study.

Polytechnic Institutes, through their existing links with industry and small businesses and by nature of their regional presence are already playing a key role in delivering much of the transformative digital skill building the INCoDe.2030 initiative seeks. A systematic and continued partnership between INCoDe.2030 and Polytechnics, supporting them in their efforts to grow more industry links and expand education initiatives could help accelerate digital skill transformations for the national economy.

Recommendation 10: regarding Axis 4 Specialisation, continue to support the role of Polytechnic Institutes as a key player and adapt a similar approach in other academic institutions/Universities

While the role Polytechnic Institutes have to play in the transformation of digital skills attainment across Portugal are very clear, less clear to the HLRC is the role of Universities into the initiative. As major actors into research and innovation, we recommend the presence of Universities into INCoDe.2030 is improved. This could be addressed through the Strategy & Action planning process (see Recommendation 15 and 16).

Recommendation 11: regarding Axis 5 Research, the HLRC recommends supporting the convergence between High Performance Computing (HPC), High Performance Data Analytics (HPDA), Artificial Intelligence (AI) and Cybersecurity.

Today, the convergence between High Performance Computing, High Performance Data Analytics and Artificial Intelligence makes the ability to use of large computing facilities mandatory. The converged infrastructures of data storage and processing have to be accessible to all scientific communities, as well as private sector. Special attention needs to be paid to the provision of training, to ensure a wide usage of these highly added value facilities.

Recommendation 12: regarding Axis 5 Research, promote FAIR (Findable, Accessible, Interoperable, Reusable) research data management.

The FAIR (Findable, Accessible, Interoperable, Reusable) principles for data management delineate the new reference concerning how research data should be handled in order to make them usable and reusable across scientific challenges and sectors. A systematic promotion of these principles should be addressed to each research project and, more in general, to all the publicly funded projects. In particular, research projects should be asked to produce a Data Management Plan in their early phases of their life. This is expected to specify how data will to be handled both during the project lifetime and after it is completed. This plan should also address properties like data quality and legal, ethical and integrity aspects of the managed data. Actions to monitor the implementation of the plan should also put in place to ensure that these data can be reused, to the extent that their terms of use allow, not only in the research framework but also in all the activities of the new data-driven economy.

Recommendation 13: regarding Axis 5 Research, Promote and facilitate interdisciplinary convergences at institutional levels for stimulation of innovation.

Innovation and societal challenges more and more require interdisciplinary approaches. This change requires that Research Communities and institutions are facilitated in establishing and profiting from collaborations across domains. Actions aimed at raising awareness on how particular domains may contribute to address certain societal challenges should be put in place to inform researchers of what they can gain from interdisciplinary collaborations. Research career evaluation criteria should be revised to promote, and not to discourage, such collaborations. Today, research communities work in silos. One effect of this is that they evaluate with a higher rate articles published in their domain specific journals than in journals of other domains. This clearly discourage scientists from focusing their research on interdisciplinary challenges.

Recommendation 14: regarding Axis 5 Research, Ensure the national programs are linked to the European one (participation to Horizon Europe and Digital Europe).

The Communication from the Commission to the European Parliament “European Cloud Initiative - Building a competitive data and knowledge economy in Europe”³ issued in 2017 has become a reference regarding the European digital strategy. It establishes Open Science as one of the major objectives to be collectively addressed at European level and introduces the European Open Science Cloud and the EuroHCP initiatives as major instruments to achieve this goal. Since then many steps have been performed to shape how these instruments should be implemented and governed. All the steps done so far confirm the central role that Members States will have in these processes. The forthcoming Research Framework Program Horizon Europe, as well as the Digital Europe Program, will further move in this direction also for other

³ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: European Cloud Initiative - Building a competitive data and knowledge economy in Europe (COM(2016) 178 final) <https://ec.europa.eu/digital-single-market/en/news/communication-european-cloud-initiative-building-competitive-data-and-knowledge-economy-europe>

important common objectives like the Strategy on Artificial Intelligence and Cybersecurity. It is thus of fundamental importance that also Portugal actively participates in shaping the European Landscape in order to valorize its digital and human resources and to enable its researchers to profit at the best from what the new European framework will offer.

2.2.Strategy & Action Planning

We recommend organizing very formally the implication and participation of each Ministry involved in the INCoDe.2030 Project into a series of 3- to 4- year Strategic Plans. It is essential to agree and share well understood strategic objectives in order to ensure the success of the initiative. Formally agreed short term Strategies (Example, INCoDe.2030 Strategy 2020-2023) which outline clear achievable and measurable goals over a shorter duration of time, and include an associated Action Plan for the defined period will help ensure delivery of the vision is attained. Organizing the work of INCoDe.2030 in this way will better enable the short-term benefits the country requires, for instance to retain and grow Industry, while laying down important building blocks for long-term aims.

Recommendation 15: the HLRC recommends developing and agreeing shorter term Strategic Plans, at the right level and frequency (minimum 2-3) over the next 10 years to ensure continuous review. Each Strategy should state shared priorities and deliverables along with measures of success and timelines across all Axes for the designated period the plan covers.

The committee recommends INCoDe.2030 now look to break down the very clearly articulated vision for 2030 into a series of actionable short-term strategic plans. These short-term strategies must outline S.M.A.R.T (specific, measurable, achievable, relevant, and time-based) goals to ensure progress can be properly monitored, and success measured. Putting into place 3 to 4 year Strategies (or Strategic Plans) over the course of the next ten years, with input and commitment secured from all Ministries invested in the project, will help to focus efforts on tackling the country's most immediate concerns at any given time. We recommend these Strategic Plans be developed and formally agreed at the highest level of representation of each Ministry, with a review meeting held no more frequently than twice a year in a Project Council. Once goals are set and measures of success, i.e. Key Performance Indicators (KPIs), are understood by all, ensure that the right data is being collected from the outset so as to be able to measure success at the end of each period.

Recommendation 16: a detailed Action Plan must accompany every Strategic Plan.

While each Strategic Plan will contain the specific, measurable objectives, that INCoDe2030 is trying to achieve over a particular time period, the Action Plan will ensure the day-to-day activities are in place towards achieving these goals. The HLRC recommends Action Plans be coordinated and prepared by the Project Officer (see Recommendation 17) in close consultation with Axis Coordinators and other representatives from the participating Ministries. The Project Officer and their team will be responsible for overseeing the monitoring and successful

implementation of Action Plans and reporting back to the Project Council on progress towards goals.

2.3. Organization & Resources

The INCoDe.2030 initiative has already produced many significant and promising results. These results were achieved by a small team of highly motivated people, with a small amount of dedicated budget. In order to ensure a national diffusion of all these results that were obtained at a local or regional scale, we consider that the initiative has to be organized as a visible and auditable organization with resources sufficient to support its activities.

Recommendation 17: the HLRC recommends at a minimum, a full-time dedicated Project Officer, and support staff as necessary, be appointed to ensure the smooth running of the overall project, ideally an individual with formal project management and /or business analysis training.

A full-time dedicated Project Officer, and support staff, will be responsible for ensuring the successful development and delivery of the INCoDe.2030 initiative through a range of essential budgeting, coordinating, planning and reporting activities as outlined in the above recommendations.

Recommendation 18: a dedicated budget made available for the Project, drawn from participating Ministries, to support the coordination and implementation of projects.

The initiative requires a dedicated budget, coming from the Ministries involved, into it. This budget allocation, which the Project Officer is responsible for managing, has to cover the salaries and amenities of the project's team, as well as the execution of activities undertaken by INCoDe.2030 to support delivery of the Strategy Plans as agreed and outlined in Action Plans (such as networking events, grant giving, etc.). A Total Cost vision is essential for the initiative, in order to follow its progression and to measure its impact.

Recommendation 19: continue to seek external review via a High Level Review Committee, in line with the timing of Strategic Plan stages.

Keeping an external point of view is mandatory for long-term projects gathering many different actions. The HLRC is in charge of giving advice and recommendations to the Project Council. In this first year of the High Level Review Committee, the commitment required the group to travel to Portugal on three separate occasions, deliver two separate conference presentations, and provide both an interim and final report written collectively over the course of 10+ days. As these visits are resource heavy for all involved, including the INCoDe.2030 project itself, the committee recommends future HLRC review visits are planned in line with appropriate stages of Strategic Plan implementation and review, for instance either at the midway point or

end of each 3-4 year strategy, whichever may prove most beneficial to the project. In this way, by lessening the frequency, the Project Officer, their team, and the INCoDe.2030 project itself are given more time and space to focus on delivering on the actions at hand.

Recommendation 20: members of the INCoDe.2030 High Level Review Committee should rotate as necessary to ensure diversity of expertise and representation (private sector/industry, schools, etc.) relevant to each Strategic Plan delivery period.

Depending on priorities that will be decided by the Project Council along the Project duration, the qualification and number of experts should evolve accordingly to ensure maximum benefit to the individual Axes.

3. Summary of Recommendations

Vision & Axis

- R1: HLRC recommends INCoDe.2030 benefit from continuous support from Government.
- R2: Focus efforts on supporting and bolstering cross-disciplinary and cross-sector networking activities across all Axes.
- R3: Play a central role in capturing project details, best practices and other useful resources from initiatives underway across the Axes and turning this into actionable data.
- R4: Regularly review Axis/Action Lines to ensure they are continuously meeting the needs of the initiative.
- R5: Ensure concrete actions to address the important issues such as gender balance, and unconscious bias, are enacted across all Axes, not only Inclusion.
- R6: Explicitly include data sharing, management and exploitation across all the axes as these specific ICT skills will become mandatory in all research areas (data-driven research) and innovation (data economy).

On the Individual Axis

- R7: Regarding Axis 2 Education, the HLRC recommends INCoDe.2030 leverage their position to support networks that regularly brings together employers and teachers together to exchange ideas and review the computing curriculum to ensure teaching stays up to date, and to help ensure that other school subject qualifications provide a foundation for a broader range of digital careers.
- R8: Regarding Axis 2 Education, continue to support and promote engagement with digital through innovative robotics and coding competitions.
- R9: Regarding Axis 3 Qualification, continue to benefit from regional implementation via Polytechnic institutes and look to expand industry partnerships, which provide crucial work experience opportunities alongside study.
- R10: Regarding Axis 4 Specialisation, continue to support the role of Polytechnic Institutes as a key player and adapt a similar approach in other academic institutions/Universities.

- R11: Regarding Axis 5 Research, the HLRC recommends supporting the convergence between High Performance Computing (HPC), High Performance Data Analytics (HPDA), Artificial Intelligence (AI) and Cybersecurity.
- R12: Regarding Axis 5 Research, promote big data and FAIR (Findable, Accessible, Interoperable, Reusable) management.
- R13: Regarding Axis 5 Research, promote and facilitate interdisciplinary convergences at institutional levels for stimulation of innovation.
- R14: Regarding Axis 5 Research, ensure the national programs are linked to the European one (participation to Horizon Europe and Digital Europe).

Strategic Planning

- R15: The HLRC recommends developing and agreeing shorter term Strategic Plans, at the right level and frequency (minimum 2-3) over the next 10 years to ensure continuous review. Each Strategy should state shared priorities and deliverables along with measures of success and timelines across all Axes for the designated period the plan covers.
- R16: A detailed Action Plan must accompany every Strategic Plan.

Organization & Resources

- R17: The HLRC recommends at a minimum, a full-time Project Officer a full-time dedicated Project Officer, and support staff as necessary, be appointed to ensure the smooth running of the overall project, ideally an individual with formal project management and /or business analysis training.
- R18: The committee recommends a dedicated budget made available for the Project, drawn from participating Ministries, to support the coordination and implementation of projects and actions.
- R19: INCoDe.2030 should continue to seek external review via a High Level Review Committee in line with the timing of Strategic Plan stages.
- R20: Members of the INCoDe.2030 High Level Review Committee should rotate as necessary to ensure diversity of expertise and representation (private sector/industry, schools, etc.) relevant to each Strategic Plan delivery period.

4. Conclusion

The committee found that INCoDe.2030 represents a concrete commitment to addressing a major challenge, and constitutes a useful vehicle through which Portugal can transform the Portuguese economy. It is an inescapable program, in its early days, and a long-term action that will benefit from continuous support and regular action planning.

Considering the size of the core implementation team, exceptional work has been undertaken thus far in setting up and supporting the various Axes and their work. The committee noted a strong commitment to deliver on the aim of INCoDe.2030, from all levels, with involvement of all the regions rather than centralising activities only in the major cities. Strong links between Higher Education and Industry have been made and supported, with Polytechnics playing a key role. The ambitiousness of the Research Programme is to be commended.

In this review report, we have made some recommendations related to actions belonging to the different Axis of the initiative. However, more than these specific recommendations, we would like to stress our three main recommendations:

- **The first one is to go further. Nothing we have seen has to be stopped, and all the actions already underway could be expanded.**
- **The second one is to organize the initiative into a Project, with its own governance layer, its own budget and human resource, and its own organization.**
- **The third is to commit to outlining a series of short-term strategies with action plans in order to ensure success can progress and be measured. These are the conditions of a new start of INCoDe.2030.**

Finally, we would like to warmly thank the team who have hosted and accompanied us on this adventure, particularly Pedro Guedes de Oliveira, Nuno Feixa Rodrigues, Sofia Marques da Silva and Rui Lourenço.

We would like to address a special thanks to Rogério Carapuça, Commissioner of the “INCODE Digital Skills Forum”, and to Mr Minister Manuel Heitor who gave us the opportunity to serve in this Committee and to discover this initiative and its ambition for Portugal.

Appendix A

Preparing the visit of the High Level Group that will assess the activities of INCoDe.2030

INCoDe.2030 is the National Initiative for the development of Digital Competences, a government programme initiated in 2017 and led by the Ministry of Science Technology and Higher Education and the Ministry of the Presidency and Administrative Modernisation, but involving also the Ministry of Education, the Ministry of Economy and the Ministry of Labour, Solidarity and Social Security.

The initiative has been designed to last along the next decade and is broad in its purposes: from *Inclusion* – aiming at a population whose exclusion comes from age, lack of qualifications, isolation and even gender –, to *Education* – aiming at providing the young generation with the tools and knowledge they need to be actively engaged in the digital transformation of Society –, *Qualification* – the goal of which is to provide people already in the work market, active or unemployed, with the required digital qualifications to get better jobs and occupy the large number of vacancies in the area –, *Specialisation* – actively using the higher education system to provide the ICT specialists that a growing number of companies require –, and finally, *Research* – leading the Science and Technology sectors, both research institutions, universities and companies, in areas fundamental to keep Portugal as a front runner in things like Advanced Computing or AI.

After two years of action, INCoDe.2030 needs to be assessed and submitted to evaluation and advice and, for that purpose, we selected a set of initiatives we would like to show, covering the described goals, so that a fair view of INCoDe can be obtained, and the justification of which is the following (organized by action lines):

- Concerning *Inclusion*, we¹ will visit 2 Creative Communities for Digital Inclusion (CCDI) in St. Tirso and Barcelos, that have been put to work with the support of local authorities (Monday morning) and the whole group will see how we have established a cooperation with the Polytechnic Institute of Viseu to develop a Digital Self-Assessment Tool as well as the efforts done together with a tech company (BizDirect) to promote the presence of more girls in ICT (this will be done in Viseu, on Tuesday).
- Concerning *Education*, on Wednesday morning we will have a presentation of what *Ciência Viva* is doing in Science Education (<https://www.sciencesquared.eu/institutions/ciencia-viva-agencia-nacional-para-cultura-cientifica-e-tecnologica>) particularly its involvement in the *Movimento Código Portugal* (Portugal Coding Move), and after lunch, part of the group will move to see an example of a Digital Lab, local initiatives in public schools that are supported by the ministry of Education.
- Concerning *Qualification*, on Wednesday, we will attend two different examples of actions: in the morning, in Leira Polytechnic Institute a presentation of what is being done to qualify workers under the program Industry4.0, supported by the ministry of Economy, and after lunch, part of the group will attend a presentation at IEFP (Institute for Employment and Professional Training) where a global strategy for digital qualification is being carried out.
- Concerning *Specialisation*, on Monday after lunch part of the group will contact a re-skilling program taking place at the Polytechnic Institute of Porto in close collaboration with Porto Tech Hub (a grouping of technological companies) which aims at converting STEM degree holders to ICT specialists. We will contact students, professors and representatives of companies. On Tuesday, in Viseu, we will discuss the involvement of companies in TeSP (which are short higher education programs taught at Polytechnic Institutes) taking as example a concrete instantiation between Viseu Polytechnic and Deloitte.
- Finally, concerning *Research* part of the group will visit, on Monday morning, MACC (the Minho Advanced Computing Centre, in Braga) and all of us will have the chance to discuss the Portuguese Strategy for Artificial Intelligence, with the National Coordinator.
- There are also the visits to two international companies (Altran and Bosch) that have R&D facilities in Portugal. Indeed, these visits don't match a specific action line or INCoDe.2030. However, they are good examples of an integrated policy the Ministry of Science has been promoting, concerning all the aspects for a more digital society: they can show us the type of specialised professionals they were able to find in Portugal and attract from other countries, but also of the problems they have in expanding and, therefore, their need for more qualified human resources; they will explain their links to Higher Education Institutions both for research and by influencing the curriculum design of ICT courses and cooperate in teaching special subjects, as well as with IEFP developing specific professional training programmes; finally they can explain their involvement in two CoLabs, a new form of cooperative R&D institutions that join companies and research centres, and has been launched last year.

¹ In order to allow more visits, sometimes we have parallel visits and we suggest to split the group. According to our feeling, while Laurent is visiting the companies (Altran and Bosch) and MAAC, Dora and Donatella would be visiting the CCDI and SWITCH but we leave to you the decision.

We should start by apologizing to be presenting you such a heavy and dense programme that will make you go from one place to another, moving around the country in three days. Fortunately, Portugal is small enough so that all these trips can be made by car. But to give a fair idea of what has been done with such a broad agenda as INCoDe's is, we have thought we had to do things, this way.

Visit Schedule

16 Jun	
Arrival at Porto	
Nora McGregor	TP 1343; London; 16:55
Laurent Crouzet	TP 457; Paris; 21:00
Donatella Castelli	KL 1715; Amsterdam; 22:15
17 Jun	
Departure to Braga – 8:00	Departure to Sto Tirso - 8:30
MAAC – 9:00	St. Tirso - Elderly Inclusion
Brga - Porto - 10:30	Barcelos - Youth at risk and minorities, 11.30
Altran (VN Gaia) – 11:30	
Lunch	
BOSCH Innovative Car HMI – 15:00	Departure to Porto
Departure to Porto – 16:30	SWitCH - Digital Reskilling
17:30	National AI Strategy 2030
20:00	Dinner and stay in Porto
18 Jun	
08:30	Departure to Viseu
10:00	Short Cycle Courses - Deloitte
11:30	Girls in ICT - BizDirect
13:00	Lunch at Viseu
14:30	Digital Self Assessment Tool
15:30	Graduate Reskill (IEFP)
17:00	Departure to Leiria
19:00	Dinner and stay in Leiria
19 Jun	
09:00	IP Leiria - Industry 4.0 Academy
10:30	Departure to Lisbon
11:30	Gência Viva - "Movimento Código Portugal"
13:00	Lunch
15:00	IEFP - Digital Qualification
15:00	Visit to Secondary School
17:00	Wrap up with at the Ministry of Science Technology and Higher Education
20:00	Dinner with Minister Manuel Heitor